Indian J Lepr 2026, 98 : 121-129

http://www.ijl.org.in

Original Article

Ocular Involvement in Patients with Hansen's Disease- An Observational Study

P Kamboj[1], V Pathania[2], G Rathore[3], Regunath T[4], M Dangi[5]

Received: 20.07.2025 Revised: 10.11.2025 Accepted: 23.01.2026

Leprosy has a higher incidence of ocular involvement than any other bacterial infection. It affects multiple ocular structures including the adnexa, eyelids, eyebrows, lashes, and lacrimal drainage system. Ocular changes may result from direct infiltration by *Mycobacterium leprae* or due to lepra reactions. During the recent years ocular leprosy has not received much attention. This study has been carried out to assess the prevalence and pattern of ocular involvement in patients with Hansen's Disease. Fifty male patients (aged 23–62 years, mean age 35.5) attending a tertiary care hospital between February 2024 to February 2025 were studied. Group A included 15 newly diagnosed cases, and Group B included 35 patients on multidrug therapy (MDT). All underwent dermatological and comprehensive ocular evaluations including Snellen's and Jaeger charts, Schirmer's test, cotton wisp test, Schiotz tonometry, slit-lamp examination, and indirect ophthalmoscopy. Ocular involvement was observed in 39 patients (78%), with a higher prevalence in those on MDT (85.7%) compared to newly diagnosed cases (60%). Dry eyes were the most common finding (42%), followed by loss of corneal sensation (24%), prominent corneal nerves (12%), episcleritis (6%), conjunctival congestion (6%), and iris atrophy (6%). Other findings included madarosis, lagophthalmos, cataract, facial palsy, meibomitis, and corneal opacities. Dry eyes were more frequent in chronic cases, while corneal anaesthesia was seen more in newly diagnosed patients. Ocular involvement in leprosy is common, often underdiagnosed, and potentially preventable. Early recognition and referral can significantly reduce vision loss. This study underscores the need for routine ocular screening in all leprosy patients.

Keywords: Hansen's Disease, Eye Involvement, Schirmer's Test, Slit Lamp Examination, Dry Eyes, Loss of Corneal Sensation, Lagophthalmos, Prominent Corneal Nerves, Episcleritis.

Introduction

Hansen's disease (HD) belongs to the group of neglected tropical diseases and can cause physical deformities and disabilities, leading to social discrimination. It affects not only the skin and peripheral nerves but also the eyes. In India, the recent prevalence rate of leprosy was 0.57/10,000 population (Biswas & Pradhan 2022). While leprosy had comparatively higher rates of ocular complications among all infectious diseases, this has changed over the past three decades with the advent of multi-drug therapy (MDT) (Biswas & Pradhan 2022). Notwithstanding, it still has the highest incidence of ocular involvement of any human bacterial infection (Grzybowski et al 2015). Ocular involvement in leprosy is estimated

[1] Parul Kamboj, MD (Dermatology), Associate Professor, Dept of Dermatology, Base hospital, Lucknow.
[2] Vikas Pathania, MD (Dermatology), Professor & HOD, Dept of Dermatology, Base hospital, Lucknow.
[3] Gyanesh Rathore, MD (Dermatology), Senior Resident, Dept of Dermatology, Base hospital, Lucknow.
[4] Regunath T, MBBS, Junior Resident, Dept of Dermatology, Base hospital, Lucknow.
[5] Meenu Dangi, MS (Ophthalmology), Dept of Ophthalmology, Command Hospital, Central Command, Lucknow.
Departments of Dermatology & Ophthalmology, Command Hospital, Central Command, Lucknow-226002 (UP), India
Corresponding Author: Dr Gyanesh Rathore, **Email**: parasafmc6144@gmail.com

