

# Clinical Spectrum of Herpes Simplex Keratitis in a Tertiary Eye Hospital, Nepal

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## ABSTRACT

**Background:** Ocular manifestations of herpes simplex virus infection range from benign blepharitis, conjunctivitis, and epithelial keratitis to vision-threatening stromal keratitis and uveitis. This study aims to find out the demographic profile, clinical manifestations of herpes simplex virus keratitis and to assess associated visual impairment in Nepalese population.

**Methods:** The retrospective study was conducted from January 2020 – February 2022. The medical records were reviewed where visual acuity at presentation and at one month follow-up, clinical details on examination and, diagnosis of the stage of disease were noted.

**Results:** Of 112 herpes simplex keratitis patients, mean age was 47.19±19.14 years. Patients of herpes simplex keratitis presented with different types of clinical manifestations namely 25 (22.31%) cases were dendritic and 13 (11.6%) geographic ulcers, 38 (33.9%) cases presented with purely stromal lesions, 19 (16.9%) cases with epithelial plus stromal lesions, 11 (9.8%) cases with stromal plus endothelial lesions and six (5.3%) cases with endothelitis. At presentation, 33 (29.4) had visual acuity of 6/6–6/18, 50 (44.6%) had 6/18–6/60, 6 (5.3%) had 6/60–3/60 and 23 (20.5%) had <3/60. At one month follow up 71 (63.3%) had visual acuity of 6/6–6/18, 30 (26.7%) had 6/18–6/60, 5 (4.4%) had <6/60–3/60 and 6 (5.35%) had <3/60.

**Conclusion:** Herpes simplex keratitis has diverse presentation and can cause significant vision impairment. Early clinical diagnosis and management may prevent disease progression and visual impairment.

**Keywords:** Herpes simplex keratitis, visual acuity, visual impairment, viral keratitis

## INTRODUCTION

Herpes simplex virus (HSV) is a ubiquitous DNA virus that can infect anywhere in the body. The most common site of infection are the mouth, genitalia and eye.<sup>1</sup> Ocular manifestations of HSV range from benign blepharitis, conjunctivitis, and epithelial keratitis to vision-threatening stromal disease and uveitis. Epithelial, stromal, and endothelial keratitis are the main subtypes of HSV keratitis.<sup>2</sup> Clinical findings in epithelial keratitis include geographic corneal ulcers with a dendritic tail or dendritic keratitis which occurs after direct invasion by the virus. The stromal keratitis subtype can be further divided into disciform keratitis, immune stromal keratitis, and necrotizing keratitis which develops as a result of immune response to the virus. Endothelial keratitis manifests as rejection line-like keratic precipitates and stromal edema.<sup>3</sup>

HSV keratitis is a very common infective disease in developed countries and it has been estimated that nearly

500,000 people in the USA are affected with ocular HSV.<sup>4</sup> In developing countries where prevalence of bacterial and fungal keratitis and associated ocular disease is high, herpetic keratitis is generally regarded as a less significant. The frequency of incidence of viral keratitis has become much greater in developing countries also because of improved socioeconomic status and following indiscriminate wide spread use of antibiotics and corticosteroids.<sup>5</sup> The epidemiology of ocular involvement with HSV has not been well defined in developing countries despite its high prevalence in developed countries. This study aims to find out the epidemiological profile, clinical manifestations including visual impairment of HSV keratitis in Nepalese population.

## METHODS

A descriptive retrospective study was conducted from January 2020 – February 2022. Ethical clearance was taken from institutional review board of National Academy of

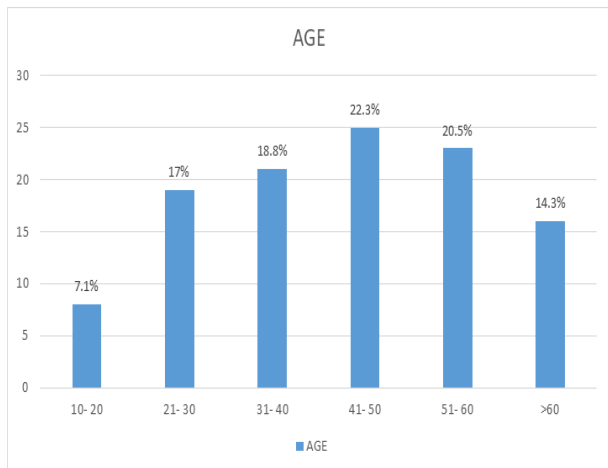
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Medical Science (NAMS, Reference number: 1/2079/80). All cases diagnosed clinically as Herpes simplex keratitis were included and cases with features of Adenoviral and Herpes zoster keratitis were excluded. The details and characteristics of each patient was noted from the record, which included demographic features such as age, sex and clinical features such as symptoms, laterality of lesion and history of recurrence of keratitis. Visual acuity at presentation, clinical details on slit-lamp examination, diagnosis of the stage of disease and visual acuity at 1 month follow up were also noted.

