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Sociodemographic and Sexual Risk Factors Associated with Genital Chlamydia Trachomatis Infection among Clinic Attendees at Irrua Specialist Teaching Hospital

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ABSTRACT

Genital chlamydia infection is frequently asymptomatic, making the identification of risk factors important for targeted screening. This cross-sectional study included 472 participants from multiple hospital clinics and used questionnaires and laboratory testing with rapid kits and GeneXpert CT to determine the sociodemographic and behavioral factors associated with genital *C. trachomatis* infection. The findings showed that younger age, early coitarche, unmarried or widowed/divorced status, cohabitation, multiple sexual partners, inconsistent condom use, and previous STI history were associated with infection. Overall, demographic and sexual-behavior factors were important predictors of genital chlamydia infection and should be considered in developing targeted screening and prevention strategies

INTRODUCTION

Chlamydia infection is often silent, so behavior-based risk profiling is a practical way to identify individuals who need testing. Young age, early sexual debut, multiple partners, and unprotected intercourse are well-established risk factors for transmission (Stein *et al.*, 2008; Magnusson *et al.*, 2015; World Health Organization, 2020). Understanding the local pattern of risk is especially important in clinic populations, where many infections are not diagnosed on symptoms alone. Global evidence shows that chlamydia remains a major public health problem and often affects sexually active young adults (Newman *et al.*, 2015; Rowley *et al.*, 2019).

LITERATURE REVIEW

Chlamydia trachomatis is one of the most common bacterial sexually transmitted infections worldwide, and many infected persons remain asymptomatic for long periods (Newman *et al.*, 2015; Rowley *et al.*, 2019). Because of this silent nature, infected individuals may continue to transmit the organism while remaining at risk of complications such as pelvic inflammatory disease, infertility, ectopic pregnancy, and chronic reproductive tract morbidity (Haggerty *et al.*, 2010; Tsevat *et al.*, 2017). Several studies have shown that younger age is a risk factor for genital chlamydia infection, partly through the dynamics of partner selection. Younger women, and women whose partners are further from their own age, have shown elevated odds of chlamydial infection

compared with women whose partners are close to their own age, reflecting newer partnerships and reduced familiarity or negotiation power within the relationship (Stein *et al.*, 2008). Early sexual debut has also been linked to increased vulnerability: women who first had intercourse before age 15 show substantially higher odds of subsequent concurrent or closely spaced serial sexual partnerships in adulthood, extending the cumulative period of exposure to infection (Magnusson *et al.*, 2015). Multiple sexual partnerships and partner concurrency are widely reported determinants of chlamydia transmission. Sexual network structure influences how quickly infection spreads through a population, and people with more partners have a greater probability of exposure and reinfection (Aral, 2001). Studies from Nigeria and other African settings have repeatedly found that multiple partners, prior STI history, and inconsistent condom use are important predictors of infection (Nwankwo & Sadiq, 2014; Ajani *et al.*, 2017).

Condom use remains one of the most effective behavioral protections against sexually transmitted infections when used consistently and correctly. However, barrier protection is often underused because of misconceptions, low risk perception, reduced negotiation power, or preference for other contraceptive methods (World Health Organization, 2020). This makes condom non-use a key modifiable factor in STI control.

Symptoms alone cannot reliably diagnose chlamydia because infection frequently presents without obvious

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clinical signs, especially in women. PCR-based screening of women with no genital symptoms has confirmed chlamydial infection in a meaningful proportion of cases, underscoring the limits of symptom-based case-finding (Frej-Mądrzak *et al.*, 2018). This has led to increased support for laboratory-based diagnosis, including rapid molecular tests such as GeneXpert CT, which improve case detection and support timely treatment in resource-limited settings (Gaydos *et al.*, 2013; Harding-Esch *et al.*, 2017).