to be at 70–75% worldwide. About 10–50% suffer from severe ocular symptoms and loss of vision occurs in approximately 5% of cases (Ganjre et al 2023). The disease leads to many ophthalmologic symptoms and signs within the range of the eyeball as well as of the bulb adnexa eyebrows, eyelids with eyelashes, and lacrimal drainage system and may occur as a consequence of direct infiltration or following lepra reactions (Pavezzi et al 2020). Ocular changes may persist or worsen even after patients are considered cured (Pavezzi et al 2020). The most important ocular clinical manifestations are lagophthalmos, ectropion, entropion, trichiasis, corneal hypoesthesia, superficial punctate keratitis, corneal ulcers and or opacity with reduced visual acuity, episcleritis, scleritis, scleral nodule, formation of "iris pearls" (pathognomonic), atrophy of the iris, iridocyclitis, chronic uveitis, and cataracts (Pavezzi et al 2020). Secondary infections can also occur, as well as cataracts and chorioretinopathy, due to the prolonged use of systemic corticosteroids for treatment of leprosy reactions. The majority of vision loss secondary to leprosy is preventable or curable (Pavezzi et al 2020). Visual impairment due to these ocular manifestations has been classified by WHO into three grades (grade-0, 1, 2) ranging from no evidence of vision loss to severe visual impairment (Patel & Modi 2016). We need data from our own country to plan future research/ research cum interventions. The present study has been carried out with this goal in mind.

Materials and Methods

The present study aimed to observe the prevalence and pattern of ocular involvement in patients with Hansen's Disease. The study was a hospital based cross-sectional study in adult patients aged >18 years who are willing, diagnosed as a case of Leprosy attending dermatology outpatients and inpatients in Command Hospital, a tertiary care hospital in Central India. Patients with preexisting ocular disorders due to causes other than leprosy were excluded from the study. A total of 50 patients were studied over a period of one year (Feb 2024 to Feb 2025). Ethical approval was obtained from Institutional Ethics Committee.

Classification of disease type was done according to the World Health Organization (WHO) operational classification into paucibacillary (PB) and multibacillary (MB) leprosy based on the number of skin lesions and nerve involvement. Patients with 1–5 skin lesions without demonstrable bacilli on slit-skin smear were classified as paucibacillary (PB), while those with more than 5 lesions and/or positive slit-skin smear and any nerve involvement were classified as multibacillary (MB) (Huang et al 2024). Data were compiled using Microsoft Excel and analyzed using SPSS version 26.0. Descriptive statistics were used to calculate mean, percentage, and proportions. Comparative analysis between newly diagnosed and MDT-treated groups was performed using the chi-square test for categorical variables and Student's t-test for continuous variables. A p-value <0.05 was considered statistically significant.

Methodology

A written and informed consent was taken from all subjects prior to the investigation. Patients were divided into two groups, group A included newly diagnosed patients of leprosy and group B included patients who were already on multi-drug therapy (MDT). A detailed history including details of lepra reaction and dermatological examination of patients were recorded followed by general ocular examination (Kanski & Bowling 2020). Visual Acuity was recorded with help of Snellen's chart and Jaeger eye chart. Schirmer's test was performed to identify and grade the severity of dry eyes. Corneal sensation in all four quadrants was checked with a wisp of

cotton. A detailed slit lamp examination of the anterior segment of eye was done with a 90 D. Intraocular pressure recorded with help of Schiotz tonometer. Fundus examination with 20 D Indirect Ophthalmoscopy was done and the findings were recorded. Collected data included age, gender, occupation, duration of disease, different features and pattern of eye involvement were obtained.

Results

All the 50 patients included in the study as per inclusion criteria were male patients (100%), age ranging from 23-62 years with mean age of patients being 35 years. Out of fifty patients 35 (70%) were old and 15 (30%) were newly diagnosed cases of leprosy (Fig. 1A).

