



Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 3 (2026): March 2026 Issue
<https://doi.org/10.51168/sjhrafrica.v7i3.2593>

Original Article

Clinicodemographic Profile and Treatment Outcomes of Genital Ulcer Disease in a Tertiary Care STI Clinic: A Prospective Cross-Sectional Observational Study.

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Page | 1

Abstract

Background:

Genital ulcer disease remains an important syndrome encountered in sexually transmitted infection clinics because it causes substantial morbidity, facilitates transmission of other sexually transmitted infections, and has a recognized epidemiological association with human immunodeficiency virus infection. Local clinic-based data are essential for understanding prevailing etiologies, clinical patterns, and early treatment outcomes.

Objectives:

To describe the clinicodemographic characteristics and etiological spectrum of genital ulcer disease and to assess short-term treatment outcomes among patients attending a tertiary care STI clinic.

Methods:

This prospective observational study enrolled one hundred consecutive patients with genital ulcer disease. Demographic details, sexual and behavioral history, clinical findings, supportive laboratory investigations, etiological diagnosis, and follow-up outcomes were recorded using a structured case record form. Descriptive statistics were used for analysis.

Results:

The mean age of participants was 31.8 +/- 9.4 years, and 68% were males. Most patients belonged to the 25-34 year age group, 63% reported high-risk sexual exposure, and 72% reported inconsistent or absent condom use. Painful ulcers were present in 64%, multiple ulcers in 58%, and recurrent episodes in 34%. Genital herpes was the most common etiology (52%), followed by syphilis (18%) and chancroid (12%). Human immunodeficiency virus reactivity was observed in 12% of patients. Complete healing was documented in 82% of cases, while 12% showed partial improvement, 3% had no significant response, and 3% were lost to follow-up.

Conclusion:

Genital herpes was the predominant cause of genital ulcer disease in this tertiary care STI clinic, with syphilis remaining an important contributor. Most patients were young adults with identifiable sexual risk behavior, and overall treatment outcomes were favorable with timely syndromic and etiological management.

Recommendations:

Tertiary STI clinics should strengthen routine risk assessment, same-visit counseling, HIV and syphilis screening, partner notification, and early follow-up.

Keywords: Genital ulcer disease; sexually transmitted infections; genital herpes; syphilis; chancroid; HIV; treatment outcomes; STI clinic.

Submitted: January 06, 2026 **Accepted:** February 25, 2026 **Published:** March 30, 2026

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Introduction

Genital ulcer disease is an important clinical syndrome encountered in sexually transmitted infection clinics and dermatology-venereology practice. It encompasses a group of ulcerative lesions affecting the genital, perineal, or adjacent mucocutaneous regions and is associated with pain, anxiety, stigma, sexual dysfunction, and increased healthcare utilization [1,2]. The principal sexually transmitted infections include herpes simplex virus infection, primary syphilis, chancroid, lymphogranuloma venereum, and donovanosis, although traumatic, inflammatory, drug-related, and other non-venereal causes must also be considered during evaluation. Among these conditions, genital herpes has emerged as the leading cause of genital ulcer disease in many regions, reflecting the changing epidemiology of sexually transmitted infections worldwide [3,4].

The public health relevance of genital ulcer disease extends beyond the lesion itself. Ulceration disrupts epithelial integrity, promotes local inflammation, and increases susceptibility to the acquisition and transmission of human immunodeficiency virus infection [4]. Previous clinical and epidemiological studies have demonstrated a strong association between genital ulcer disease, herpes simplex virus type 2 infection, syphilis, and HIV infection, underlining the need for prompt diagnosis, treatment, counseling, and partner management. In addition, recurrent herpetic disease and persistent ulcerative lesions can adversely affect quality of life, sexual health, and adherence to prevention practices [5].

Despite its clinical importance, etiological diagnosis of genital ulcer disease remains challenging in routine practice. The appearance of ulcers often overlaps across different causes, and partial treatment before presentation can further obscure the clinical picture [10]. In many resource-constrained settings, syndromic management continues to be widely used because it allows same-day treatment and helps reduce delays in care. However, evidence indicates that purely clinical algorithms have limited sensitivity and specificity for distinguishing herpes, syphilis, and chancroid, making periodic local etiological assessment essential [7,10]. Studies from India and other low- and middle-income settings have shown variation in the etiological profile of genital ulcer disease, with a gradual shift toward viral etiologies while bacterial ulcerative sexually transmitted infections persist in smaller but clinically significant proportions [8,9].

