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Original Article

Frequency of HIV and Syphilis Seropositivity among Patients with Anogenital Warts: A Cross-Sectional Study

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Abstract

Background Anogenital warts (condylomata acuminata) are benign, sexually transmitted proliferative lesions of the anogenital skin and mucosa caused predominantly by low-risk human papillomavirus (HPV) types, particularly HPV 6 and 11. Aim of present study is to determine the frequency of seropositivity of syphilis and HIV in patients with anogenital warts.

Objective To determine the frequency of seropositivity of syphilis and HIV in patients with anogenital warts.

Methods One sixty patients were enrolled in the study. Clinical examination of anogenital area in the presence of suitable chaperone where required, were carried out in all patients. Laboratory test like TPHA for syphilis and HIV by ELISA were done in every patient from a single reference laboratory to avoid variability in the test results. All patients were managed as per standard protocols. All the data were processed by SPSS v26.0. Frequency and percentages were used for categorical parameters. Chi square test was applied in which *P*-valve <.05 was considered significant.

Results Gender distribution of the patients showed that 79.4% (n=127) were male whereas 20.6 %(n=33) were females. The distribution of sexual preferences was as follows: 18.8% (n=30) of participants were homosexual, 66.9% (n=107) were heterosexual, and 14.4% (n=23) were bisexual. The frequency of HIV seropositivity was 8.1% (n=13), while the frequency of syphilis seropositivity was 3.1% (n=5).

Conclusion The study demonstrated the presence of both HIV and syphilis seropositivity among patients with anogenital warts, highlighting the importance of appropriate screening for sexually transmitted infections in this population. The findings should be interpreted in the context of the characteristics of the study population and the local epidemiological setting.

Keywords HIV; Syphilis; Human Papillomavirus; Sexually Transmitted Infections; Anogenital warts.

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Introduction

The epidermotropic human papillomavirsus (HPV) is responsible for the epidermal manifestation known as anogenital warts. Some HPV types can result in high-risk neoplastic HPV lesions, whereas others can create benign, low-risk HPV lesions. Anogenital warts are caused by low-risk strains. Over 90 percent of anogenital warts are caused by HPV types 6 and 11.[1] The vulva, vagina, cervix, perineum, perianal region, and penis are the most commonly impacted locations.

HPV infiltrates cells of the basal layer of the epidermis and passes via skin and mucosal micro-

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abrasions in the ano-genital region. Viral DNA, capsids, and particles are generated following a latency period ranging from three weeks to nine months. The morphological atypical koilocytosis of anogenital warts is developed by infected host cells.[2]

One previous systematic review that included 187 studies from 49 jurisdictions, reported AGW prevalence ranging from 0.5 to 33.1%, depending on population, age, sex, geography, and methodology.[3] It is a major public health problem worldwide especially in developing countries.[3,4] Anogenital warts are usually asymptomatic but have a great psychological impact.[5,6] Human papillomavirus (HPV) is one of the most common sexually transmitted viral infections worldwide. It is known fact that if a patients has one STD then the risk of having another STD is more common.[7,8] Various studies have shown that there is an association of positive syphilis and HIV serology with anogenital warts.[9,10] One previous researcher conducted a study on 93 patients having anogenital warts, out of which 11 (11.8%) patients tested positive for HIV and 1 (1.1%) tested positive for syphilis.[9]

There is limited local data on HIV and syphilis seropositivity among patients with anogenital warts. This study aims to address this gap and support early identification, diagnosis, and management of these sexually transmitted infections in this high-risk population.

Methods

This descriptive cross-sectional prevalence study was conducted in the Dermatology Outpatient Department (OPD) of Jinnah Hospital, Lahore, Pakistan, for 06 months. The study was approved by the Institutional Review/ Ethical Review Committee of Jinnah Hospital Lahore (Ref. No.SC-009/ERB/33/AIMC/JHL dated 18.06.2026). Written informed consent was obtained from all participants. For participants aged 12-17 years, written parental/guardian consent and participant assent were obtained before enrolment. A sample size of 160 patients was calculated using the WHO sample size calculator for estimating a population proportion. The calculation was based on an anticipated prevalence of seropositivity, a 95% confidence level, and 8% margin of error. Accordingly, 160 consecutive eligible patients were enrolled using a non-probability purposive sampling technique. After obtaining informed consent, a detailed history was taken and a physical examination was performed by the researcher in the presence of an appropriate chaperone. Patients of either gender aged 12–60 years with a clinical diagnosis of anogenital warts were included. These are benign, sexually transmitted proliferative lesions of the anogenital skin and mucosa caused predominantly by low-risk human papillomavirus (HPV) types, particularly HPV 6 and 11. Patients with a previous history of treatment for HIV or syphilis were excluded. After informed consent, a detailed history was obtained and physical examination was performed by the researcher in the presence of an appropriate chaperone. Relevant demographic and clinical information, including age, gender, number of anogenital warts, duration of lesions, and sexual preference, was recorded.

