

Prevalence and Factors Associated With Genital Chlamydial Infections among Women Attending the Gynaecology Clinic At Mbarara Regional Referral Hospital

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Abstract

Background: Chlamydia trachomatis is responsible for the most common bacterial sexually transmitted bacterial infection. The largest burden is in low income countries. These organisms are not screened for in Mbarara, and information about the burden of disease is not available. This study aimed at establishing the prevalence and factors associated with genital Chlamydia infection among women of reproductive age attending the gynecology clinic at Mbarara Regional Referral Hospital.

Methods: In a cross-sectional study done at Mbarara Regional Referral Hospital, 324 women aged 15-49 years were consented and interviewed. Data on socio-demographics, maternal medical conditions, obstetric and gynaecological factors and endocervical swabs were collected consecutively from November 2015 to January 2016 from women attending gynaecology clinic at Mbarara Regional Referral Hospital. Samples were analysed using a CTK biotech Chlamydia kit, which is a rapid immunoassay test for the detection of genital chlamydial antigen in urogenital samples. Results were analysed using STATA 13, Logistic regression models were used to estimate level of significance, the odds ratios (OR) and 95 % CI of the association between the factors and genital infections. Significance was set at a p value of <0.05.

Results: Of the 324 samples collected, 86 were positive for C. trachomatis antigen giving a prevalence rate of 26.5%. Of all the associated factors examined, only type of residence was significantly associated with C. trachomatis infection ($p=0.0413$) with those living in peri-urban areas at greater risk of infection (aOR 2.4 95%CI 1.22-4.82). Other social demographic, medical obstetric and gynecological factors were not associated with C. trachomatis infection. No symptom or clinical sign was significant for the infection.

Conclusion and recommendation: The prevalence of genital C. trachomatis infection among women attending gynecology clinic is high. Genital Chlamydia infection has no predictive signs and symptoms in our setting. Screening of women in reproductive age should be encouraged.

Keywords: Genital Chlamydia *trachomatis*, endocervical swabs, gynaecology clinic.

Introduction

Genital Chlamydia infection is a sexually transmitted infection (STI). It is caused by Chlamydia trachomatis which is a gram negative bacterium obligate intracellular parasite. More than 499 million new cases of curable sexually transmitted infections (gonorrhoea, syphilis, Chlamydia trachomatis and Trichomonas vaginalis) occur every year globally [1]. Chlamydia trachomatis is responsible for the most common bacterial sexually transmitted bacterial infection [2]. In 2005 10 million new infections of chlamydia in Africa [3].

Over ninety percent (90%) of the urogenital infections in women and fifty percent (50%) of the urogenital infections in men are asymptomatic [4, 5]. If undetected and not treated, genital Chlamydia infection can ascend to the upper genital tract and cause pelvic inflammatory disease (PID) and related sequelae (ectopic pregnancy and tubal factor infertility). In women 10% - 40% of PID cases are caused by Chlamydia trachomatis. 30-40% of PID cases result in infertility and 40-50% of ectopic pregnancies can be attributed to PID [6]. There is a probability of 16% that an episode of C. trachomatis infection will result in PID, [7]. Untreated genital infections (chlamydia and gonorrhoea) account for 85% cases of infertility in sub-Saharan Africa, [1]. C. trachomatis accounts for 22% of infertility in Africa, [8]. During pregnancy untreated Chlamydia infection can increase the risk for premature rupture of the membranes, low birth weight, chorioamnionitis, neonatal sepsis and conjunctivitis in new borns, [9]

Many developed countries have developed screening programs to check transmission and long term sequel of disease. Center for Disease Control in United States recommends annual screening of genital C. trachomatis, infection of all sexually active females aged below twenty six years and older women with risk factors and all pregnant women, [10]. In developing countries C. trachomatis is not routinely screened the actual burden of the disease is not known Management is based on syndromic approach yet studies have shown a symptoms have a low sensitivity and positive predictive value for detecting chlamydia infections, [11]. This study aims at establishing the prevalence of Chlamydia trachomatis infection among women visiting gynecological clinic. It will help clinicians and government to decide on whether to embark on community screening of Chlamydia.