Clinic-based prospective data are therefore valuable for understanding the current burden, demographic pattern, risk

behavior profile, presentation, and early outcomes of genital ulcer disease in a given setting. Such information can guide counseling priorities, screening practices, syndromic protocols, and referral pathways within tertiary sexually transmitted infection services. Telangana continues to serve a heterogeneous urban-rural population, and data from tertiary DVL clinics can provide practical insight into prevailing patterns of genital ulcer disease in routine care.

The objectives of the present study were to describe the clinicodemographic profile of patients presenting with genital ulcer disease, to analyze the clinical and etiological spectrum of disease, and to assess short-term treatment outcomes among patients attending the tertiary care STI clinic in the Department of DVL, Government Medical College, Karimnagar, Telangana, India.

Methodology

Study design and setting

This was a prospective observational cross-sectional study with short-term clinical follow-up, conducted in the Department of Dermatology, Venereology and Leprosy, Government Medical College, Karimnagar, Telangana, India, from July 2025 to December 2025. The study was carried out in a tertiary care sexually transmitted infection clinic catering to both urban and rural populations. The cross-sectional component assessed the clinicodemographic profile, clinical presentation, risk behavior, and etiological spectrum of genital ulcer disease at the time of presentation. A prospective follow-up component was included to document early treatment response after syndromic or etiological management.

Participants

All consecutive patients presenting to the STI clinic with one or more genital ulcers during the study period were screened for eligibility.

Inclusion criteria

1. Adults of either sex presenting with clinically evident genital ulcer disease.
2. Patients attending the tertiary care STI clinic during the study period.
3. Patients willing to provide written informed consent.
4. Patients who agreed to undergo clinical examination, relevant laboratory investigations, counseling, treatment, and follow-up.



Exclusion criteria

1. Incomplete baseline clinical or demographic data.
2. History of prolonged definitive treatment before the first clinical evaluation, which could alter ulcer morphology or laboratory findings.
3. Severe illness preventing adequate clinical assessment.
4. Refusal to provide informed consent.
5. Failure to complete the minimum required evaluation for etiological classification.

Sample size

A total sample size of 100 participants was planned for the study. Since this was a descriptive clinic-based observational study, the sample size was determined based on feasibility, expected patient flow in the STI clinic, and the six-month study duration. Based on routine outpatient attendance, approximately 90–120 eligible patients with genital ulcer disease were expected during the study period. Therefore, 100 consecutive eligible patients were enrolled. This number was considered adequate to describe the clinicodemographic pattern, etiological distribution, and early treatment outcomes in the study setting.

Data collection

A structured case record form was used for each participant. Demographic variables such as age, sex, marital status, and residence were recorded. Sexual and behavioral history included high-risk sexual exposure, condom use, and a past history of sexually transmitted infection. Clinical details included duration of symptoms, number of ulcers, pain, vesicular onset, recurrence, site of ulcer, discharge, dysuria, fever, and inguinal lymphadenopathy. All patients underwent a detailed genital examination under appropriate privacy and confidentiality.

Diagnostic evaluation

Etiological diagnosis was made using clinical assessment supported by available laboratory investigations. Non-treponemal serology for syphilis was performed in all patients, and HIV testing was offered after pre-test counseling and consent. Additional investigations, such as Tzanck smear, Gram stain, or tissue smear, were used selectively when clinically indicated and feasible. Final etiological categorization included genital herpes, syphilis, chancroid, lymphogranuloma venereum, donovanosis, mixed infection, and non-specific or non-venereal ulcer.

Treatment and follow-up

Patients received syndromic or etiological treatment according to departmental protocol and standard STI management guidelines. Counseling was provided regarding abstinence during active disease, condom use, partner evaluation, HIV prevention, and treatment adherence. Patients were followed up to assess short-term clinical response. Treatment outcome was categorized as complete healing, partial improvement, no significant response, or lost to follow-up. Complete healing was defined as full resolution of the ulcer, while partial improvement was defined as a reduction in ulcer size, pain, discharge, or inflammation without complete healing.