MATERIALS AND METHODS

This was a cross-sectional study involving 472 participants recruited from multiple hospital clinics at Irrua Specialist Teaching Hospital. The study population included both male and female clinic attendees, and data were collected using a pretested questionnaire alongside laboratory testing for *Chlamydia trachomatis* infection. The questionnaire captured sociodemographic variables, sexual behavior, and clinical history relevant to STI risk. Participants aged 15 years and above were interviewed using structured questionnaires. Information collected

included age, marital status, cohabitation, sexual debut, number of partners, condom use, and previous STI history. Laboratory confirmation was done using GeneXpert CT as the reference standard.

Participants were tested using rapid kits and GeneXpert CT, and the GeneXpert result was treated as the reference standard for analysis. Statistical associations between infection status and explanatory variables were evaluated to identify possible risk factors. The findings were interpreted in relation to sex-specific patterns, sociodemographic characteristics, and clinical symptoms.

RESULTS AND DISCUSSION

The study reports that infection was associated with coitarche before age 15, younger age group, unmarried status, widowhood or divorce, cohabitation, multiple sexual partners, non-use or inconsistent use of condoms, and previous STI history. These findings show that both demographic and sexual-network factors contributed to infection risk. The association with prior STI suggests either repeated exposure or persistent vulnerability in higher-risk sexual networks.

Table 1: Sociodemographic Characteristics of Study Participants (N = 472)

Variable	Category	Frequency (n)	Percentage (%)
Age Group (years)	<20	36	7.6
	20–30	252	53.4
	31–40	128	27.1
	>40	56	11.9
Gender	Male	229	48.5
	Female	243	51.5
Religion	Christianity	292	61.9
	Islam	180	38.1
Marital Status	Married	193	40.9
	Single	137	29.0
	Co-habiting	93	19.7
	Divorced	25	5.3
	Widowed	24	5.1
Family Setting (Married, n=137)	Monogamy	51	37.2
	Polygamy	86	62.8
Employment Status	Employed	142	30.1
	Unemployed	141	29.9
	Self-Employed	103	21.8
	Student	86	18.2
Level of Education	FLSC (Primary)	61	12.9
	SSCE (Secondary)	151	32.0
	Diploma	68	14.4
	Degree	192	40.7

Keys: FLSC = First Leaving School Certificate; SSCE = Senior Secondary Certificate Examination.

Table 1 summarizes the sociodemographic profile of the study population. The mean age of participants was 29.96 $\pm$ 8.02 years, with ages ranging from 16 to 56 years; over half (53.4%) fell within the 20–30-year bracket. Slightly

more participants were female (51.5%) than male (48.5%), and the majority identified as Christian (61.9%). Married participants formed the largest marital-status group (40.9%), followed by single participants (29.0%); among

the married, polygamous unions (62.8%) outnumbered monogamous ones. Degree holders made up the largest educational category (40.7%), and employment status was fairly evenly distributed across employed, unemployed, self-employed, and student categories.

Table 2: Prevalence of Genital Chlamydia Infection and Its Association with Sociodemographic Factors

Factor	Category	n	Positive n (%)	Negative n (%)	P-value
Age Group (years)	<20	36	11 (30.6)	25 (69.4)	0.02
	20–30	252	104 (41.3)	148 (58.7)	
	31–40	128	49 (38.3)	79 (61.7)	
	>40	56	11 (19.6)	45 (80.4)	
Gender	Male	229	90 (39.3)	139 (60.7)	0.33
	Female	243	85 (35.0)	158 (65.0)	
Religion	Christianity	292	104 (35.6)	188 (64.4)	NS
	Islam	180	71 (39.4)	109 (60.6)	
Marital Status	Married	137	49 (35.8)	88 (64.2)	0.001
	Single	193	72 (37.3)	121 (62.7)	
	Co-habiting	93	47 (50.5)	46 (49.5)	
	Divorced	25	3 (12.0)	22 (88.0)	
	Widowed	24	4 (16.7)	20 (83.3)	
Family Setting (Married)	Monogamy	51	15 (29.4)	36 (70.6)	0.03
	Polygamy	86	33 (38.4)	53 (61.6)	
Employment Status	Employed	142	48 (33.8)	94 (66.2)	0.001
	Unemployed	141	62 (44.0)	79 (56.0)	
	Self-Employed	103	24 (23.3)	79 (76.7)	
	Student	86	41 (47.7)	45 (52.3)	
Level of Education	FLSC	61	21 (34.4)	40 (65.6)	<0.001
	SSCE	151	58 (38.4)	93 (61.6)	
	Diploma	68	40 (58.8)	28 (41.2)	
	Degree	192	56 (29.2)	136 (70.8)	