Majority of the patients were asymptomatic 34/50 (68%) patients and thirty 16/50 (32%) were symptomatic (Fig. 1B) and reported some type of eye-related complaints with most common symptom being burning sensation and itching along with irritation of eyes. Others symptoms were ranging from watering from eyes, redness, photosensitivity, blurring of vision and difficult to close the eyes completely.

Dermatological examination showed involvement varying from a solitary hypopigmented and hypoaesthetic patch to multiple well defined polysized hypoaesthetic, xerotic, and atrichic patches involving trunk and extremities along with peripheral nerve thickening ranging from single feeding nerve to multiple peripheral nerve thickening with or without tenderness and in most cases with residual areas hypoaesthesia and minor motor sequelae (Fig. 2A).

General ocular examination revealed two cases with lagophthalmos and two with madarosis and a single patient with ptosis which was bilateral in single case (Fig. 2B).

Visual examination by Snellen's chart for distant

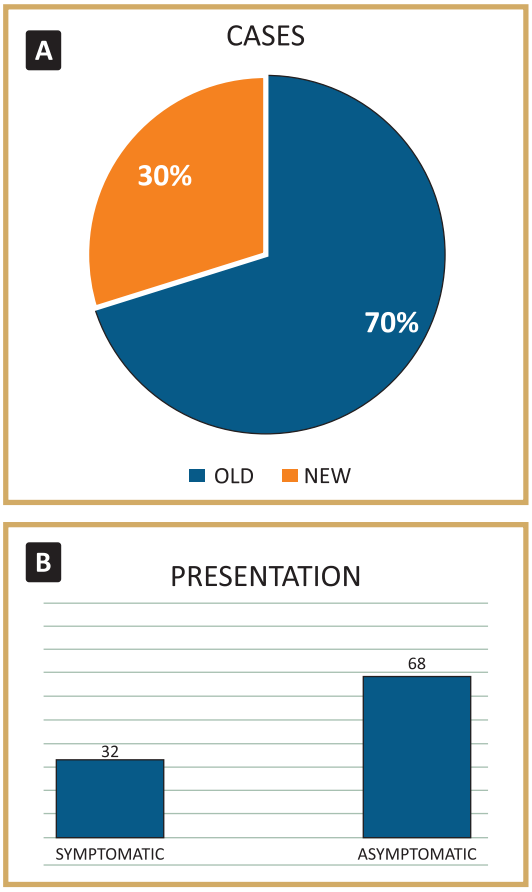

Fig. 1 (A & B) : 1A: Graph showing the percentage of fresh and old cases in the study and 1B: Graph showing the percentage of symptomatic and asymptomatic patients on presentation.

vision and Jaeger eye chart for near vision revealed three patients with refractive errors both in distant and near vision. Among three patients two were from group B and one from group A. None of them had serious problem with vision.

Schirmer's test revealed dry eyes in 21/50 (42%), 06 patients with severe dry eye (<5 mm), 13 with moderate dry eye (5-10mm), 02 patients with probable dry eye (10-15mm). It was bilateral in