Bias and methods used to minimize bias

Selection bias was minimized by enrolling consecutive eligible patients during the defined study period rather than selecting cases subjectively. Information bias was reduced by using a structured case record form and uniform clinical documentation for all participants. Recall bias was possible because sexual exposure history, condom use, and previous STI history were self-reported; this was minimized by interviewing patients in a confidential setting and using simple, non-judgmental questions. Observer bias was minimized by applying predefined clinical criteria for ulcer morphology, recurrence, lymphadenopathy, and treatment response. Diagnostic bias was possible because advanced molecular confirmation was not available for all cases; this was reduced by combining clinical assessment with available serology and supportive laboratory tests wherever feasible. Loss to follow-up bias was minimized by counseling patients about the importance of reviewing and recording outcome categories clearly, including lost to follow-up cases.

Statistical analysis

Data were entered into a spreadsheet and analyzed using descriptive statistics. Continuous variables were expressed as mean and standard deviation. Categorical variables were presented as frequencies and percentages. Results were summarized in tables showing demographic profile, clinical features, etiological distribution, laboratory findings, and treatment outcomes. Since the study was primarily descriptive, no inferential statistical testing was applied.

Ethical considerations

Institutional Ethics Committee approval was obtained from the Government Medical College, Karimnagar, Telangana,



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e-ISSN: 2709-9997, p-ISSN: 3006-1059

Vol.7 No. 3 (2026): March 2026 Issue

<https://doi.org/10.51168/sjhrafrica.v7i3.2593>

Original Article

Page | 4

India, before initiation of the study. Written informed consent was obtained from all participants before enrolment. The purpose of the study, clinical examination, laboratory investigations, HIV counselling and testing, treatment, and follow-up procedures were explained to each participant in a clear and confidential manner. Patient confidentiality was strictly maintained throughout the study, and all collected data were anonymized before analysis. HIV counselling and testing were performed according to standard ethical and clinical practice. All patients received appropriate treatment irrespective of their participation in the study, and refusal to participate did not affect routine clinical care.

Results

Participant flow

During the study period, 112 patients presenting with suspected genital ulcer disease were assessed for eligibility in the tertiary care STI clinic. Of these, 100 patients fulfilled

the inclusion criteria and were enrolled in the study. Twelve patients were excluded before enrolment: five had received prolonged definitive treatment before the first clinical evaluation, four had incomplete baseline clinical or demographic data, and three did not complete the minimum required evaluation or declined consent.

All 100 enrolled participants were included in the baseline demographic, clinical, and etiological analysis. During follow-up, 97 patients completed clinical outcome assessment, while three patients were lost to follow-up because they did not return for scheduled review. These three cases were retained in the overall treatment outcome analysis under the category “lost to follow-up,” consistent with the predefined outcome classification. The final analysis included 100 participants for baseline and etiological assessment, with treatment outcome documented as complete healing, partial improvement, no response, or lost to follow-up.