Diagnosis of epithelial keratitis was made if the lesion comprised either dendritic ulcers (lesions with a branching, linear pattern with terminal bulbs), or geographic ulcers (broad ulcers with swollen, scalloped, or geographic epithelial borders). Stromal keratitis included cases of immunostromal keratitis, which can manifest as focal, multiple, or diffuse stromal opacities often accompanied by edema, and cases of interstitial keratitis, which have accompanying blood vessels with stromal opacity. Endothelitis included cases of disciform keratitis, which comprises stromal edema in a disc shape with underlying keratic precipitates, and cases of keratouveitis, in which uveitis predominates with mutton-fat keratic precipitates.<sup>6</sup> Cases with other types of keratitis were excluded. The treatment regimen included: epithelial keratitis were treated with topical antivirals, whereas topical steroids and oral antivirals were used in cases of stromal keratitis. Topical steroids as mainstay, and oral antivirals as needed were used for cases of endothelitis. Statistical analysis was done using SPSS 25.

**RESULTS**

Of 112 Herpes simplex keratitis patients, age ranged from 10-73 years, with mean age of 47.19± 19.14 years. The maximum number of patients belonged to age group 41- 50 years which comprised 25 cases (Figure 1). Among the total number of cases 68 (60.71%) were female and 44 (39.28%) were male with ratio of 17:11.



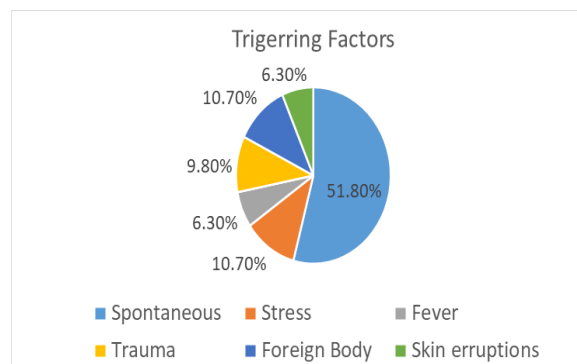
**Figure 1:** Age (years) Distribution of HSV keratitis patients

The common symptoms were mild pain, redness, decreased vision, photophobia, watery discharge where 22 (19.6%) patients presented with mild pain, 90 (80.35%) with redness, 49 (43.75%) photophobia, 53 (47.32%) decreased vision and 44 (39.28%) watery discharge.

History of recurrence was present in 37 (33%) cases and bilateral keratitis was seen in 4 (3.6%) cases. Stromal keratitis was the most common sub type of HSV keratitis as shown in Table 1.

**Table 1:** Clinical presentation of Herpes simplex virus keratitis

Type of Keratitis	Frequency (%)
Dendritic	25 (22.31)
Geographic	13 (11.60)
Stromal	38 (33.92)
Epithelial+ Stromal	19 (16.94)
Stromal + Endothelitis	11 (9.81)
Endothelitis	6 (5.30)



**Figure 2:** Different triggering factors for HSV keratitis

Fifty-eight patients (51.8%) had history of spontaneous onset of disease followed by other triggering factors such as stress, fever, foreign body, skin eruptions and trauma as shown in Figure 2.

Most of the patients had visual impairment at presentation as shown in Table 2.