Materials and methods

Study setting. The study was carried out at gynecology clinic at Mbarara Regional Referral Hospital. The hospital is a teaching hospital located in Western Uganda provides health care services to over ten districts in South-western region. The hospital also extends services to other districts that include: Mubende, Masaka, and some parts of the neighbouring countries like the Republic of Rwanda, Burundi, and Democratic Republic of Congo and Northern part of Republic of Tanzania. The clinic registers 300 patients per month.

Study design This was a cross sectional study where 324 eligible women attending the gynaecology clinic were sampled, consented, interviewed, examined and endocervical swabs were taken off for analysis with the aim of identifying evidence of genital tract infections

Sample collection and analysis. Endocervical swabs were collected from consented participants using sterile plastic-shaft Dacron swabs. Collected samples were analyzed using Chlamydia Rapid Test Device –(CTK BioTech, Inc USA). The Chlamydia Rapid Test Device (Swab/Urine) is a qualitative, lateral flow immunoassay for the detection of Chlamydia antigen from female cervical swab, male urethral swab. In this test, antibody specific to the Chlamydia antigen is coated on the test line region of test. During testing, the extracted antigen solution reacts with an antibody to Chlamydia that is coated onto particles. The mixture migrates up to react with the antibody to Chlamydia on the membrane and generates a coloured line in the test line region. The presence of this coloured line in the test line region indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a coloured line will always appear in the control line region. The test procedure was conducted according to the manufacturer's instruction manual.

Statistical analysis: The database was imported into STATA 13 soft-ware for analysis. The prevalence of genital chlamydia was established as a proportion of patients diagnosed with Chlamydia out of all enrolled patients attending gynecology clinic at MRRH. Proportions were used to describe the clinical manifestations of patients diagnosed with genital chlamydia.

A bivariate analysis was done to establish all factors that have a significant relationship with having genital chlamydia infections, using logistic regression, at a significance level of 5%. Their crude odds ratios with 95% Confidence intervals were generated.

All statistically significant and biologically credible factors were subjected to multiple logistic regressions to allow adjustment for any confounding.

Results

Respondents' characteristics

The study participants had a mean age of 32 ± 7 years. The mean age at 1st sexual intercourse was 18 ± 3 years. Most respondents reported one sexual partner in last 1 year. Majority have symptoms suggestive of genital infections (64.2%). A large percentage of participants (91.3%) knew about contraceptive methods but only 45.4% were using contraceptives. (see table 1)

Prevalence of genital C.trachomatis

The proportion of genital chlamydia infection among women of reproductive age attending gynaecology clinic was 26.5 (95% CI 21.7-31.4%).

Factors associated with genital *C.trachomatis*.

The study showed that only residency type was significantly associated with genital chlamydial infection ($p=0.0413$). Those staying in peri-urban areas were more likely to be infected with genital chlamydia infection (Crude OR. 2.3, 95% CI-1.17-4.54)(Table 2). The study showed no behavioural characteristics was significantly associated with genital chlamydial infection. None of the obstetric factors had a significant association genital chlamydia infection. 62.8% and 52.3% of the women with genital chlamydia infection had reported current and previous symptoms of genital tract infections respectively. Most women diagnosed with genital chlamydia infection (61.6%) were not using contraceptives.(Table 3)