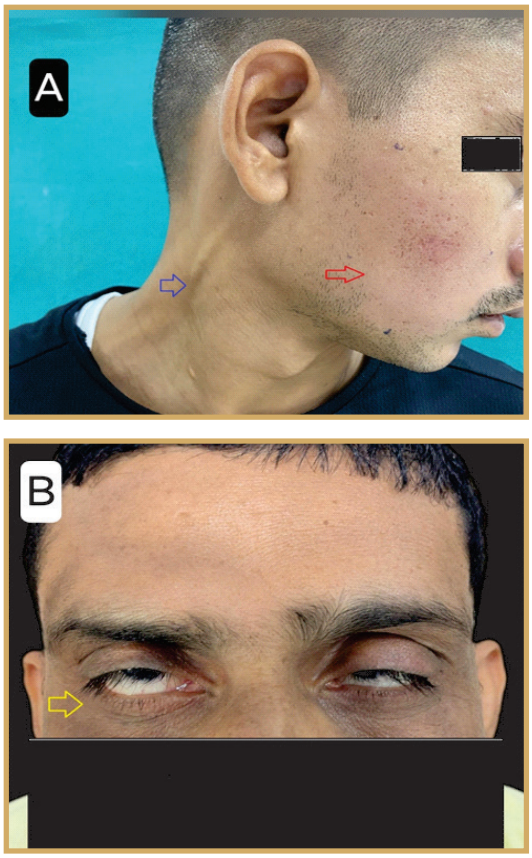

Fig. 2 (A & B): 2A- A 24 years old male borderline tuberculoid patient with hypopigmented to erythematous atrichic patch over his cheek (red arrow) with thickened greater auricular nerve (blue arrow); and 2B: A 39 years old male borderline lepromatous patient with bilateral lagophthalmos.

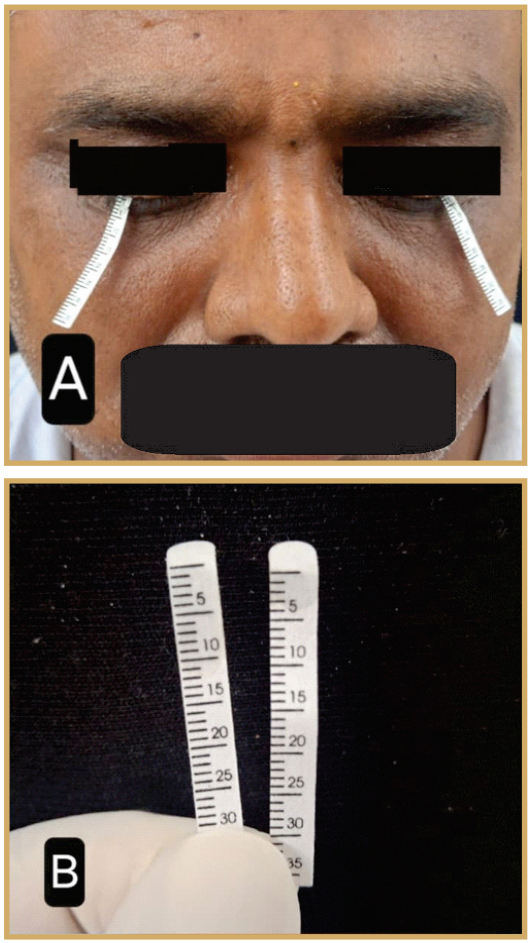

Fig. 3 (A&B): 3A-Schirmer's test in a borderline lepromatous patient revealed dry eyes and 3B: Schirmers test showing tear flow till 4 mm in left eye and 12 mm on right side of a borderline lepromatous patient.

19/21 (90%) cases and unilateral in 02/21 (10%) (Figs. 3A & 3B).

Corneal sensation in all four quadrants with a wisp of cotton revealed reduced corneal sensation in 12/50 (24%) patients, of which group A had 08 cases and 04 in group B. Intraocular pressure was within normal limits in all the cases studied.

A detailed slit lamp examination with 90 D starting from the eyelid revealed meibomitis and meibomean gland dysfunction, episcleritis and prominent episcleral vessels one each in group B cases. The conjunctiva showed xerosis in both fresh and old cases. Pterygium, conjunctival pigmentation, pingecula in old

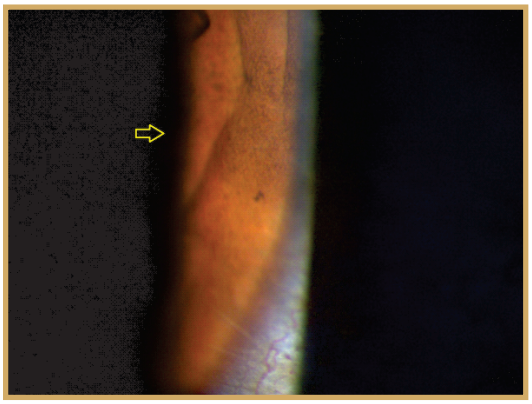

Fig. 4 : Slit lamp examination with 90 D magnification showing prominent corneal nerve.

cases, opacification noticed in the cornea in single patient in group B and prominent corneal nerves in 06 cases (Fig. 4), iris revealed atrophy in one old patient, lens showed cataract in 02 group B cases. Fundus examination revealed no abnormalities in any of the cases.

