Spinghar University- Kabul

Spinghar Journal of Biomedical Sciences (SJBS)

Vol. 2, No. 1, Apr 2026, pp. 69-79

Seroprevalence of Syphilis and Associated Factors among Women in Baghlan Province, Afghanistan: A Multicenter Cross-sectional Study

Ferdaws Yaqoubi, *Hadia Azami, Mohammad Musawer Sharifi, Sayed Shaheen Shah Hashimi, *Yazdan Rezaee

Medical Sciences Research Center, Ghalib University, Kabul, Afghanistan

ARTICLE INFO

Type: Original Article
Received: 19/01/2026
Accepted: 15/04/2026

*Corresponding Author:
Hadia Azami
Yazdan Rezaee

E-mail address:
dr.hadia.azami@gmail.com
yazdan.rezaee@ghalib.edu.af

DOI:
https://doi.org/10.64444/sjbs.33

ABSTRACT

Background: Syphilis has re-emerged as a significant global public health concern, yet data on its burden among women in Afghanistan remain limited.

Methods: A multicenter cross-sectional study was conducted from January to December 2025 among 1,000 women of reproductive age attending gynecological and obstetric services at five private health facilities in Pul-e-Khumri, Baghlan Province, Afghanistan. Participants were consecutively enrolled, and data were collected using a structured questionnaire covering sociodemographic characteristics, reproductive history, sexual network factors, behavioral and hygiene-related practices, and self-reported genitourinary symptoms. Syphilis screening was performed using a treponemal rapid diagnostic test, and HIV was tested using a rapid antibody test. Univariable and multivariable logistic regression analyses were conducted to identify factors associated with syphilis seropositivity in the study population.

Results: Among 1,000 participants, 7.1% tested positive for syphilis antibodies, with a small proportion also testing positive for HIV. In multivariable analysis, middle economic status and having a co-wife were independently associated with higher odds of seropositivity, while educational attainment and condom use were associated with lower odds. In the symptom-based model, genital sore showed the strongest independent association, followed by abdominal and groin pain.

Conclusion: This study provides evidence on syphilis among women of reproductive age in Afghanistan by documenting a high seroprevalence and identifying associated factors in a previously underreported population. These findings support strengthening screening and prevention efforts within reproductive health services.

Keywords: Syphilis; Seroprevalence; Women of reproductive age; Sexually transmitted infections; Afghanistan

Introduction

Syphilis is a systemic infection caused by the spirochete bacterium *Treponema pallidum*. Transmission may occur vertically from mother to child during pregnancy or be acquired primarily through sexual contact and, less commonly, through blood transfusion [1, 2]. Syphilis may remain asymptomatic or progress through primary, secondary, latent, and tertiary stages. If left untreated, it can lead to severe neurological, ocular, otologic, cardiovascular, and systemic

complications [3]. In recent years, syphilis has re-emerged as a global public health concern, with rising incidence reported across multiple regions, including North America, Europe, and Asia. Meanwhile, many low- and middle-income countries continue to bear a substantial burden, particularly among women of reproductive age [4]. Data from neighboring countries such as Iran and Pakistan suggest generally low prevalence in the general population but higher levels in selected clinical and higher-risk groups, highlighting regional heterogeneity and important gaps in surveillance [5-7].

Although syphilis affects multiple population groups, women of reproductive age warrant particular attention for surveillance and prevention because untreated infection may have important reproductive and obstetric consequences. Maternal syphilis has been associated with severe adverse pregnancy outcomes, including miscarriage, stillbirth, preterm birth, low birth weight, and neonatal death [8, 9]. Consequently, increasing syphilis prevalence in this population may increase the risk of congenital syphilis at the population level, as epidemiological studies have documented parallel increases in congenital syphilis in settings where syphilis incidence among women of reproductive age is rising [10, 11].