Keys: NS = not statistically significant; $p < 0.05$ = statistically significant.

Table 3: Association Between Genital Chlamydia Infection and Clinical/Behavioral Risk Factors

Parameter	Category	n	Positive n (%)	Negative n (%)	OR (95% CI)	P-value
Age of First Sexual Debut	<15	205	73 (35.6)	132 (64.4)	NA	
	15–20	183	84 (45.9)	99 (54.1)		
	>20	84	18 (21.4)	66 (78.6)		0.001
Sexual Partners (Preceding Year)	1 partner	257	87 (33.9)	170 (66.1)	NA	
	2–3 partners	159	66 (41.5)	93 (58.5)		
	≥4 partners	56	22 (39.3)	34 (60.7)		0.27
Sexual Intercourse per Week	<3 times	194	83 (42.8)	111 (57.2)	NA	
	3 times	231	65 (28.1)	166 (71.9)		
	>3 times	47	27 (57.4)	20 (42.6)		<0.0001

>1 Partner in Last 3 Months	Yes	170	78 (45.9)	92 (54.1)	1.43 (1.13–1.80)	0.003
	No	302	97 (32.1)	205 (67.9)	Rf	
Condom Use at Last Encounter	Yes	85	17 (20.0)	68 (80.0)	0.49 (0.32–0.76)	<0.0001
	No	387	158 (40.8)	229 (59.2)	Rf	
Treated for STI (Last 3 Months)	Yes	123	66 (53.7)	57 (46.3)	1.72 (1.37–2.15)	<0.0001
	No	349	109 (31.2)	240 (68.8)	Rf	
Treated for UTI (Last 3 Months)	Yes	106	46 (43.4)	60 (56.6)	1.23 (0.95–1.59)	0.13
	No	366	129 (35.2)	237 (64.8)	Rf	
Knowledge of HIV Status	Yes	149	99 (66.4)	50 (33.6)	2.82 (2.24–3.53)	<0.0001
	No	323	76 (23.6)	246 (76.4)	Rf	
Urethral Discharge	Yes	73	50 (68.5)	23 (31.5)	1.98 (1.53–2.55)	<0.0001
	No	156	60 (38.5)	96 (61.5)	Rf	
Lower Abdominal Pain	Yes	133	63 (47.4)	70 (52.6)	1.43 (1.13–1.81)	0.004
	No	339	111 (32.7)	228 (67.3)	Rf	
Testicular Pain	Yes	55	36 (65.5)	19 (34.5)	1.82 (1.39–2.39)	<0.0001
	No	174	70 (40.2)	104 (59.8)	Rf	
Pain on Urination	Yes	111	66 (59.5)	45 (40.5)	1.96 (1.58–2.45)	<0.0001
	No	361	109 (30.2)	252 (69.8)	Rf	
Symptoms Status	Yes	236	109 (46.2)	127 (53.8)	1.65 (1.29–2.11)	<0.0001
	No	236	66 (28.0)	170 (72.0)	Rf	

Keys: OR = Odds ratio; CI = Confidence interval; Rf = Reference category; NA = Not applicable; $p < 0.05$ = statistically significant.