The prevalence of ophthalmological changes was 39/50 (78%) and was found to be more in group B - 30/35 (85.7%) compared to group A - 09/15 (60%) (Table 1). It was also more in symptomatic 14/16 (87.5%) than asymptomatic 25/34 (73.5%) (Fig. 5). The most common findings were dry eyes 21/50 (42%) and loss of corneal sensation 12/50 (24%) followed by prominent corneal nerves 06/50 (12%), episcleritis in 03/50 (6%), conjunctival congestion 03/50 (6%), Iris atrophy 03/50 (6%), refractive error 03/50 (6%), prominent facial nerve 03/50 (6%). Other features observed included madarosis (4%), lagophthalmos (4%), cataract (4%), prominent episcleral vessels (2%), meibomitis (2%), corneal opacity (2%), meibomean gland dysfunction (2%), facial nerve palsy (2%), pterygium (2%), conjunctival pigmentation (2%), and pingecula (2%). It was also observed that the dry eyes were most common findings in group B and corneal anaesthesia in group A. The majority of patients

Table 1: Comparative clinical and statistical analysis of ocular findings in patients with Hansen's disease.

Parameter	Group A (New cases, n = 15)	Group B (MDT cases, n = 35)	Statistical test	p-value	Interpretation
Ocular involvement present (n %)	9 (60%)	30 (85.7%)	Chi-square = 4.05	0.044*	Significantly higher in Group B
Dry eyes present (n %)	5 (33.3%)	16 (45.7%)	Chi-square = 0.80	0.37	Not significant
Corneal anaesthesia present (n %)	8 (53.3%)	4 (11.4%)	Chi-square = 10.6	0.001**	Significantly higher in Group A
Multiple ocular lesions present (n %)	3 (20%)	25 (71%)	Chi-square = 9.8	0.002**	Highly significant difference

*p < 0.05 considered significant; **highly significant; ***very highly significant.

