RESEARCH ARTICLE

Chlamydial Prevalence, risk factor and complications among symptomatic pelvic inflammatory disease women, visiting hospital

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Abstract

Objective: To determine the prevalence of chlamydia, its risk factors and complications among women with symptomatic pelvic inflammatory disease.

Method: The cross-sectional study was conducted from September 2022 to October 2023 at the Gynaecology and Obstetrics Department of a public-sector tertiary care hospital in Rawalpindi, Pakistan, and comprised symptomatic pelvic inflammatory disease women aged 18-50 years. Nucleic acid amplification test on urine samples was used to determine the prevalence of chlamydia. The association with various risk factors was determined. Data was analysed using SPSS version 25.

Results: There were 762 women with mean age 27.15±4.43 years (range: 19-49 years). All the participants (100%) were married, with 740(97.1%) being multiparous and 22(2.9%) nulliparous. Of the total, 16(2.1%) women were found to be chlamydia-positive. Among them, 14(87.5%) belonged to lower socio-economic strata. With respect to complications, 1(6.25%) woman had an episode of ectopic pregnancy and infertility. Nulliparous status, aversion to barrier contraception, and age were significant risk factors ($p<0.05$).

Conclusion: The prevalence of chlamydia infection in women with symptomatic pelvic inflammatory disease was low. Increasing age, nulliparity and avoidance of barrier contraception were found to be major risk factors.

Keywords: Chlamydia trachomatis, Sexually transmitted diseases, Pelvic inflammatory disease. (JPMA 75: 772; 2025)

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Introduction

Sexually transmitting infections (STIs) were formerly referred to in the literature as venereal diseases or sexually transmitted diseases (STDs). The condition is defined as the transmission of infectious organisms through sexual contact between partners, which can be vaginal, anal or oral. Chlamydia, gonorrhoea, syphilis and trichomonas are the commonest but curable bacterial and parasitic infections. Other contagions are considered treatable, but not curable.[1] Chlamydia trachomatis causes both asymptomatic and symptomatic disease.[2] Reportedly, in up to 70% of women, it leads to asymptomatic illness.[3] In 2018, the World Health Organisation (WHO) conducted global surveillance of STIs and reported 127 million new chlamydial infections.[4] Undiagnosed and untreated presence of this microbe among women cause long-term complications, including cervicitis 10-20%, pelvic inflammatory disease (PID) 10-16%, infertility 5%, chronic pelvic pain 3%, and ectopic pregnancy 2%.[5]

PID is an inflammation associated with scarring of the upper female reproductive tract. Mostly presenting with fever, lower abdominal pain, abnormal vaginal discharge, and vulvar symptoms, it is more prevalent among women of reproductive age group, especially in their second and third decades of life.[6,7] Chlamydia-related PID is considered a preventable cause of this detrimental reproductive health ailment.[3] The long-term impact of this ailment leads to ectopic pregnancy and infertility. Infertility then accompanies psychological consequences, like depression, anxiety, feeling of guilt, shame and secrecy, along with relationship problems.[8]

Pakistan is a Muslim-majority developing state where inflation, poor source of income, poor healthcare access, illiteracy, gender bias, male dominance and prejudices against women are quite prevalent. Social norms have made the subject of STIs to be covered up rather than highlighted and publicly discussed. Such factors have contributed to the scarcity of literature in Pakistan about the prevalence of STIs in the general population. Also, to our knowledge, no study has thus far been conducted to assess the prevalence of chlamydia infection among PID symptomatic women. The current study was planned to fill the gap in literature by determining the prevalence of chlamydia, its risk factors and complications among women with symptomatic PID.