Despite the global burden of disease, epidemiological data on syphilis remain limited in several settings, including Afghanistan. Historical observations suggest that syphilis represented a considerable health burden in the country during the mid-20th century. One of the earliest health surveys conducted in Afghanistan reported a substantial burden of syphilis in Kabul, Herat, and Kandahar; however, most diagnoses were based primarily on clinical observations due to limited laboratory diagnostic capacity at the time [12]. More recent evidence from a large study of blood donors reported a syphilis seroprevalence of 0.54% [13]. Despite several studies conducted among selected populations in Afghanistan, data on the burden of syphilis among women of reproductive age remain scarce. Furthermore, research has identified important knowledge gaps regarding syphilis among both patients and healthcare providers in the country [14].

To address these gaps, we aimed to assess the seroprevalence of syphilis and associated factors among women of reproductive age attending gynecological and obstetric services in private health facilities in Pul-e-Khumri, Baghlan Province, Afghanistan.

Methods

Study Design and Setting

A cross-sectional study was conducted between January and December 2025 in Pul-e-Khumri District, Baghlan Province, Afghanistan. Baghlan Province is located in northeastern Afghanistan and its provincial capital, Pul-e-Khumri, has an estimated population of 230,112, of whom approximately 49.1% are female [15]. The study was conducted in five participating private health facilities providing gynecologic and obstetric services. These facilities were selected due to their willingness to participate, the consistent availability of laboratory testing services, and the feasibility of standardized data collection, which were not uniformly available across public-sector facilities during the study period. While this may limit generalizability, these facilities represent an important point of care for women seeking reproductive health services in the study setting.

Study Population and Eligibility Criteria

The study population consisted of women of reproductive age presenting to gynecological and obstetric services at participating private health facilities who underwent syphilis and HIV screening during the study period. All eligible participants were included consecutively at the time of their clinical visit. Only participants who provided informed consent for study participation and testing were enrolled. Individuals who did not consent were not included; however, the

number of non-consenting individuals was not systematically recorded.

Data Collection

Data were collected using a structured questionnaire administered by trained healthcare personnel at the time of consultation. The questionnaire was pilot tested prior to the study to ensure clarity, relevance, and feasibility. Information collected included sociodemographic characteristics (age, marital status, educational attainment, economic status, and family size), reproductive history (parity), sexual network characteristics (co-wife status), behavioral factors (condom use), hygiene-related practices (bathing frequency, sanitary pad use, sharing of towels, and sharing of underwear), and self-reported genitourinary symptoms (genital sore, abdominal pain, dyspareunia, vaginitis, dysuria, groin pain, leukorrhea, hematuria, and vulvar itching).

All variables were self-reported by participants. Economic status was based on self-reported monthly household income (in Afghanis) and categorized as low (<7,000 AFN), middle (7,000 –14,000 AFN), and high (>14,000 AFN). These income categories were defined based on local income distribution and practical categorization used in similar field-based studies. Co-wife status was defined as the presence of at least one co-wife in a polygamous marriage (yes/no). Hygiene-related practices included bathing frequency categorized as 0–1 times per week vs 2–6 times per week, and sanitary pad use categorized as never, sometimes, or always. Other binary variables, including condom use and sharing of towels and underwear, were recorded as yes/no.

Laboratory testing

All participants underwent rapid serological testing for syphilis and HIV. Syphilis screening was performed using the Healstone Rapid Device Syphilis Test (Ref: GCSYP-302a), a qualitative immunochromatographic assay designed to detect treponemal antibodies (both IgG and IgM) against *T. pallidum*. According to manufacturer specifications, the syphilis test demonstrates high sensitivity and specificity for the detection of treponemal antibodies. HIV testing was conducted using the Healgen HIV ½ One Step Rapid Test (Ref: GCHIC-302a), which qualitatively detects antibodies to HIV-1 and HIV-2.

All testing procedures were performed by trained healthcare personnel under standardized conditions, in accordance to manufacturer instructions and appropriate storage and handling of test kits to ensure quality control. Results were interpreted within the specified time window. Due to the unavailability of confirmatory non-treponemal and treponemal assays, reactive screening results could not be further verified. Given the use of treponemal rapid test, results were interpreted as evidence of past or present exposure to *T. pallidum* (seroreactivity).