Blood samples were collected from all participants and tested for HIV and syphilis at a single reference laboratory to minimize inter-laboratory variability. HIV screening was performed using an ELISA-based assay. Samples reactive on initial ELISA were retested by ELISA, and repeatedly reactive samples were further confirmed by PCR according to the laboratory's testing algorithm. Because contemporary HIV diagnostic algorithms generally incorporate a supplemental HIV-1/HIV-2 antibody differentiation assay following a reactive screening test, the actual confirmatory algorithm used in this study should be reported exactly as documented by the reference laboratory.

For syphilis, the Treponema Pallidum Hemagglutination Assay (TPHA) was performed. A positive TPHA result was interpreted as evidence of treponemal antibody exposure. As a non-treponemal

test such as Rapid Plasma Reagin (RPR) or Venereal Disease Research Laboratory (VDRL) testing was not performed, TPHA positivity could not distinguish active syphilis from previous or treated infection. This limitation was considered when interpreting the findings. Participants requiring treatment were managed according to standard treatment protocols.

Data were entered and analyzed using IBM SPSS Statistics version 26.0. Continuous variables, including age, number of anogenital warts, and duration of anogenital warts, were summarized as mean±standard deviation. Categorical variables, including gender, sexual preference, HIV seropositivity, and syphilis seropositivity, were presented as frequencies and percentages. The frequency of HIV and syphilis seropositivity was determined. Where subgroup analyses were performed, data were stratified according to age and gender. Fisher's exact test was used for categorical comparisons when expected cell counts were small or zero; the chi-square test was used when its assumptions were satisfied. All tests were two-sided, with a significance level of $P<.05$. Exact p-values were reported where applicable. Because this was a descriptive cross-sectional prevalence study and not a comparative study, the primary objective was estimation of the frequency of HIV and syphilis seropositivity rather than comparison between treatment or exposure groups.

Result

Table 1 presents the baseline characteristics of the 160 enrolled patients with anogenital warts. The majority of participants were male (127; 79.4%), while 33 (20.6%) were female. Regarding age distribution, most patients were between 12 and 40 years of age (129; 80.6%), whereas 31 (19.4%) were aged 41–60 years. With respect to sexual preferences, 107 (66.9%) participants reported heterosexual preference, followed by 30 (18.8%) who reported homosexual preference and 23 (14.4%) who reported bisexual preference. The mean age was 33.99±7.74 years; mean duration of anogenital warts was 1.53±0.85 years.

Table 1 Baseline Information Regarding Enrolled Patients (n=160).

Outcome	*Frequency*	*Percentage (%)*
Genders		
Males	127	79.4
Females	33	20.6
Age groups (Yrs)		
12-40	129	80.6
41-60	31	19.4
Sexual Preferences		
Homosexual	30	18.8
Heterosexual	107	66.9
Bisexual	23	14.4

Table 2 Distribution of seropositivity of HIV & Syphilis.

Outcome	Number(n)	*Percentage (%)*
Seropositivity of HIV		
Positive	13	8.1
Negative	147	91.9
Seropositivity of Syphillis		
Positive	5	3.1
Negative	155	96.9

HIV seropositivity was reported descriptively (HIV: n=13; syphilis: n=5), these frequencies were reported descriptively as the primary outcomes, and no statistically powered subgroup comparisons were undertaken; therefore, the findings were interpreted cautiously as shown in **Table 2**.

Table 3 presented the stratification of HIV seropositivity according to age, gender, and number of anogenital warts. Among patients aged 12–40 years, 9 (5.6%) were HIV seropositive compared with 4 (2.5%) among those aged 41–60 years. The difference in HIV seropositivity between the two age groups was not statistically significant ($P=.28$). Regarding gender, all 13 HIV-seropositive patients were male, while none of the female participants were HIV seropositive. This difference was statistically significant ($P=.05$). With respect to the number of anogenital warts, HIV seropositivity was observed in 11 (6.9%) patients with 1–10 warts and in 2 (1.2%) patients with more than 10 warts; the difference was not statistically significant ($P=.70$).