**Table 2:** Presenting Visual Acuity of HSV keratitis patients

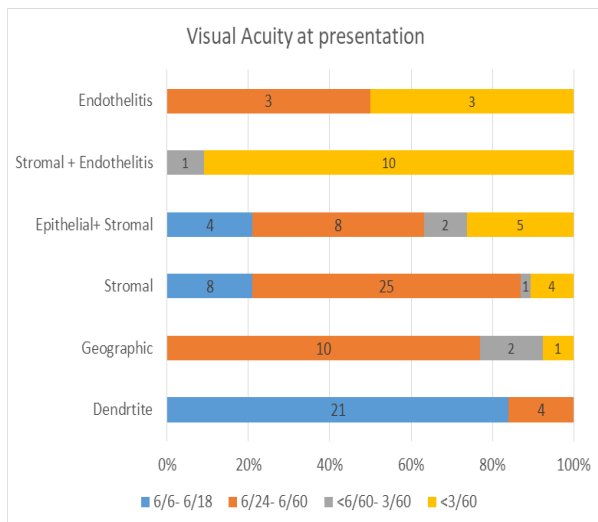
Visual Acuity at Presentation	Frequency (%)
No Visual impairment (6/6 - 6/18)	33 (29.41)
Visual impairment (6/18-6/60)	50 (44.60)
Severe Visual impairment (6/60- 3/60)	6 (5.31)
Blind (<3/60)	23 (20.52)

Presenting visual acuity of each sub type of keratitis has also been categorized as shown in Figure 3.

Of 112 cases that followed up to one month since the first visit, 71 (63.3%) had visual acuity of 6/6–6/18, 30 (26.7%) had 6/18–6/60, 5 (4.5%) had <6/60–3/60, and 6 (5.35%) had <3/60. Table 3 shows vision at one month follow up in each type of keratitis.

**DISCUSSION**

Our study included 112 patients of HSV keratitis where patients mean age at presentation was 47.19± 19.14 years which is similar to study done by Shah et al.<sup>7</sup> In our study



**Figure 3:** Visual acuity at presentation in different types of keratitis

**Table 3:** Visual Acuity at one month in different types of Keratitis

Visual acuity at one month	Type of Keratitis						Total (%)
	Dendritic	Geographic	Stromal	Epithelial+Stromal	Endothelitis	Stromal+endothelium	
6/6 – 6/18	23 (20.5%)	9 (8.03%)	27 (24.2%)	11 (9.8%)	1 (0.89%)	0	71 (63.3%)
6/24 – 6/60	2 (1.78%)	4 (3.57%)	10 (8.92%)	5 (3.57%)	5 (4.46%)	5 (4.46%)	30 (26.7%)
6/60 – 3/60	0	0	0	2 (1.78%)	0	3 (2.67%)	5 (4.45%)
<3/60	0	0	1 (0.89%)	2 (1.78%)	0	3 (2.67%)	6 (5.3%)

60.71% cases were female and 39.28% cases were male, whereas other studies done in the Indian subcontinent have shown a clear male preponderance for HSK.<sup>5,8</sup> One third of the cases in our study presented with purely stromal lesions, 22.3% were dendritic and 11.6% were geographic ulcers, 16.9% cases presented with epithelial and stromal lesion, 9.81% stromal plus endothelial lesion, 5.30% presented with endothelitis. This finding of the study is comparable to Kabra et al, who reported 20% of cases presenting with dendritic and geographic ulcers and 53.64% with stromal keratitis.<sup>5</sup> The study done by Chaudhary reported disciform keratitis to be the commonest presentation of HSK.<sup>9</sup> In 1985, Darougar et al reported dendritic keratitis in 15% of cases and disciform keratitis in only 2%.<sup>10</sup> The studies done earlier showed lower incidence of stromal involvement whereas in our study stromal involvement has also increased and mixed type of involvement are also seen which points toward a shift in natural history.

The common symptoms presented were 22 patients presented with mild pain, 90 with redness, 49 photophobia, 53 decreased vision and 44 watery discharge which is similar to other studies.<sup>5,9,13</sup> Most of the patients in our study 51.8% had history of spontaneous onset of disease

followed by other triggering factors i.e. 10.70% stress, 10.70% foreign body, 6.30% fever. Study by Raju et al showed the most common triggering factor was stress 15.6% followed by fever and trauma (11.1%).<sup>8</sup> In our study, at presentation, 29.41% had no visual impairment, 44.60% had some visual impairment, 5.31% had severe visual impairment, and 20.53% were blind. Study by Shah et al showed 54.63% had visual acuity >6/60 and 35.76% had visual acuity <3/60.<sup>7</sup> The visual acuity in different types of keratitis showed the decrease in vision with involvement of stroma and endothelium. In the present study, the extent of visual gain at 1 month follow up was as follows: 63.3% had visual acuity of 6/6–6/18, 26.7% had 6/18–6/60, 4.4% <6/60–3/60, and 5.35% <3/60. Wilhelmus study reported that 73% had visual acuity of 20/40 or better, 24% had visual acuity between 20/60 and 20/200, and only 3% had visual acuity worse than 20/200, after 5 years of follow-up.<sup>2</sup>

**Limitation:** As this is retrospective study, prospective

study with longer follow up would have been better. The site of lesion was not mentioned in detail although it has effect in final visual outcome.