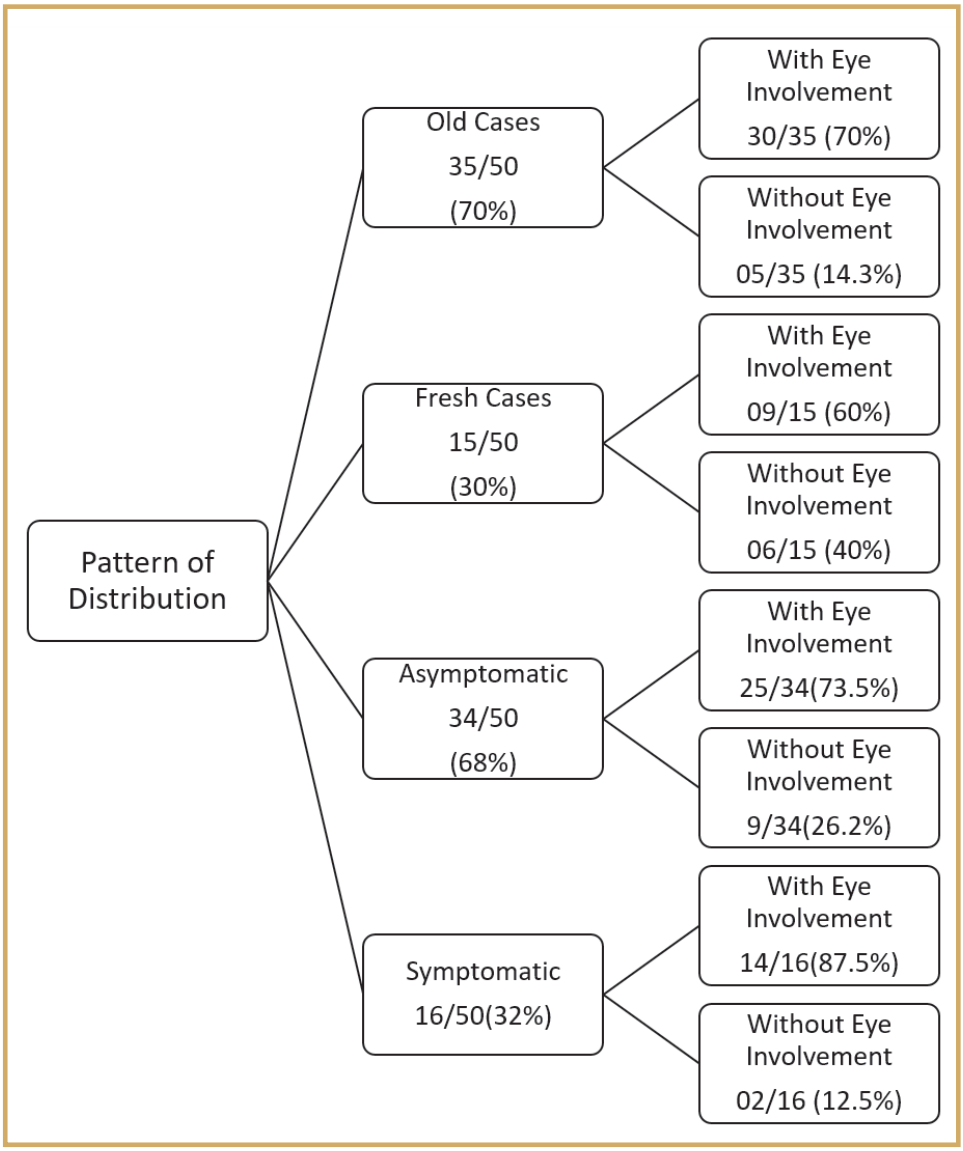

Fig. 5: Prevalence data of ocular leprosy in symptomatic, asymptomatic, fresh and old cases.

(28) had multiple ocular lesions, with just 11 patients with only one ocular abnormality. The highest frequency of abnormal ophthalmologic findings in patient was 04 in the ophthalmological examination of 02 patients in group B (Fig. 6). Additionally, eye involvement was frequently observed in patients with other deformities (motor, paralytic and anaesthetic deformities of hands and feet). Twenty out of fifty patients had other deformities as well and we observed ocular manifestations in 17/20 (85%) in this subset of patients. As far as the immunological pole was