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 27. Continuous variables were summarized using means and standard deviations (SDs), and categorical variables were summarized using frequencies and percentages. Data completeness was assessed prior to analysis, and no missing values were identified. Consequently, all observations were retained and included in the analyses without the need for imputation or exclusion procedures.

The primary outcome was syphilis seropositivity, defined as a reactive treponemal rapid test result for *T. pallidum* antibodies. HIV results were analyzed descriptively to assess seroreactivity overall and among women with reactive syphilis results. Univariable and multivariable logistic regression analyses were performed to estimate crude and adjusted odds ratios (ORs) with 95% confidence intervals (CIs).

Two conceptual multivariable logistic regression models were specified a priori. The first model evaluated sociodemographic and behavioral factors associated with syphilis seropositiv-

ity and included age (continuous), economic status, educational attainment, co-wife status, and condom use. These variables were selected based on biological plausibility and prior epidemiologic evidence regarding sexually transmitted infections and were considered the most relevant to the primary etiologic framework. Other variables associated with syphilis seropositivity in univariable analyses were explored but were not retained in the final primary model in order to preserve model parsimony, reduce redundancy among related predictors, and improve interpretability given the limited number of outcome events.

The second model evaluated associations between self-reported genitourinary symptoms and syphilis seropositivity. To preserve model parsimony given the limited number of seropositive outcomes, symptom variables were entered simultaneously and the model was adjusted for age only. Symptoms included genital sore, abdominal pain, dyspareunia, vaginitis, dysuria, groin pain, leukorrhea, hematuria, and vulvar itching. Symptom variables were coded as binary indicators (yes vs no), with 'no' as the reference category.

A formal sample size or statistical power calculation was not performed, and all eligible participants presenting during the study period were included to maximize statistical power and improve precision of estimates. Statistical significance was defined as $P < 0.05$.

Ethical Considerations

Ethical approval for this study was obtained from the Biomedical Ethics Committee of Ghalib University, Kabul, Afghanistan. Written informed consent was obtained from all participants prior to enrollment. Participant confidentiality was maintained through data anonymization and by limiting access to study records to authorized personnel only.

Results

A total of 1,000 participants were included in the final analysis. Among them, 71 (7.1%) were seropositive for syphilis based on the treponemal rapid test. The mean age of the study population was 30.1 ± 12.5 years. HIV seropositivity was detected in 7 participants (0.7%), including 5 individuals who also had reactive syphilis serology.

Participants with syphilis seropositivity were more likely to have no formal education, belong to the middle economic category, and were all married. Compared with seronegative individuals, they more frequently reported larger family size (≥11 members), multiparity, and having a co-wife. Condom use was less common, and hygiene-related practices, including infrequent bathing, non-use of sanitary pads, and sharing towels, were more frequently reported in this group (**Error! Reference source not found.**).

Only 29.6% of seropositive participants reported a genital sore. Non-specific genitourinary symptoms were more common, particularly abdominal pain, groin pain, leukorrhea, vulvar itching, and dyspareunia. Vaginitis, dysuria, and hematuria were also reported (**Error! Reference source not found.**).

Table 1: Characteristics of study participants and prevalence of syphilis (N = 1000)