Patients and Methods

The cross-sectional study was conducted from September 2022 to October 2023 at the Gynaecology and Obstetrics

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Department of a public-sector tertiary care hospital in Rawalpindi, Pakistan, and comprised symptomatic PID women. After approval from the institutional ethics review committee, the sample size was calculated using formula:[9] $n=Z^2 1\text{-}a/2\ p(1\text{-}p)/d^2$ where 'n' = sample size, '$Z^2 1\text{-}a/2$'= confidence interval (CI), 'p' = estimated proportion and 'd'= desired precision. The prevalence of chlamydia among females was taken as 15%,[10] the calculations were done with 95% CI, 80% power and 5% margin of error. The sample was inflated by 25% to cover up for possible dropout. The sample was raised using non-probability convenience sampling technique from among those visiting the outpatient department (OPD) who were mostly patients having lower and middle socio-economic status (SES). Those included were women aged 18-50 years complaining of symptoms consistent with PID who were currently sexually active, nulliparous or multiparous, pregnancy, ectopic pregnancy, and secondary sub-fertility. Women giving a history of chronic illnesses, like asthma, chronic obstructive pulmonary disease (COPD), heart diseases, or with immunity sparing illnesses and systemic diseases not affecting reproductive tract were also included. Women with any autoimmune disorder, Klinefelter syndrome, and any systemic illness affecting immunity along with females who were not sexually active for the preceding 3 years were excluded.

After taking informed consent from all the subjects, data was collected using a questionnaire by Gynaecology and Obstetrics Residents who were briefed in detail. The urine sample of the participants were sent to the institutional pathology laboratory for nucleic acid amplification test (NAAT).[11]

Data was analysed using SPSS version 25. For univariate analysis, qualitative variables were analysed as frequencies and percentages. Quantitative variables had non-normal distribution of data as assessed using Shapiro-Wilk test, and were expressed as median values and interquartile range (IQR). For bivariate analysis, Fisher exact test and Mann Whitney U test were applied for quantitative and qualitative data, respectively. For multivariate analysis, binomial logistic regression was applied to determine the effect of risk factors on chlamydial infection. The model fitting information of binary logistic regression indicated that the prevalence of chlamydia was predictable based on the presence of studied risk factors in the population. The model also explained 20% Nagelkerke R2 variance in chlamydia detection and correctly classify 97.9% cases. Odds ratios (ORs) of different risk factors were calculated with 95% CI. $P<0.05$ was considered significant.

Results

All the 762(100%) women enrolled completed the study. The mean age was 27.15±4.43 years (range: 19-49 years). All the 762(100%) were married, with 740(97.1%) being multiparous and 22(2.9%) nulliparous. There were 616(80.8%) women having lower SES and 146(19.2%) with middle SES. Overall, 14(1.8%) women had a previous episode of diagnosed and treated STI, 114(15%) were already diagnosed with PID and 480(63%) women were using frequent antibiotics for genitourinary complaints.

A range of symptoms were noted (Table 1), and qualitative risk factors for the acquisition of chlamydial infection and PID were assessed (Figure). In terms of complications accompanied by PID, 598(78.5%) women had chronic pelvic pain, 68(8.9%) had an episode of ectopic pregnancy, and 74(9.7%) were suffering from sub-fertility.

Of the total, 16(2.1%) women were found to be chlamydia-positive. Among them, 14(87.5%) had lower SES, while majority were multiparous and had frequent antibiotic use for genitalia-associated symptoms, and were not using barrier contraception or oral contraceptive pill (OCPs) (Table 2).

With respect to complications, 1(6.25%) woman had history of ectopic pregnancy, and 1(6.25%) had a complaint of subfertility. As for the symptoms among chlamydia-positive women, 14(87.5%) presented with unusual vaginal discharge and chronic lower abdominal pain.

Table-1: Symptomatology of pelvic inflammatory disease among the participants.