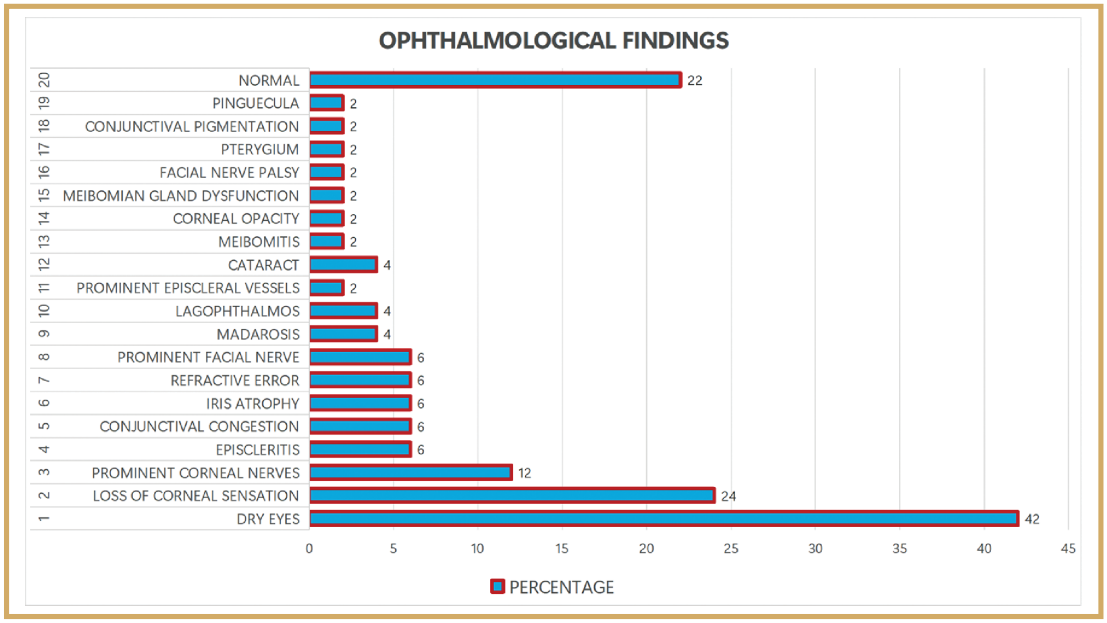

Fig. 6 : Graph showing the ocular manifestations of leprosy shown as percentages.

concerned, 24 patients were in lepromatous pole, 19 were in tuberculoid pole, 4 patients were of pure neuritic and one patient of histoid leprosy. Maximum number of patients in lepromatous pole had features of eye involvement (18/24) 75% followed by tuberculoid (10/19) 52.6 %. Prevalence of ocular findings in patients with lepra reactions was (21/32) 65.6% and without reactions (12/18) 66.6 %.

Discussion

The present study found ocular involvement in 78% of patients with Hansen's disease, aligning with the global trend where ocular manifestations may range from 70% to 75% (Pavezzi et al 2020). Despite the majority of patients being asymptomatic, detailed ophthalmic examination revealed significant ocular pathology, with dry eyes and corneal anesthesia being the most common findings. Notably, older or previously treated patients (Group B) exhibited a higher prevalence (85.7%) compared to newly diagnosed patients (60%), highlighting the chronic nature of ocular damage in leprosy. In comparison with the study conducted by Pavezzi et al (2020) in Brazil, which reported 100% ocular involvement among 86 multibacillary patients, the prevalence in our study is slightly lower. Despite this, our study corroborates the prominence of dry eye disease, also observed in 81.4% patients of Pavezzi's study (Pavezzi et al 2020). However, while meibomian gland dysfunction was a dominant finding in their sample, it was less prominent in our cohort. Instead, we found a wider range of clinical findings including episcleritis, conjunctival congestion, and prominently visible corneal nerves. The findings also resonate with the study by Reddy & Reddy (2019) conducted in India. Their data suggested that ocular involvement increased with disease duration, affecting 86.6% in patients with over 10 years of disease duration (Reddy & Reddy 2019). In contrast, we found notable involvement even in newly diagnosed patients (60%), which