Variable	***Category***	***Syphilis***	
		Positive n (%)	Negative n (%)
Age(yr)	<20	2 (2.8)	163 (17.5)
	20–29	25 (35.3)	408 (43.9)
	30–39	28 (39.4)	203 (21.9)
	≥40	16 (22.5)	155 (16.7)
Education status	No formal education	47 (66.2)	393 (42.3)
	Educated	24 (33.8)	536 (57.7)
Economic status	Low	5 (7.0)	97 (10.4)
	Middle	65 (91.5)	766 (82.5)
	High	1 (1.4)	66 (7.1)
Family Size	1–6	4 (5.6)	156 (16.8)
	7–10	25 (35.2)	443 (47.7)
	≥11	42 (59.2)	330 (35.5)
Marital status	Unmarried	0 (0.0)	167 (23.6)
	Married	71 (100.0)	762 (76.4)
Parity	Nulliparous	3 (4.2)	268 (28.8)
	Primiparous	6 (8.5)	116 (12.5)
	Multiparous	62 (87.3)	545 (58.7)
Co-wife status	Yes	18 (25.4)	77 (8.3)
	No	53 (74.6)	852 (91.7)
Condom use	Yes	3 (4.2)	174 (18.7)
	No	68 (95.8)	755 (81.3)
Bathing frequency	0–1	31 (43.7)	301 (32.4)
	2–6	40 (56.3)	628 (67.6)
Sanitary pad use	Never	51 (71.8)	405 (43.6)
	Sometimes	14 (19.7)	174 (18.7)
	Always	6 (8.5)	350 (37.7)
Share towel	Yes	36 (50.7)	232 (25.0)
	No	35 (49.3)	697 (75.0)
Share underwear	Yes	5 (7.0)	50 (5.4)
	No	66 (93.0)	879 (94.9)
HIV status	Positive	5 (7.0)	2 (0.2)
	Negative	66 (93.0)	927 (99.8)

HIV: Human immunodeficiency virus

Table 2: Genitourinary symptoms among study participants according to syphilis serostatus (N=1000)

Symptoms		***Syphilis***	
		Positive n (%)	Negative n (%)
Genital sore	Yes	21 (29.6)	47 (5.1)
	No	50 (70.4)	882 (94.9)
Abdominal pain	Yes	67 (94.4)	757 (81.5)
	No	4 (5.6)	172 (18.5)
Groin pain	Yes	56 (78.9)	489 (52.6)
	No	15 (21.1)	440 (47.4)

Vaginitis	Yes	20 (28.2)	113 (12.2)
	No	51 (71.8)	816 (87.8)
Dyspareunia	Yes	29 (40.8)	246 (26.5)
	No	42 (59.2)	683 (73.5)
Vulvar itching	Yes	39 (54.9)	349 (37.6)
	No	32 (45.1)	580 (62.4)
Leukorrhea	Yes	50 (70.4)	502 (54.0)
	No	21 (29.6)	427 (46.0)
Dysuria	Yes	12 (16.9)	187 (20.1)
	No	59 (83.1)	742 (79.9)
Hematuria	Yes	7 (9.9)	77 (8.3)
	No	64 (90.1)	852 (91.7)

Univariable Poisson regression analysis of factors associated with syphilis seropositivity are seen in Table 3. Most genitourinary symptoms were associated with increased odds of syphilis seropositivity in univariable analysis. Genital sore showed the strongest crude association, followed by abdominal pain, groin pain, and vaginitis. Vulvar itching, leukorrhea, and dyspareunia were also significantly associated with higher odds of seropositivity. Dysuria and hematuria were not significantly associated with seropositivity (**Error! Reference source not found.**).

Table 3: Univariable Logistic Regression analysis of factors associated with syphilis seropositivity

Variable	***Category***	***Crude OR (95% CI)***	***P-value***
Age (continuous)	Per year increase	1.016 (0.999–1.033)	0.065
Education level	No formal education	Ref	—
	Educated	0.374 (0.225–0.623)	<0.001
Economic status	Low	Ref	—
	Middle	1.646 (0.647–4.188)	0.295
	High	0.294 (0.034–2.574)	0.269
Family size (number of household members)	1–6	Ref	—
	7–10	2.201 (0.754–6.424)	0.149
	≥11	4.964 (1.749–14.087)	0.003
Parity	Nulliparous	Ref	—
	Primiparous	4.621 (1.136–18.793)	0.032
	Multiparous	10.163 (3.161–32.673)	<0.001
Co-wife status	No	Ref	—
	Yes	3.758 (2.097–6.734)	<0.001
Condom use	No	Ref	—
	Yes	0.191 (0.060–0.616)	0.006
Bathing Frequency (times per week)	0–1	Ref	—
	2–6	0.618 (0.379–1.008)	0.054
Sanitary pad use	Never	Ref	—
	Always	0.136 (0.058–0.321)	<0.001
	Sometimes	0.639 (0.345–1.185)	0.155
Share towel	No	Ref	—
	Yes	3.090 (1.896–5.036)	<0.001
Share underwear	No	Ref	—
	Yes	1.332 (0.514–3.453)	0.556