Table 1 showing socio-demographic characteristics of participants

Characteristics	N	n (%)
Mean age in years (sd)		32.2 (7.8)
Age in years,	324	
<25		56 (17.3)
25-34		137 (42.3)
35-49		131 (40.4)
Residency type	308	
Rural		173 (56.2)
Peri-urban		47 (15.3)
Urban		88 (28.6)
Level of education,	323	
No formal education		16 (5)
Primary		167 (51.7)
Secondary		92 (28.5)
Tertiary		48 (14.9)
Type of occupation,	318	
Unemployed		44 (13.8)
Peasant farmer		114 (35.9)
Professional		41 (12.9)
Business		83 (26.1)
Skilled manual		36 (11.3)
Income in Ug. Sh	316	
<90000		123 (39.0)
>=90000		193 (61.1)
Marital status	322	
Single		22 (6.8)
Co-habiting		66 (20.5)
Married monogamously		164 (51.0)
Married polygamously		31 (9.6)
Widowed		16 (5.0)
Divorced/separated		23 (7.1)
Age at 1 st intercourse,	321	
<15		12 (3.7)
15-17		113 (35.2)
>=18		196 (61.1)
Number of sexual partners		
In last 12 months	324	
0		27 (8.4)
1		272 (84.2)
>=2		24 (7.4)
Previous history of genital infection symptoms,	324	171 (52.8)
Current history of genital infection symptoms	321	206 (64.2)
Currently using contraception,	293	133 (45.4)
Clinical examination findings	324	
Genital ulcers		17 (5.3)
Vaginitis		100 (30.9)
Supra pubic pain		72 (22.2)
None		135 (35.2)

The participants had a mean age of 32.2years. Most lived in rural areas (56.2%).

Table 2: showing association of socio-demographic characteristics with genital Chlamydia infection.

Variable	No chlamydia n(%)	Chlamydia n(%)	COR [95% CI]	p- value
Age in years				0.6237
<25	44 (78.6)	12 (21.4)	1	
25-34	99 (72.3)	38 (27.7)		
>35	95 (72.5)	36 (27.5)		
Residency type				0.0413**
Rural	131 (75.7)	42 (24.3)	1	
Peri-urban	27 (57.5)	20 (42.6)	2.3 [1.17-4.54]	
urban	67 (76.1)	21 (23.9)	0.9 [0.54-1.78]	
Tribe.				0.3272
Nkore	201 (73.9)	71 (26.1)	1	
Ganda	16 (72.7)	6 (27.3)	1.1 [0.40-2.82]	
Kiga	12 (85.7)	2 (14.3)		
other	9 (56.3)	7 (43.6)	0.4 [0.10-2.16] 2.2 [0.79-6.13]	
Level of education				0.1979
No formal education	15 (93.8)	1 (6.3)	0.2 [0.02-1.50]	
Primary				
Secondary	120 (71.9)	47 (28.1)	1.1 [0.51-2.17]	
Tertiary	67 (72.8)	25 (27.2)		
	35 (72.9)	13 (27.1)	1.0 [0.46-2.20]	
Type of occupation			1	0.8697
Unemployed	30 (68.2)	14 (31.8)	1.12 [0.45-2.84]	
Peasant farmer	85 (74.6)	29 (25.4)	0.8 [0.37-1.82]	
Professional	29 (70.7)	12 (29.3)	1	
Business	62 (74.7)	21 (25.3)	0.8 [0.36-1.89]	
Skilled manual	28 (77.8)	8 (22.2)	0.7 [0.24-1.94]	
Income in Ug. Sh				0.7314
<90000	92 (74.8)	31 (25.2)	0.9 [0.5-1.53]	
>=90000	141 (73.1)	52 (26.9)	0.4 [0.27-0.51]	
Marital status				0.5472
Single	14 (63.6)	8 (36.4)	1.5 [0.59-3.84]	
Co-habiting	47 (71.2)	19 (28.8)	1.1 [0.57-2.01]	
Married monogamously	119 (72.6)	45 (27.4)	1	
Married polygamously	25 (80.7)	6 (19.4)	0.6 [0.24-1.65]	
Widowed	14 (87.5)	2 (12.5)	0.4 [0.08-1.73]	
Divorced/separated	17 (73.9)	6 (26.1)	0.9 [0.35-2.52]	
Duration of relationship				0.0917
<2	18 (90.0)	2 (10.0)	1	
2-4	41 (77.4)	12 (22.6)	2.6 [0.53-13.0]	
>=5	135 (70.3)	57 (29.7)	3.8 [0.85-16.92]	

In this study type of residence was significantly associated with genital tract infection. Women staying in peri-urban areas were two times more likely to have the infection than those staying in rural areas.