Table 3 presents the clinical and behavioral risk factors most strongly associated with genital chlamydia positivity. Age at first sexual debut was significantly associated with infection ($p = 0.001$), with the highest positivity recorded among those who first had intercourse between 15 and 20 years (45.9%). Reporting more than one sexual partner in the preceding three months nearly doubled the odds of infection (OR = 1.43, 95% CI 1.13–1.80, $p = 0.003$), while condom use at the most recent sexual encounter was protective (OR = 0.49, 95% CI 0.32–0.76, $p < 0.0001$). A recent history of STI treatment (OR = 1.72, $p < 0.0001$) and not knowing one's HIV status (OR = 2.82, $p < 0.0001$) were both strongly associated with positivity. Clinical symptoms — urethral discharge, testicular pain, lower abdominal pain, pain on urination, and overall symptomatic status — were each significantly associated with infection, though, as noted in the Discussion, a substantial proportion of positive cases remained asymptomatic, underscoring the limits of symptom-based screening alone.

Discussion

This study showed that infection was associated with young age, early coitarche, multiple partners, condom non-use, and prior STI history. This pattern is consistent with the known epidemiology of chlamydia, which often affects sexually active young adults and is frequently asymptomatic (Newman *et al.*, 2015; Rowley *et al.*, 2019). The age pattern suggests that younger, sexually active adults carried a greater burden of infection. This agrees with evidence linking age-related partner selection patterns to increased chlamydial infection risk among young women, together with newer partnerships and

higher sexual network turnover (Stein *et al.*, 2008; Rowley *et al.*, 2019). The concentration of cases in the 20–30-year range also reflects the age band in which sexually transmitted infections are commonly detected in clinic-based studies (Newman *et al.*, 2015).

Early sexual debut was another major finding. Participants who initiated sex before age 15 were more likely to be infected, which aligns with evidence that early sexual debut is associated with subsequent patterns of concurrent and closely spaced sexual partnerships that prolong cumulative exposure to infection (Magnusson *et al.*, 2015).

Multiple sexual partners were also associated with infection in the present study. This is expected because multiple partnerships increase the size of sexual networks and the probability of repeated exposure or reinfection (Aral, 2001). The finding that more than one sexual partner in the past three months was significantly associated with infection reinforces the importance of partner reduction and partner notification as prevention strategies.

Condom non-use emerged as one of the strongest and most actionable findings. The low rate of condom use in the study population, together with its strong association with positivity, indicates that unprotected sex is a key driver of transmission. This is consistent with evidence that condoms reduce the transmission of bacterial STIs when used consistently and correctly (World Health Organization, 2020).

Marital status and cohabitation also appeared important in the analysis. Single, divorced, widowed, and cohabiting respondents showed patterns indicating greater exposure than married respondents. This agrees with evidence that never-married status and related relationship

characteristics are associated with perceived partner concurrency, which in turn raises the risk of exposure to infected partners (Gaffoor *et al.*, 2016).

Previous STI history was associated with infection and should be viewed as a strong clinical warning sign. A history of STI may reflect repeated exposure, incomplete partner treatment, or ongoing vulnerability in high-risk networks (Haggerty *et al.*, 2010; Tsevat *et al.*, 2017).

The symptom findings are also important because many participants were asymptomatic or had non-specific symptoms. Lower abdominal pain, pain on urination, and genital discharge were reported, but symptom status alone did not reliably identify all infections. This supports the view that symptom-based diagnosis is insufficient for chlamydia control, especially in women, where infection is frequently silent (Frej-Mądrzak *et al.*, 2018).

CONCLUSION

Genital Chlamydia trachomatis infection among clinic attendees at Irrua Specialist Teaching Hospital was associated mainly with younger age, early sexual debut, multiple sexual partners, condom non-use, and previous STI history. These findings indicate that the infection is driven largely by modifiable sexual behavior and social vulnerability rather than by symptoms alone (World Health Organization, 2020).

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