OR: Odds ratio; CI: Confidence interval; Ref: Reference category. All odds ratios are calculated relative to the specified reference category for each variable

In the multivariable model including sociodemographic and behavioral variables (Model 1), middle economic status and having a co-wife were independently associated with higher odds of syphilis seropositivity. In contrast, educational attainment and condom use were independently associated with lower odds of seropositivity (**Error! Reference source not found.**).

Table 4: Univariable Logistic Regression analysis of genitourinary symptoms associated with syphilis seropositivity

Variable	***Category***	***Crude OR (95% CI)***	***P-value***
Genital sore	No	Ref	—
	Yes	7.882 (4.337–14.191)	<0.001
Abdominal pain	No	Ref	—
	Yes	3.806 (1.369–10.579)	0.010
Dyspareunia	No	Ref	—
	Yes	1.917 (1.168–3.145)	0.010
Vaginitis	No	Ref	—
	Yes	2.832 (1.629–4.924)	<0.001
Dysuria	No	Ref	—
	Yes	0.807 (0.425–1.532)	0.512
Groin pain	No	Ref	—
	Yes	3.359 (1.873–6.025)	<0.001
Leukorrhea	No	Ref	—
	Yes	2.025 (1.197–3.426)	0.009
Hematuria	No	Ref	—
	Yes	1.210 (0.536–2.732)	0.646
Vulvar itching	No	Ref	—
	Yes	2.025 (1.246–3.293)	0.004

OR: Odds ratio; CI: Confidence interval; Ref: Reference category. All odds ratios are calculated relative to the specified reference category for each variable.

In the second multivariable model including age and self-reported genitourinary symptoms (Model 2), genital sore, abdominal pain, and groin pain remained independently associated with syphilis seropositivity, with genital sore showing the strongest association. Dysuria was inversely associated with syphilis seropositivity after adjustment, while the remaining symptoms, including dyspareunia, vaginitis, leukorrhea, hematuria, and vulvar itching, were not statistically significant in the adjusted model (**Error! Reference source not found.**).

Table 5: Multivariable Logistic regression models associated with syphilis seropositivity

Variable	***Category***	***MODEL 1***		***MODEL 2***	
		aOR (95% CI)	*P*-value	aOR (95% CI)	*P*-value
Age	Per year	0.993 (0.973–1.014)	0.513	0.998 (0.976–1.020)	0.842
Education level	No education	Ref		—	—
	Educated	0.454 (0.253–0.814)	0.008	—	—
Economic status	Low	Ref		—	—
	Middle	3.007 (1.131–7.996)	0.027	—	—

	High	1.126 (0.121–10.508)	0.917	—	—
Co-wife status	No	Ref		—	—
	Yes	3.641 (1.949–6.802)	<0.001	—	—
Condom use	No	Ref		—	—
	Yes	0.258 (0.078–0.849)	0.026	—	—
Genital sore	No	—	—	Ref	
	Yes	—	—	7.946 (3.794–16.641)	<0.001
Abdominal pain	No	—	—	Ref	
	Yes	—	—	5.073 (1.738–14.812)	0.003
Dyspareunia	No	—	—	Ref	
	Yes	—	—	0.739 (0.395–1.383)	0.345
Vaginitis	No	—	—	Ref	
	Yes	—	—	1.543 (0.787–3.024)	0.207
Dysuria	No	—	—	Ref	
	Yes	—	—	0.278 (0.131–0.588)	<0.001
Groin pain	No	—	—	Ref	
	Yes	—	—	3.155 (1.651–6.029)	<0.001
Leukorrhea	No	—	—	Ref	
	Yes	—	—	1.361 (0.748–2.477)	0.314
Hematuria	No	—	—	Ref	
	Yes	—	—	0.502 (0.193–1.304)	0.157
Vulvar itching	No	—	—	Ref	
	Yes	—	—	1.608 (0.899–2.875)	0.109

aOR: Adjusted odds ratio; CI: Confidence interval; Ref: Reference category. All adjusted odds ratios are calculated relative to the specified reference category for each variable

Discussion

This multicenter study provides important epidemiological evidence on syphilis seroprevalence and associated factors among women attending gynecological and obstetric services in private health facilities in Pul-e-Khumri, Baghlan Province.