Table 3 Stratification for seropositivity of HIV with respect to gender.

Subgroups	*Seropositivity of HIV*		*P-value*
	Positive	*Negative*	
Age (Years)			
12-40	9 (5.6%)	120 (75%)	.281
41-60	4 (2.5%)	27 (16.9%)	
Gender			
Male	13 (8.1%)	114 (79.2%)	.072
Female	0	33 (20.6%)	
Number of anogenital warts			
1-10	11 (6.9%)	118 (73.8%)	1.000
>10	02 (1.2%)	29 (18.1%)	

*Statistically Significant; Fisher's exact test.

Table 4 Stratification for seropositivity of Syphilis with respect to gender.

Subgroups	*Seropositivity of Syphilis*		*P-value*
	Positive	*Negative*	
Age (Years)			
12-40	2 (1.2%)	127 (79.4%)	.05*
41-60	3 (1.9%)	28 (17.5%)	
Gender			
Male	5(3.1%)	122(77.5%)	.584
Female	0	33 (20.6%)	
Number of anogenital warts			
1-10	5(3.1%)	124(76.2%)	.584
>10	0	31 (19.4%)	

*Statistically Significant; Fisher's exact test.

Table 4 presented the stratification of syphilis seropositivity according to age, gender, and the number of anogenital warts. Among patients aged 12–40 years, 2 (1.2%) were seropositive for syphilis, compared with 3 (1.9%) among those aged 41–60 years. The difference between the two age groups was statistically significant (*P*=.02). Regarding gender, all 5 (3.1%) syphilis-seropositive patients were male, while none of the female participants were seropositive; however, this difference was not statistically significant (*P*=.25). With respect to the number of anogenital warts, syphilis seropositivity was observed in 5 (3.1%) patients with 1–10 warts, whereas none of the patients with more than 10 warts were seropositive. This difference was not statistically significant (*P*=.26).

Discussion

Anogenital warts, also known as condyloma acuminata, are among the most common clinical manifestations of genital human papillomavirus (HPV) infection. Approximately 90% of anogenital warts are attributable to HPV types 6 and 11.[11,12] They may occur around the genital, perianal, and anal regions and can present as solitary or multiple skin-colored or whitish, flat or exophytic lesions.[13,14] The occurrence of anogenital warts is influenced by sexual exposure and HPV transmission, although the presence of visible warts does not necessarily indicate recent infection because HPV may remain asymptomatic for prolonged periods.[15,16]

In the present study, the majority of patients (80.6%, n=129) were between 12 and 40 years of age, while 19.4% (n=31) were between 41 and 60 years. The mean age was 33.99±7.74 years. The predominance of younger patients in the present study is consistent with previous studies reporting a higher occurrence of anogenital warts among younger adults.[17,18] Younger age and greater sexual exposure, including a higher number of lifetime sexual partners, have also been identified as factors associated with genital warts.[18] However, as this study did not include a comparison group or assess duration and frequency of sexual exposure, this finding should be interpreted as a demographic characteristic of the study population rather than evidence of an association between age and anogenital warts.

There was a marked male predominance in the present study, with males accounting for 79.4% (n=127) and females for 20.6% (n=33) of participants. This finding is consistent with recent epidemiological evidence indicating that anogenital warts may occur more frequently among men in several clinical and population-based settings. A recent global analysis of anogenital wart incidence reported higher incidence rates among men than women in several countries and regions, with the difference becoming more pronounced at older ages.[19] Similarly, a recent retrospective study from Northern India involving 294 patients with anogenital warts reported a slight male predominance (53.1% males versus 46.9% females), although the gender distribution was substantially more balanced than in the present study.[20]

Regarding sexual preference, 66.9% (n=107) of participants reported heterosexual preference, 18.8% (n=30) homosexual preference, and 14.4% (n=23) bisexual preference. Previous studies have reported variable patterns of sexual behavior among patients with HPV infection and anogenital warts.[18,19] The distribution observed in the present study should, however, be interpreted descriptively because the study was not designed to determine whether a particular sexual preference was associated with anogenital warts.