Variables	n (%)
Abnormal vaginal discharge	728 (95.5)
Lower abdominal discomfort	728 (95.5)
Chronic onset	694 (91.1)
Acute onset	64 (8.9)
Dyspareunia	552 (72.4)
Intermenstural bleeding	538 (70.6)
Post-coital bleeding	228 (29.9)
Recurrent fever	134 (17.6)
Recurrent dysuria	416 (54.6)

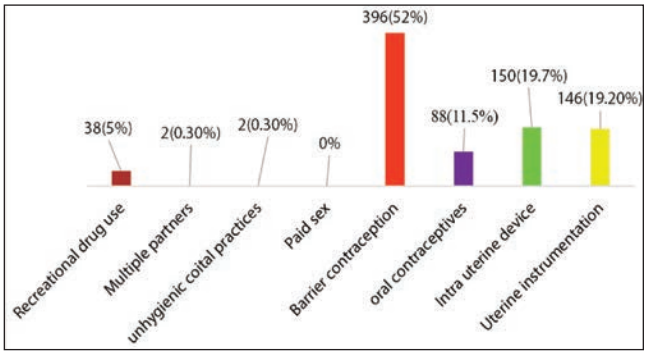

Figure: Incidence of risk factors for chlamydial infection.

Table-2: Univariate, bivariate and multivariate analyses of risk factors for chlamydia.

Variables	Units of measurement	Chlamydia (positive)	Chlamydia (negative)	*p*-value[a]	OR	95% confidence interval Lower	95% confidence interval Upper
Age Median(IQR)	years	34(6)	26(11)	<0.001*	1.22*	1.15	1.33
Socioeconomic status n (%)							
Lower (reference)	Lower	14(87.5)	602(80.6)	0.74	1.66	0.35	7.84
Middle	Middle	2(12.5)	144(19.3)				
Parity n (%)							
Multiparous (reference)	Nulliparous	2(12.5)	20(2.6)	0.07	8.1*	1.37	48.68*
Nulliparous	Multiparous	14(87.5)	726(97.3)				
Recreational drug use (patient or partner) n (%)	No(reference)/yes	2(12.5)	36(4.8)	0.187	2.58	0.48	13.65
Multiple partners (patient or partner) n (%)	No(reference)/yes	0	2(0.26)	1	-	<0.001	<0.001
Unhygienic coital practices n (%)	No(reference)/yes	0	2(0.26)	1	-	<0.001	<0.001
Barrier contraception n (%)	Yes(reference)/No	4(25)	392(52.5)	0.04*	4.62*	1.25	16.91*
Oral contraceptives n (%)	No(reference)/yes	2(12.5)	86(11.5)	0.71	1.17	0.22	6.12
Intrauterine device n (%)	No(reference)/yes	4(25)	142(19)	0.52	0.53	0.12	2.25
Uterine instrumentation n (%)	No(reference)/yes	2(12.5)	148(19.8)	0.75	0.55	0.11	2.71
Recurrent dysuria n (%)	No(reference)/yes	8(1.9)	408(98.1)	0.72	0.822	0.28	2.4
Frequent antibiotic use n (%)	No(reference)/yes	10(62.5)	470(63)	1	1.12	0.35	3.5
Sexually transmitted diseases n (%)	No(reference)/yes	0	14(1.87)	1	0.00	0.00	-

[a]Calculated via fisher exact test, [b]Binary logistic regression, OR: Odds ratio, * significant.

Nulliparous women compared to multiparous were found to have 8.1 times (95%CI: 1.37-48.68) more risk of chlamydia, and there was 4.6 times (95% CI: 1.2-16.7) greater likelihood of getting chlamydial infection among women who did not practice barrier contraception methods. Increasing age posed the risk of infection by 1.2 times (95CI: 1.15-1.33).

Discussion

The current study concluded that frequently observed symptoms of PID were atypical vaginal discharge and persistent lower abdominal discomfort, which was in line with literature.[12] The study also reported associated symptoms, including painful intercourse and intermenstrual bleeding among the majority of subjects. Less frequently, they also complained of post-coital bleeding or recurrent fever. This worsened presentation of PID could be because people were seen to be reluctant in consulting physician as STDs carried with them a lot of social stigma. Also, poor people with ailments usually seek advice from local pharmacies or traditional healers, leading to the worsening of illness.[13]