The observed syphilis seroprevalence in this study is higher than estimates reported in other populations, including 1.4% among women of reproductive age attending healthcare facilities in Swaziland [16] and 0.37% in rural China [17]. These differences may reflect variations in study populations, local epidemiological conditions, diagnostic methodologies, and access to healthcare facilities, including limited availability of routine STI screening, delayed healthcare seeking, and sociocultural barriers to sexual health services in the study setting. As the treponemal rapid test detects antibodies and cannot distinguish active from past infection, the observed seroprevalence likely reflects cumulative exposure rather than active disease. Nevertheless, the overall syphilis seropositivity of 7.1% indicates a substantial level of serological exposure in this study population and underscores the need for strengthened surveillance and routine screening within reproductive health services.

The association with co-wife status may reflect interconnected sexual networks within polygynous marital structures. In such settings, sociocultural and interpersonal power dynamics may limit women's ability to negotiate condom use or other protective measures, increasing vulnerability to sexually transmitted infections [18]. In contrast, the relationship between economic status and syphilis seropositivity was less consistent. Although no association was observed in univariable analysis, an effect emerged after adjustment, suggesting potential confounding by

other factors. Unlike studies reporting a protective effect of higher socioeconomic status [19, 20], no consistent gradient was identified in this study, which may partly reflect the skewed distribution of income within the study population. This finding should be interpreted with caution, as it may reflect residual confounding or differential healthcare-seeking behavior rather than a true causal relationship.

Educational attainment and reported condom use were independently associated with lower odds of syphilis seropositivity. The association with education may reflect its role in improving health knowledge and promoting preventive behaviors; however, sexual practices are also shaped by broader social and cultural influences, and education alone may not fully determine infection risk [21]. Similarly, the protective association of condom use is consistent with established epidemiological evidence [4]. This is biologically plausible, as transmission of *Treponema pallidum* occurs through direct contact with infectious lesions and mucosal surfaces. However, because such lesions may occur outside areas covered by condoms, protection remains incomplete [22].

Only a limited number of self-reported genitourinary symptoms remained independently associated with syphilis seropositivity. Genital sore demonstrated the strongest association, followed by abdominal pain and groin pain, while other symptoms were not significant after adjustment. However, these manifestations are non-specific and may reflect other reproductive tract infections or shared behavioral risk factors rather than syphilis alone. Notably, genital sores were reported by only 29.6% of seropositive participants, which may reflect the painless nature of the chancres and the potential for lesions to occur at internal genital sites, such as the cervix or vaginal wall [23], making clinical recognition challenging. Together, these findings suggest that symptom-based screening alone is insufficient and reinforce the importance of routine laboratory testing.

HIV seropositivity was low in this population. However, the biological interplay between syphilis and HIV is well-documented. Syphilis infection has been shown to increase the risk of acquiring HIV by two- to threefold [24]. Ulcerative sexually transmitted infections (STIs) such as syphilis can disrupt epithelial and mucosal barriers, facilitating viral entry and increasing susceptibility to HIV [24-26]. Although HIV seropositivity was rare in this study, these findings support the value of integrated screening for both infections within reproductive health programs.

Hygiene-related behaviors, including infrequent bathing, non-use of sanitary pads, and sharing of towels or underwear, were more common among seropositive participants. Although these practices are unlikely to directly cause syphilis, they may reflect underlying socioeconomic vulnerability, broader reproductive health challenges, or increased exposure to other genital tract conditions, highlighting potential avenues for health education and community-based interventions.