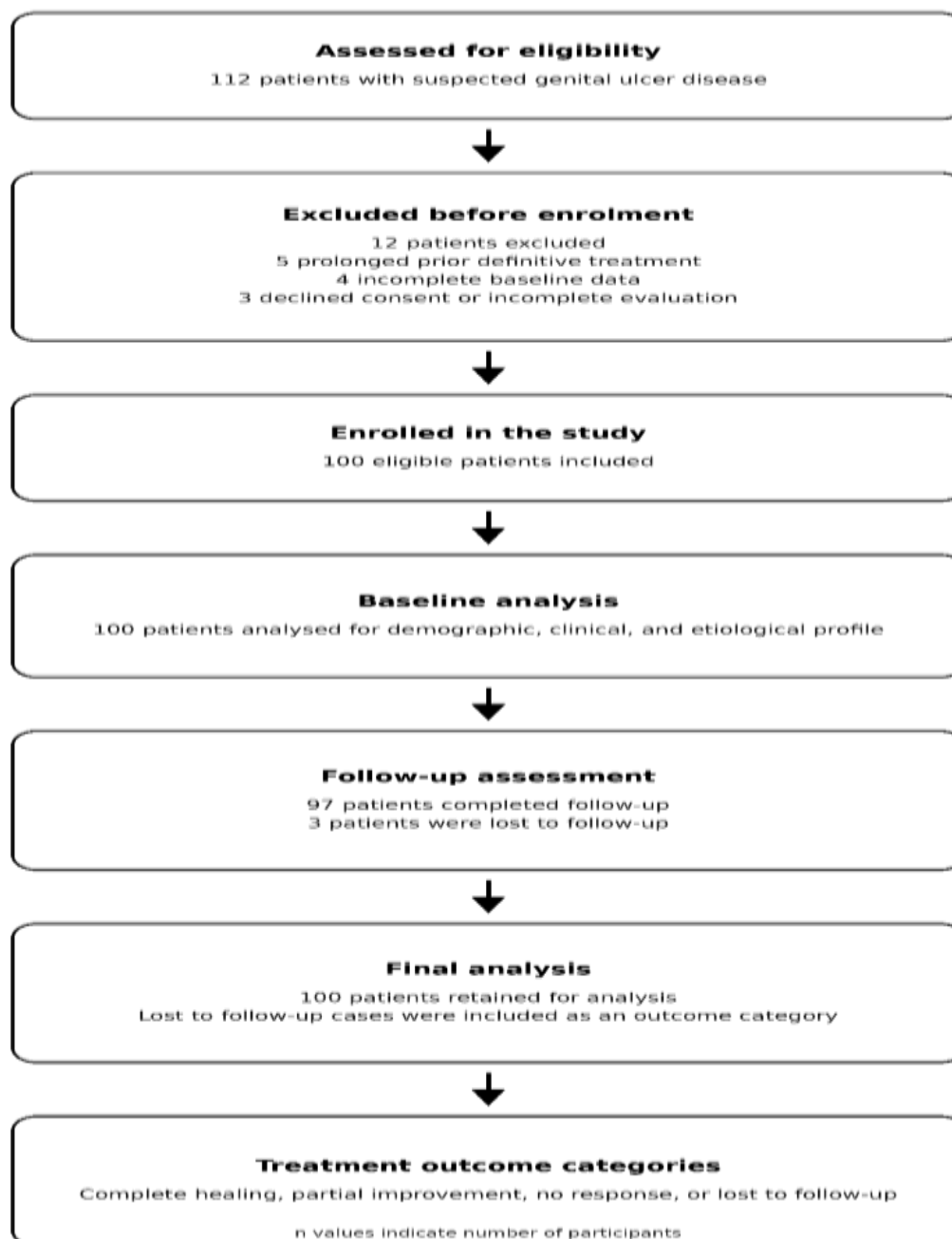


Figure 1: Participant Flow Diagram



The present prospective observational study included 100 consecutive patients diagnosed with genital ulcer disease attending the tertiary care STI clinic. The mean age of the study population was 31.8 +/- 9.4 years. The majority of patients belonged to the 25-34 year age group [38%], followed by 18-24 years [24%], 35-44 years [23%], and 45 years or older [15%]. Males constituted 68% of the study

population, while females accounted for 32%, giving a male-to-female ratio of 2.1:1. Most participants were married [54%], and 61% were from urban areas. A history suggestive of high-risk sexual exposure was present in 63% of patients, inconsistent condom use was reported by 72%, and 27% had a past history of sexually transmitted infection [Table 1].

Table 1. Sociodemographic and behavioral profile of study participants [N = 100]

Variable	Category	n	%
Age group	18-24 years	24	24
	25-34 years	38	38
	35-44 years	23	23
	>=45 years	15	15
Sex	Male	68	68
	Female	32	32
Marital status	Married	54	54
	Unmarried	46	46
Residence	Urban	61	61
	Rural	39	39
History of high-risk sexual exposure	Present	63	63
	Absent	37	37
Condom use	Consistent	28	28
	Inconsistent / none	72	72
Past history of STI	Present	27	27
	Absent	73	73

Mean age: 31.8 +/- 9.4 years

Painful genital ulcers were observed in 64% of patients, whereas 36% had painless ulcers. Multiple ulcers were more common than single ulcers [58% versus 42%]. Vesicular onset was noted in 39% of cases, inguinal lymphadenopathy in 29%, recurrent episodes in 34%, and associated urethral

or vaginal discharge in 22%. Dysuria was present in 18% and fever in 11% of patients. The mean duration of symptoms before presentation was 6.8 +/- 3.9 days. Penile lesions were the most common presentation site [62%],



followed by vulval lesions [28%], perianal ulcers [6%], and cervical or vaginal lesions [4%] [Table 2].