Risk factor analysis revealed that current patients did not engage in paid sex, multiple partners and unhygienic sexual behaviours. Less than 5% subjects had a history of recreational drug use. Only half of the current patients utilised barrier contraception and only one-tenth used OCPs. It was also seen that the risk of getting chlamydial infection was 4.5 times greater in people who did not practice barrier contraception. This stigmatisation of contraception was influenced by a variety of elements, including illiteracy, lower SES, cultural and societal factors, male dominance, affordability, availability.[14] Religious factors in contrast play a protective role against acquiring STIs.[15]

According to the current study, 19% of females with PID had intrauterine devices (IUDs) implanted, and 19% had a history of uterine instrumentation. The risk estimation of chlamydia-associated PID with IUD was seen to be non-significant. An investigation on the correlation between PID and IUD was undertaken in Pakistan revealing a substantial positive link between the two with OR 2.36, which was contrary to the current findings.[16]

In the current study, 2.1% subjects tested positive with chlamydia, and nearly all of them had lower SES, were multiparous women, and were not practising barrier contraception. A cohort study estimating the efficacy of available techniques detecting chlamydia found that women who tested negative for chlamydia with non-NAAT opposed to NAAT had 17% greater adjusted risk of PID after 12 months.[17] This supported the current study's choice of NAAT as the testing tool.

The current study noted chlamydia positivity to be 2.1%. Earlier studies in Pakistan determine the prevalence to be 4.7% in Faisalabad,[18] 4% in Abbottabad[19] and 15% in Quetta.[10] Another study planned among females of reproductive age found that 11.28% of the participants had immunoglobulin G (IgG) antibodies against chlamydia in their blood indicating recent or past silent infection.[20] The prevalence of this bacteria also varies significantly around the globe, ranging from 0.1% to 25.7% depending on the study's methodology and the specific features of the population.[21] A systemic review planned on chlamydia

among general population of five WHO regions found 0.8% of women with chlamydial infection in Southeast Asia.[22] The lower frequency of chlamydia seen in the current study might be caused by a variety of factors. Nearly 63% of the women were frequently using antibiotics for their illness before enrolment, leading to a population of partially treated subjects. The variation in research population in terms of social opinions, ethics and awareness could be the cause of these discrepancies in STI prevalence.

Chlamydial infections associated with PID lead to devastating complications. Persistent pelvic discomfort was the most common consequence observed in the current study, while ectopic pregnancies or complaints of infertility were reported by <10% cases. Among chlamydia-positive PID patients, one had ectopic pregnancy and one had infertility. A retrospective cohort study showed that regardless of antibiotic usage, women with positive test were more likely to experience negative reproductive health consequences. Additionally, this risk also rose with additional chlamydia infections.[3]

The current study has several limitations. Due to social, moral and religious considerations, sampling on general population was not possible, leading to the use of convenience sampling technique. Detailed information on vaginal hygienic practices was not obtained from the subjects. Asymptomatic nature of PID and chlamydia suggests that the reported PID rates might be underestimated, and the actual number of women with chlamydia diagnosis on repeated testing might have been greater than reported.

The current findings, however, suggest a need to increase community awareness of these illnesses while encouraging safe sexual behaviours through STI-related counselling. Health services should also be planned by government and non-governmental organisations (NGOs) to ensure early diagnosis and management to help in reducing morbidity associated with complications. Screening should be done in high-risk population for chlamydia among both genders of reproductive age. Multi-centre studies should be planned in major cities of Pakistan to have a more realistic estimate of prevalence.

Conclusion

The prevalence of chlamydia infection among symptomatic PID women was low. The risk of getting chlamydial infection was more with increasing age, among nulliparous women and those who did not practice barrier contraception.

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Conflict of Interest: None.

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Author Contribution:

AIM: Design, data acquisition, drafting, final approval and agreement to be accountable for all aspects of the work.
WN: Design, data entry, interpretation, writing, final approval and agreement to be accountable for all aspects of the work.
MA: Design, data collection, drafting, final approval and agreement to be accountable for all aspects of the work.