This study has several limitations. First, syphilis diagnosis relied on a treponemal rapid test, which cannot distinguish active from past infection and may have led to overestimation of the true burden of active syphilis infection. In addition, potential cross-reactivity with antibodies generated in response to other treponemal infections cannot be excluded. Second, the cross-sectional design precludes causal inference and introduces the possibility of reverse causality in associations between reported symptoms and syphilis seropositivity. Third, self-reported behavioral and clinical data are subject to recall and social desirability biases, and residual confounding is possible due to the lack of data on partner risk behaviors and prior sexually transmitted infections. Fourth, the study population was limited to women attending private health facilities, potentially restricting generalizability. Finally, the relatively small number of seropositive outcomes may have limited statistical precision and increased the risk of unstable estimates

in multivariable models, particularly for categories with sparse observations.

Despite these limitations, the study adds to the limited evidence on syphilis seroprevalence and associated factors among women in this setting. The findings suggest gaps in access to routine sexually transmitted infection screening and prevention services, as well as the potential influence of social and structural factors, including marital networks and socioeconomic conditions, on infection risk. The observed associations and symptom patterns further highlight the limitations of symptom-based approaches and the importance of integrating laboratory-based screening into routine care. Future research incorporating confirmatory testing and population-based sampling is needed to better characterize the epidemiology of syphilis and inform context-specific prevention strategies.

Conclusion

This multicenter study identified a high syphilis seroprevalence among women attending gynecological and obstetric services in Pul-e-Khumri, Baghlan Province. Middle economic status and co-wife status were independently associated with higher odds of seropositivity, while educational attainment and condom use were associated with lower odds. A limited number of genitourinary symptoms were also associated with seropositivity.

These findings support the need to strengthen syphilis screening and prevention within reproductive health services. Expanding access to routine testing, improving public awareness, reducing stigma surrounding STI testing, and promoting partner notification and testing may facilitate earlier detection and help interrupt transmission. Further research using confirmatory diagnostics and broader population-based approaches is warranted.

References

1. Begaj T, Sobrin L. Ophthalmic Consequences of Syphilis. Int Ophthalmol Clin. 2022;62(2):251-68.
2. (WHO) WHO. Data on syphilis: World Health Organization (WHO); 2024 [Available from: https://www.who.int/data/gho/data/themes/topics/data-on-syphilis.
3. (WHO) WHO. Syphilis Geneva: World Health Organization; 2025 [Available from: https://www.who.int/news-room/fact-sheets/detail/syphilis.
4. Rosset F, Celoria V, Delmonte S, Mastorino L, Sciamarrelli N, Boskovic S, et al. The epidemiology of syphilis worldwide in the last decade. J Clin Med. 2025;14(15):5308.
5. Esmaeilzadeh F, Mohammadi M, Amjadipour A, Jafari A, Ghelichi-Ghojogh M, Khezri R, et al. Prevalence of syphilis infections among the Iranian population: a systematic review and meta-analysis. Iran J Public Health. 2022;51(7):1513.
6. Shah SA, Zubair M, Soomro A, Sheikh R, Zhamalbekova A, Abidi SH. Analysis of seroprevalence and risk factors for syphilis and HIV among female sex workers and transgender individuals in different cities of Sindh, Pakistan. Plos One. 2025;20(1):e0312683.
7. Muhammad I, Khalifa EH, Salih MM, Ullah W, Elseid MS, Qasim M, et al. Analysis of molecular subtypes and antibiotic resistance in *Treponema pallidum* isolates from blood donors in Khyber Pakhtunkhwa, Pakistan. Plos one. 2024;19(6):e0305720.
8. Gomez GB, Kamb ML, Newman LM, Mark J, Broutet N, Hawkes SJ. Untreated maternal syphilis and adverse outcomes of pregnancy: a systematic review and meta-analysis. Bulletin of the World Health Organization. 2013;91:217-26.
9. Mathias BA, Muñoz TIC, Guaicha EPG, Quinde APG, Herrera MFB. Side effects of Sexually Transmitted Infections (STIs) on female fertility: diagnostic and treatment strategies–a literature review. Ibero-Am J Health Sci Res. 2024;4(1):84-92.
10. García-Cisneros S, Herrera-Ortiz A, Olamendi-Portugal M, Sánchez-Alemán MA. Re-emergence of syphilis in women of reproductive age and its association with the increase in congenital syphilis in Mexico during 2010–2019:

an ecological study. BMC Infect Dis. 2021;21(1):992.
11. Hengel B, McManus H, Monaghan R, Mak DB, Bright A, Tolosa X, et al. Notification rates for syphilis in women of reproductive age and congenital syphilis in Australia, 2011–2021: a retrospective cohort analysis of national notifications data. Med J Australia. 2024;221(4):201-8.
12. Cutler JC. Survey of venereal diseases in Afghanistan. Bulletin of the World Health Organization. 1950;2(4):689.
13. Hashemi E, Waheed U, Saba N, Wazeer A. First report from Afghanistan on the prevalence of blood-borne infections: A retrospective cross-sectional multicentre study for an epidemiological assessment. J Blood Med. 2022:45-50.
14. Todd C, Ahmadzai M, Atiqzai F, Smith J, Miller S, Azfar P, et al. Prevalence and correlates of HIV, syphilis, and hepatitis knowledge among intrapartum patients and health care providers in Kabul, Afghanistan. AIDS Care. 2009;21(1):109-17.
15. (NSIA) NSaIA. Estimated Population of Afghanistan 2025-26. 2025.
16. Ginindza TG, Stefan CD, Tsoka-Gwegweni JM, Dlamini X, Jolly PE, Weiderpass E, et al. Prevalence and risk factors associated with sexually transmitted infections (STIs) among women of reproductive age in Swaziland. Infect Agents Cancer. 2017;12(1):29.
17. Liao K-J, Zhang S-K, Liu M, Wang Q-M, Liu J, Shen H-P, et al. Seroepidemiology of syphilis infection among 2 million reproductive-age women in rural China: a population-based, cross-sectional study. Chinese Med J. 2017;130(18):2198-204.
18. Dhillon S, Amoak D, Chidimbah Munthali GN, Sano Y, Antabe R, Luginaah I. Polygamy and safe sex negotiation among married women: evidence from Cameroon. BMC Infect Dis. 2023;23(1):817.
19. Huda MN, Ahmed MU, Uddin MB, Hasan MK, Uddin J, Dune TM. Prevalence and demographic, socioeconomic, and behavioral risk factors of self-reported symptoms of sexually transmitted infections (STIs) among ever-married women: evidence from nationally representative surveys in Bangladesh. Int J Environ Res Public Health. 2022;19(3):1906.
20. Guedes ALdL, Guimarães DCdS, Sarkis DJ, Gabriel TT, Delgado CS, Campos AAL, et al. Factors associated with women diagnosed with syphilis who received prenatal care in a primary healthcare unit. Einstein (São Paulo). 2023;21:eAO0046.
21. Macêdo VCd, Lira PICd, Frias PGd, Romaguera LMD, Caires SdFF, Ximenes RAdA. Risk factors for syphilis in women: case-control study. Revista de Saúde Pública. 2017;51:78.
22. Organization WH. Condoms 2025 [Available from: https://www.who.int/news-room/fact-sheets/detail/condoms.
23. Avelleira JCR, Bottino G. Syphilis: diagnosis, treatment and control. Anais Brasileiros de Dermatologia. 2006;81:111-26.
24. Wu MY, Gong HZ, Hu KR, Zheng H-y, Wan X, Li J. Effect of syphilis infection on HIV acquisition: a systematic review and meta-analysis. Sexually transmitted infections. 2021;97(7):525-33.
25. Karp G, Schlaeffer F, Jotkowitz A, Riesenberg K. Syphilis and HIV co-infection. Eur J Int Med.. 2009;20(1):9-13.
26. Puspawati NMD, Yasa IWPS, Manuaba IBP, Wande IN, Somia IKA. Bidirectional Association within HIV and Syphilis Coinfection: A Pathophysiological and Clinical Review. Russian Open Med J. 2025;14(3):313.