Table 3: showing association of behavioural, obstetric and gynaecological characteristics with genital Chlamydia infection

Variable	No chlamydia n(%)	Chlamydia n(%)	COR [95%CI]	p-value
Drink alcohol				0.1912
No	203 (72.2)	78 (27.7)	1	
Yes	35 (81.4)	8 (18.6)	0.5 [0.26-1.34]	
Age at 1 st intercourse				0.1853
<15	11 (91.7)	1 (8.3)	0.3 [0.03-2.11]	
15-17	79 (69.9)	34 (30.1)	1.2 [0.75-2.10]	
>=18	146 (74.5)	50 (25.5)	1	
Number of sexual partners				
In last 3months				0.7636
0	36 (75.0)	12 (25.0)	1	
1	193 (72.8)	72 (27.2)	1.1 [0.55-2.27]	
>=2	9 (81.8)	2 (18.2)	0.6 [0.12-3.52]	
In last 6months				0.6486
0	24 (75.0)	8 (25.0)	1	
1	200 (72.7)	75 (27.3)	1.1 [0.48-2.61]	
>=2	14 (82.4)	3 (17.7)	0.6 [0.15-3.83]	
In last 12 months				0.9773
0	20 (74.1)	7 (25.9)	1	
1	199 (73.2)	73 (26.8)	1.0 [0.43-2.58]	
>=2	18 (75.0)	6 (25.0)	1.0 [0.15-0.83]	
Parity				0.1748
0	25 (80.7)	6 (19.4)	1	
1-2	86 (79.6)	22 (20.4)	1.1 (0.39-2.92)	
3-4	51 (68.0)	24 (32.0)	2.0 (0.71-5.41)	
>=5	76 (69.7)	33 (30.3)	1.8 (0.68-4.82)	
Previous history of genital infection symptoms	126 (73.7)	45 (26.3)	1 (0.60-1.60)	0.9219
Currently have symptoms of genital infection	152 (64.7)	54 (62.8)		0.754
Do you know about contraception	217 (73.8)	77 (26.2)	0.7 (0.33-1.73)	0.5039
Are you using contraception	102 (75.6)	33 (24.4)	0.8 (0.49-1.36)	0.4340
HIV serology				0.5295
Negative	211 (74.0)	74 (26.0)	1	
Positive	27 (69.2)	12 (30.8)	1.2 [0.61-2.63]	

There were no association between behavioural obstetric and gynaecological characteristics with genital Chlamydia infection

Table4: showing adjusted Odds Ratios of factors associated with genital Chlamydia infection

Characteristic	adjusted OR [95%CI]	p-value
Age category in years,		
<25	1	
25-34	1.4 [0.68-3.11]	0.332
35-40	1.5 [0.71- 3.32]	0.278
Residency type		
Rural	1	
Peri-urban	2.4 (1.22-4.82)	0.011
urban	0.9 (0.53-1.79)	0.943

Residency type was significantly associated to genital chlamydial infection, with women staying in peri –urban areas more likely to be infected.

Table5: Clinical presentations of genital Chlamydia infection

Characteristics	Sample size N	No Chlamydia n(%)	Chlamydia n(%)	p-value
History of Abortion	324	59 (24.8)	13 (15.1)	0.064
History of Ectopic pregnancy	324	8 (3.4)	3 (3.5)	0.956
History of I.U.F.D	324	4 (1.7)	4 (4.7)	0.128
History of L.B.W	324	1 (0.4)	1 (1.2)	0.451
History of PROM	324	2 (0.8)	3 (3.5)	0.088
Current history of genital infection symptoms	321	64.7	62.8	0.754
Reasons for medical consultation				
Abnormal vaginal discharge	324	61 (25.6)	16 (18.6)	0.190
Lower abdominal pain	324	126 (52.9)	49 (57.0)	0.520
Infertility	324	4 (1.7)	4 (4.7)	0.128
Genital itching	324	17 (7.1)	9 (10.5)	0.331
Abnormal uterine bleeding	324	22 (9.20)	5 (5.8)	0.324
Dysuria	324	13 (5.5)	8 (9.3)	0.215
Genital sores	324	3 (1.3)	0 (0.0)	0.296
Vulvar warts	324	2 (0.8)	1 (1.2)	0.789
Amenorrhea	324	1 (0.4)	0 (0.0)	0.547
Screening of CACX	324	4 (1.7)	1 (1.2)	0.738
Family planning	324	3 (1.3)	1 (1.2)	0.944
Pelvic mass	324	4 (1.7)	0 (0.0)	0.226
Medical review	324	9 (3.8)	6 (7.0)	0.227
Recurrent abortions	324	0 (0.0)	2 (2.3)	0.018 ***0.072 (exact fisher test)
Perineal tear	324	2 (0.8)	0 (0.0)	0.394
Clinical examination findings				
Genital ulcers	324	15 (6.3)	2 (2.3)	0.156
Vaginitis	324	69 (29.9)	31 (36.1)	0.255
Supra pubic tenderness	324	52 (72.2)	20 (27.8)	0.788