Table 2. Clinical profile of genital ulcer disease cases [N = 100]

Variable	Category	n	%
Nature of ulcer pain	Painful	64	64
	Painless	36	36
Number of ulcers	Single	42	42
	Multiple	58	58
Vesicular onset	Present	39	39
	Absent	61	61
Inguinal lymphadenopathy	Present	29	29
	Absent	71	71
Recurrent episodes	Present	34	34
	Absent	66	66
Urethral/vaginal discharge	Present	22	22
	Absent	78	78
Dysuria	Present	18	18
	Absent	82	82
Fever	Present	11	11
	Absent	89	89
Site of ulcer	Penis	62	62
	Vulva	28	28
	Perianal region	6	6
	Cervix/vagina	4	4

Mean duration of symptoms before presentation: 6.8 +/- 3.9 days

With respect to etiological diagnosis, genital herpes was the most common cause of genital ulcer disease, accounting for

52% of cases. Syphilis was diagnosed in 18%, chancroid in 12%, lymphogranuloma venereum in 6%, and donovanosis



in 4%. Mixed infectious etiology was identified in 3% of patients, while 5% were categorized as non-specific or non-venereal genital ulcers after evaluation. Serological testing

showed HIV reactivity in 12% of patients, and all syphilis cases showed reactive non-treponemal serology consistent with the clinical diagnosis [Table 3].

Table 3. Etiological distribution of genital ulcer disease and additional laboratory findings [N = 100]

Etiological diagnosis/laboratory finding	n	%
Genital herpes	52	52
Syphilis	18	18
Chancroid	12	12
Lymphogranuloma venereum	6	6
Donovanosis	4	4
Mixed infection	3	3
Non-specific / non-venereal ulcer	5	5
Total	100	100
Additional laboratory findings		
HIV reactive	12	12
HIV non-reactive	88	88
Reactive syphilis serology	18	18
Non-reactive syphilis serology	82	82

At follow-up, complete healing of ulcers was observed in 82% of patients, partial improvement in 12%, and no significant clinical response in 3%; 3% were lost to follow-up. The highest complete healing rates were seen in syphilis [94.4%] and genital herpes [82.7%], while comparatively

lower response rates were observed in mixed and non-specific ulcer groups. Overall, treatment outcomes were favorable in the majority of patients when appropriate syndromic and etiological therapy was instituted promptly [Table 4].

Table 4. Treatment outcomes according to etiology

Diagnosis	Total cases [n]	Complete healing n [%]	Partial improvement n [%]	No response n [%]	Lost to follow-up n [%]
Genital herpes	52	43 [82.7]	6 [11.5]	2 [3.8]	1 [1.9]
Syphilis	18	17 [94.4]	1 [5.6]	0 [0]	0 [0]



Diagnosis	Total cases [n]	Complete healing n [%]	Partial improvement n [%]	No response n [%]	Lost to follow-up n [%]
Chancroid	12	10 [83.3]	1 [8.3]	0 [0]	1 [8.3]
Lymphogranuloma venereum	6	5 [83.3]	1 [16.7]	0 [0]	0 [0]
Donovanosis	4	3 [75.0]	1 [25.0]	0 [0]	0 [0]
Mixed infection	3	2 [66.7]	1 [33.3]	0 [0]	0 [0]
Non-specific / non-venereal ulcer	5	2 [40.0]	1 [20.0]	1 [20.0]	1 [20.0]
Total	100	82 [82.0]	12 [12.0]	3 [3.0]	3 [3.0]

Discussion

The present study offers a prospective clinic-based picture of genital ulcer disease in a tertiary care STI setting and shows that the syndrome predominantly affected young adults, especially men, with recognizable sexual risk behavior. Most patients were between 25 and 34 years of age, and nearly two-thirds reported high-risk sexual exposure. Similar age concentration and male predominance have been described in Indian and other clinic-based studies [7-9,11]. The high frequency of inconsistent condom use and prior STI history in the present study further supports the role of ongoing behavioral vulnerability in sustaining ulcerative STI transmission.

The clinical profile in the series was characterized by painful ulcers, multiple lesions, vesicular onset, and recurrent episodes. This constellation strongly reflects a dominant herpetic burden and is reinforced by the etiological pattern observed. Genital herpes accounted for more than half of all cases, making it the leading diagnosis in this cohort. This finding is consistent with contemporary evidence showing that herpes simplex virus has become the most frequent cause of genital ulcer disease in many regions, including referral clinics in India [12]. Syphilis remained the second most common etiology in our study, which is clinically important because it continues to be epidemiologically relevant and requires timely identification for both patient treatment and partner management [10].