## CONCLUSION

Herpes simplex keratitis has diverse presentation and can cause significant vision impairment. Due to lack of investigation in developing country clinical diagnosis is important. Early clinical diagnosis and management of HSV could limit disease progression which may prevent visual impairment.

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## REFERENCES

- Langenberg AG, Corey L, Ashley RL, Leong WP, Straus SE. Chiron HSV Vaccine Study Group A prospective study of new infections with herpes simplex virus type 1 and type 2. *N Engl J Med.* 1999;341(19):1432–1438. DOI: [10.1056/NEJM199911043411904](https://doi.org/10.1056/NEJM199911043411904)
- Wilhelmus KR. Antiviral treatment and other therapeutic interventions for herpes simplex virus epithelial keratitis. *Cochrane Database Syst Rev.* 2015;CD002898. DOI: [10.1002/14651858.CD002898.pub5](https://doi.org/10.1002/14651858.CD002898.pub5)

3. Shoji J, Sakimoto T, Inada N, et al. A diagnostic method for herpes simplex keratitis by simultaneous measurement of viral DNA and virus-specific secretory IgA in tears: an evaluation. *Jpn J Ophthalmol.* 2016;60(4):294–301. DOI: [10.1007/s10384-016-0448-y](https://doi.org/10.1007/s10384-016-0448-y)
4. Lairson DR, Beqrey CE, Reynolds TF, Wilhelmus KR. Prevention of herpes simplex virus eye disease. A cost effectiveness analysis. *Arch ophthalmol* 2003;21:108- 112. DOI: [10.1001/archophth.121.1.108](https://doi.org/10.1001/archophth.121.1.108)
5. Kabra A, Lalitha P, Mahadevan K, et al. Herpes simplex keratitis and visual impairment: A case series. *Indian J Ophthalmol* 2006;54:23-7. DOI: [10.4103/0301-4738.21610](https://doi.org/10.4103/0301-4738.21610)
6. Edward MS, Holland J, Schwartz GS. Classification of herpes simplex virus keratitis. *Cornea* 1999;18:144–54. DOI: [10.1097/00003226-199903000-00002](https://doi.org/10.1097/00003226-199903000-00002)
7. Shah A, Joshi P, Bhusal B, Subedi P. Clinical Pattern and Visual Impairment Associated With Herpes Simplex Keratitis. *Clinical Ophthalmology* 2019;13:2211–2215. DOI: [10.2147/OPHT.S219184](https://doi.org/10.2147/OPHT.S219184)
8. Pramod NP, Rajendran P, Kannan KA, Thyagarajan SP. Herpes simplex keratitis in South India: clinico-virological correlation. *Jpn J Ophthalmol.*1999;43(4):303–307. DOI:[10.1016/S0021-5155\(99\)00026-X](https://doi.org/10.1016/S0021-5155(99)00026-X)
9. Chaudhary M. Clinical and epidemiological profile of herpetic eye disease in a tertiary eye care center. *J Inst Med.* 2017;40(2).
10. Darougar S, Wishart MS, Viswalingam ND. Epidemiological and clinical features of primary herpes simplex virus ocular infection. *Br J Ophthalmol.* 1985;69(1):2–6. DOI: [10.1136/bjo.69.1.2](https://doi.org/10.1136/bjo.69.1.2)
11. Sinha A, Dulani S. Clinical profile of herpes simplex viral keratitis cases attending eye opd in tertiary hospital of Chhattisgarh state. *Indian Journal of Clinical and Experimental Ophthalmology* 2017;3(4):440-443. DOI: [10.18231/2395-1451.2017.0107](https://doi.org/10.18231/2395-1451.2017.0107)
12. Yousuf M, Akhter M, Sajid. Clinical spectrum of Herpes simplex keratitis in Patients attending various health institutions in North India. *Journal of Medical Science and Clinical Research* 2018;6(11):134-138.DOI: <https://dx.doi.org/10.18535/jmscr/v6i11.25>
13. Saini JS, Agarwala R. Clinical pattern of recurrent herpes simplex keratitis. *Indian Journal of Ophthalmology* 1999;47(1):11-14. PMID: 16130278