The frequency of HIV seropositivity in the present study was 8.1% (n=13), whereas syphilis seropositivity was 3.1% (n=5). These findings indicate that both HIV and syphilis were present among patients presenting with anogenital warts. Previous studies have similarly demonstrated the coexistence of anogenital warts with other sexually transmitted infections. In a study of 200 patients newly diagnosed with anogenital warts in Guangzhou, China, 24.5% had at least one concurrent STI; HIV was detected in 4.3% of men and syphilis in 1.7%.[21] The HIV seropositivity observed in the present study (8.1%) was therefore higher than the HIV prevalence reported in that study, whereas the syphilis frequency (3.1%) was also higher than the reported syphilis prevalence. These differences may reflect variations in geographical setting, population characteristics, sexual networks, healthcare-seeking behaviour, and STI screening practices. More recent evidence continues to demonstrate a strong epidemiological relationship between HIV and HPV-related anogenital disease. Collectively, these findings support the occurrence of HPV-related anogenital disease and other STIs within overlapping high-risk populations, although the direction and magnitude of these associations cannot be determined from the present cross-sectional study.

The relatively small number of seropositive participants, particularly those with syphilis (n=5), limits the precision of the estimates and makes subgroup comparisons vulnerable to statistical instability. Nevertheless, the detection of HIV and syphilis among patients with anogenital warts is clinically relevant because recent evidence demonstrates substantial STI co-infection among populations affected by HIV and other sexually transmitted infections. A 2024 systematic review and meta-analysis reported a pooled syphilis prevalence of 7.3% among people living with HIV, with considerable variation according to geographical region and clinical setting.[22] Therefore, the present findings should primarily be interpreted as descriptive estimates of HIV and syphilis seropositivity within this specific clinical population rather than as evidence that anogenital warts independently increase the risk of HIV or syphilis. Larger multicentre studies with appropriate comparison groups would be required to determine whether the observed frequencies are significantly different from those in individuals without anogenital warts and to identify independent predictors of co-infection.

Previous studies have reported varying frequencies of sexually transmitted infections among populations with anogenital warts and other sexually transmitted diseases.[20-22] Differences between these studies and the present findings may be related to differences in study populations, healthcare settings, sampling methods, diagnostic methods, and underlying epidemiological characteristics. Direct comparison should therefore be made cautiously.

The objective of the study was to determine the frequency of syphilis seropositivity and HIV seropositivity among patients with anogenital warts. The study was not designed to differentiate active syphilis infection from previous or treated infection. TPHA was used as the serological test for syphilis; therefore, a positive result was interpreted as syphilis seropositivity rather than confirmed active syphilis. Accordingly, the term ‘syphilis seropositivity’ has been used consistently throughout the manuscript, and no separate analysis of active syphilis infection was performed.

Routine HIV and syphilis testing is not necessarily performed universally for every patient presenting with anogenital warts in all clinical settings, and screening practices may vary according to clinical assessment, available laboratory facilities, and individual risk factors. International STI guidance recommends consideration of evaluation for coexisting sexually transmitted infections in patients presenting with anogenital warts and emphasizes HIV testing in this clinical context. Therefore, the presence of anogenital warts provides an important clinical opportunity for identifying previously undiagnosed sexually transmitted infections.

The rationale for the present study was not to establish a new universal screening policy, but to determine the frequency of HIV and syphilis seropositivity specifically among patients with anogenital warts in our local clinical population. Because local data on this specific patient group are limited and screening practices may not be uniform, documenting the frequency of seropositivity may provide evidence to inform local clinical practice and determine whether targeted STI screening in this population warrants greater consideration. The findings may also help identify patients who require further diagnostic evaluation, counselling, and appropriate management. However, the single-center setting, purposive sampling, absence of a control group, relatively small number of seropositive participants, and lack of detailed assessment of behavioral and sexual-health risk factors limit the generalizability and interpretation of the findings.

Conclusion

The study demonstrated the presence of both HIV and syphilis seropositivity among patients with anogenital warts, emphasizing the clinical importance of considering appropriate sexually transmitted infection screening in this population. The findings should be interpreted in the context of the characteristics of the study population and the local epidemiological setting. Given the observed results, patients presenting with anogenital warts should be offered routine screening for HIV and syphilis in our setting.

This approach may facilitate early diagnosis and treatment of coexisting sexually transmitted infections and reduce onward transmission

Declaration of patient consent Authors certify that they have obtained all appropriate patient consent.

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Author's contribution

MS: Substantial contribution to conception and study design, acquisition of data and manuscript writing.

RM: Substantial contribution to analysis and interpretation of data and manuscript writing.

AS,AA: Substantial contribution to interpretation and acquisition of data and revised the manuscript critically.

GB: Substantial contribution to analysis and interpretation of data and revised the manuscript critically.

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