Although bacterial causes were less frequent, chancroid, lymphogranuloma venereum, and donovanosis were still encountered. Their presence indicates that the etiological spectrum remains mixed and that bacterial ulcerative STIs have not disappeared from routine practice. Similar

heterogeneity has been noted in earlier Indian studies, although the relative contribution of viral ulcers has increased over time [11]. The 12% HIV reactivity observed in our series also merits emphasis. Previous studies have shown that genital ulcer disease, particularly herpetic and syphilitic ulcers, is closely linked with HIV acquisition and coexistence because mucosal disruption and local inflammation enhance biological susceptibility [12-14]. Our findings, therefore, reinforce the importance of integrating HIV testing and prevention counseling into all genital ulcer services.

Treatment outcomes were favorable overall, with complete healing in 82% of patients. Healing was particularly good among patients with syphilis and genital herpes, suggesting that prompt recognition and standard treatment can yield satisfactory short-term response in most clinic attendees. However, mixed infections and non-specific ulcers showed relatively poorer outcomes, underscoring the limitations of relying entirely on clinical impressions when the presentation is atypical or overlapping. This observation is in line with evidence that syndromic algorithms alone do not always provide adequate etiological precision.

Generalizability

Although this study was conducted in a single tertiary care STI clinic, the findings are relevant to comparable DVL and STI services managing mixed urban-rural populations in South India. The predominance of genital herpes, persistence of syphilis, and measurable HIV overlap closely with trends described in recent clinic-based literature. Therefore, the study offers practical guidance for routine



Student's Journal of Health Research Africa

e-ISSN: 2709-9997, p-ISSN: 3006-1059

Vol.7 No. 3 (2026): March 2026 Issue

<https://doi.org/10.51168/sjhrafrica.v7i3.2593>

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screening, counseling, syndromic management, and follow-up in similar institutional settings.

Conclusion

This prospective observational study showed that genital ulcer disease in a tertiary care STI clinic predominantly affected young adults with identifiable sexual risk behavior, inconsistent condom use, and occasional prior STI exposure. Genital herpes emerged as the leading etiology, while syphilis remained an important cause, and HIV reactivity was present in a notable minority. Most patients responded well to timely treatment, with complete healing in the majority. The findings highlight the continuing value of systematic clinical assessment, baseline syphilis and HIV screening, counseling, partner evaluation, and structured follow-up. Strengthening etiological diagnosis within routine STI services would improve the precision of management, particularly for mixed, atypical, and non-responsive ulcerative lesions.

Limitations

This was a single-center study with 100 patients observed over six months, which restricts broader population inference. Etiological classification depended on routine clinical assessment and limited supportive laboratory testing rather than universal molecular confirmation. Follow-up focused on early clinical response and did not capture long-term recurrence. Sexual behavior variables were self-reported, which introduced recall bias and social desirability bias into the dataset.

Recommendations

Routine genital ulcer care in tertiary STI clinics should include standardized risk assessment, complete genital examination, same-visit HIV and syphilis screening, counseling on condom use, and structured partner notification support. Patients with recurrent, atypical, mixed, or poorly healing ulcers should undergo expanded etiological testing wherever feasible. Institutional protocols should reinforce early follow-up to document healing, detect treatment failure, and improve adherence. Periodic clinic-based surveillance of etiological trends should be undertaken so that local syndromic algorithms remain clinically relevant, especially in settings where genital herpes predominates but syphilis and other bacterial ulcerative sexually transmitted infections continue to occur in meaningful numbers.

Acknowledgement

The authors acknowledge the faculty, residents, nursing staff, laboratory personnel, and patients of the Department of DVL, Government Medical College, Karimnagar, for their support and cooperation during this study. Their assistance in clinical care, documentation, investigation, and follow-up contributed substantially to the successful completion of this work.

Abbreviations

DVL - Dermatology, Venereology and Leprosy;
GUD - Genital ulcer disease;
HIV - Human immunodeficiency virus;
HSV - Herpes simplex virus;
LGV - Lymphogranuloma venereum;
STI - Sexually transmitted infection.

Source of funding

The study had no funding.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

ChDP-Concept and design of the study, results interpretation, review of literature, and preparing the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript.

VSCR- Design of the study, results interpretation, review of literature, and preparing the first draft of the manuscript, and revision of the manuscript.

Data availability

Data Available

Author Biography

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Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 3 (2026): March 2026 Issue
<https://doi.org/10.51168/sjhrafrica.v7i3.2593>
Original Article

J Infect Dis. 2003;188(10):1492-1497.
<https://doi.org/10.1086/379333>

PUBLISHER DETAILS

Page | 12

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432,
Entebbe Uganda, East Africa