was higher than 33.3% observed by Reddy & Reddy (2019) in early-stage patients. This may imply that certain ocular changes such as corneal anaesthesia and dry eyes may appear early due to direct infiltration by *M. leprae* or early autonomic dysfunction, rather than being strictly duration-dependent. Comparison with the UK-based study of Malik & Morris (2011) further validates our findings. Their cohort showed a 51.6% rate of ocular complications, with 22.2% being vision-threatening (Malik & Morris 2011). Common features in their study included impaired lid closure, iris atrophy, corneal hypoesthesia, and cataract-all of which were also observed in our sample (Malik & Morris 2011). However, the younger mean age of our cohort was lesser (35.5 years vs 50 years), possibly explaining the lower proportion of vision-threatening pathology. A unique contribution of our study lies in the identification of several relatively underreported findings. Prominent corneal nerves were documented in 12% of cases, episcleritis and associated episcleral vessel prominence in 6%, and conjunctival congestion in 6%. These signs, though less emphasized in prior studies, indicate localized inflammatory activity or early-stage ocular involvement that warrants further evaluation. Moreover, the frequent coexistence of ocular manifestations with systemic deformities (motor and sensory) underlines the value of integrated screening for early identification and intervention. Interestingly, most patients with ocular involvement (56%) had multiple co-existing lesions, emphasizing on the need for thorough, holistic examination rather than symptom-based screening. This becomes even more crucial as 68% of patients were asymptomatic for ocular complaints. The presence of silent but significant ocular pathology in such cases argues strongly for routine ophthalmologic evaluation at the time of diagnosis, even in the absence of symptoms. Although this was a hospital-based study with certain limitations, such as a limited sample size and no pediatric and female patients, the findings still hold relevance for the clinical practice. Early identification of ocular signs can substantially reduce the burden of avoidable causes of blindness which can be treated if detected early. Future large-scale, community-based studies are needed to improve our understanding of disease patterns and to validate new markers of early ocular involvement in Hansen's Disease. In conclusion, the study affirms that ocular involvement in Hansen's disease is an underreported condition due to a large number of patients being asymptomatic at initial presentation. The high frequency of subclinical ocular findings, especially in patients with other deformities, highlights the need for routine eye screening as part of the baseline and follow-up care, as it can be instrumental in preserving vision and improving quality of life in this vulnerable population.

Conclusion and future perspective

Our study shows a wide spectrum of ocular changes in leprosy. Ours was a hospital-based study done for a limited duration of one year with a limited sample size. Community-based studies on are thus needed to better understand the magnitude of the problem. Such studies appear important to validate our findings and also generate data of newer modalities which will help in decoding the ocular involvement in Hansens's disease. Better modalities for testing, interpreting and prognosticating based on AI based technology tools may be way forward in the future. Till such time the authors recommend considering routine screening for ocular involvement in new cases of Hansen's disease for early diagnosis and prevention of ocular deformities.

References

1. Biswas J, Pradhan A (2022). Commentary: Ocular lesions in leprosy–Should we forget? *Indian J Ophthalmol*. **70**: 2673–2674.
2. Ganjre SA, Jeria S, Madke B (2023). Catastrophic ocular complications in leprosy: a case report. *Pan Afr Med J*. **44**: 1.
3. Grzybowski A, Nita M, Virmond M (2015). Ocular leprosy. *Clin Dermatol*. **33**: 79–89.
4. Huang CY, Su SB, Chen KT (2024). An update of the diagnosis, treatment, and prevention of leprosy: A narrative review. *Medicine.* 103(34): e39006.
5. Kanski JJ, Bowling B (2020). Kanski's Clinical Ophthalmology: A Systematic Approach, 9th edn, Elsevier, Edinburgh, pp 1-944.
6. Malik AN, Morris RW (2011). The prevalence of ocular complications in leprosy patients seen in the United Kingdom over a period of 21 years. *Eye (London)*. **25(6)**: 740–745.
7. Patel NR, Modi KR (2016). A cross-sectional study of deformities in patients of leprosy at a tertiary care center of Western India. *Indian J Lepr***. 88**: 209–215.
8. Pavezzi PD, do Prado RB, Boin Filho PÂ et al (2020). Evaluation of ocular involvement in patients with Hansen's disease. *PLoS Negl Trop Dis*. **14**: e0008585.
9. Reddy GN, Reddy GA (2019). Ocular manifestations of leprosy. *Trop J Ophthalmol Otolaryngol*. **4(7)**: 414–418.

How to cite this article : Kamboj P, Pathania V, Rathore G et al (2026). Ocular Involvement in Patients with Hansen's Disease - An Observational Study. *Indian J Lepr.* **98**: 121-129.