None of the clinical presentations was predictive of genital chlamydial infection

Discussion

The prevalence of 26.5% among women attending gynecology clinic is high. Similar results were found in India 26% among symptomatic and 21% among asymptomatic patients [12] and among Surinamese living in the Netherlands visiting high risk STI clinic 20% [13].

This prevalence is lower than those found in Jos Nigeria, South Eastern Nigeria and Zaria Nigeria. 56%, 40.7, and 38% respectively [14-16]. The difference may be explained due to different study settings and Laboratory methods. Whereas in this study we used rapid Chlamydia antigen test to detect infection, Okoror et al., used culture method which is more sensitive. Tukur et al., performed the study in infertility clinic while this study was in general gynaecology clinic. *C. trachomatis* is known to cause tubal factor infertility these may explain the high prevalence.

Its higher than the prevalence found in Mozambique 8% [17], North Western Nigeria 9.6% [18], North Western Tanzania 12% [11] Kenya 2.8% [19] and 10% among pregnant women at Mbarara regional referral hospital (Ouna et al. 2010) (unpublished data). These were community studies Whereas this study was hospital based study.

Factors associated with genital Chlamydia infection

In this study, only place of residency was significantly associated with genital Chlamydia infection with those living in peri-urban areas being at increased risk, this concurs with systemic review of studies done in UK which showed *C. trachomatis* is more significant in areas of deprivation, [20]. Residents in peri-urban areas demonstrate a more risk sex behavior compared to residents of other areas. [21]. This may explain the increased risk of infection among residents of peri-urban areas

In contrast to this study, previous epidemiological studies on chlamydial infection have identified a variety of risk factors, including the, an age under 25 years, number of partners, contraceptive use, young age at first intercourse, previous poor pregnancy outcome [11, 22-25]. The difference may be explained different in population characteristics, majority of our participants were above 25 years, had one sexual partner in the last 12 months and had 1st sexual intercourse at 18 years and above. Few participants were using condoms.

But this study like other studies done in southern Mozambique, Brazil, and Ghana no statically significant associated of these factors with genital Chlamydia infection was observed [17, 26, 27]

Clinical presentation of genital Chlamydia infection

In this study we found no single symptom or clinical sign was significantly associated with genital Chlamydia infection. Similar findings were reported by studies done in Nepal among rural women, Kenya among HIV infected women, Botswana among pregnant women. [28-30] (Christian et al. 2005, G Marx, et al. 2010 Maria et al. 2007).

In a study done in Rakai found only 6% of patients with chlamydia were symptomatic [5]. In North Western Tanzania, the sensitivity of a syndromic diagnosis PID to detect *C. trachomatis*, was found to be 17% with positive predictive value (PPV) at 12%, [11]

Conclusion and recommendation

The prevalence of genital *C. trachomatis* infection among women attending gynecology clinic at MRRH is high (26.5%). living in peri-urban areas increases the risk of Chlamydia infection. There are no predictive signs and symptoms of genital Chlamydia infection in our setting. Women of reproductive age should be screened for *C. trachomatis*, to prevent adverse outcomes.

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