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Clinicians' perspectives on the management of dry eye disease in India Settings

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Abstract

Objective: To gather clinicians' perspectives on diagnostic approaches, treatment preferences, and influencing factors in the management of dry eye disease (DED) in routine Indian settings.

Methodology: This cross-sectional study gathered the perspectives of clinicians managing DED in routine practice across India. The study questionnaire included 23 questions on DED burden, diagnosis, risk factors, treatment preferences, clinical scenarios, follow-up practices, and adherence barriers. Data were analyzed using descriptive statistics.

Results: The study included 54 clinicians. As reported by 44% of the participants, the preferred drug for managing aqueous-deficient DED is the polyethylene glycol (PEG) and propylene glycol (PG) combination eye drops. For evaporative DED, 48% preferred the same combination. Approximately 57% advised the combination of sodium hyaluronate + PEG + PG for severe dry eye. Around 44% of respondents indicated that lipid-based lubricants are occasionally preferred for evaporative DED. About 57% of clinicians stated that, in patients unresponsive to carboxymethylcellulose 0.5%, switching to PEG + PPG is the preferred strategy. Nearly 48% reported that PEG + PPG eye drops are their preferred choice for managing digital eye strain/computer vision syndrome.

Conclusion: PEG + PG combination eye drops are widely preferred by clinicians for managing various forms of DED, including aqueous-deficient, evaporative, and digital eye strain, and are commonly used in severe cases and in those unresponsive to carboxymethylcellulose, underscoring their versatility and clinical acceptance.

Keywords: Dry eye disease, Polyethylene glycol, propylene glycol, sodium hyaluronate

Introduction

Dry eye disease (DED) is one of the most common ocular surface disorders, affecting tens of millions of people worldwide. Its prevalence varies widely from 5% to 50%, depending on geographic location and diagnostic criteria [1]. The Tear Film and Ocular Surface Society Dry Eye Workshop II (TFOS DEWS II) defines DED as a multifactorial disease of the ocular surface characterized by a loss of tear film homeostasis, accompanied by symptoms, where tear film instability, hyperosmolarity, ocular surface inflammation, damage, and neurosensory abnormalities play key etiological roles. TFOS DEWS II further notes that global DED prevalence ranges from 5% to 50%, underscoring the variability based on population and diagnostic approach [2]. A study from North India reported a DED prevalence of 32%, with 81% of those cases classified as severe based on symptoms [3].

DED imposes a significant burden on individuals, often impairing daily functioning, social engagement, and work productivity. The chronic discomfort and visual disturbances associated with DED can negatively impact the quality of life, leading to difficulties in performing routine activities. Furthermore, the persistent symptoms may contribute to psychological distress, decreased self-esteem, and social withdrawal [4-6].

There are several treatment options available for DED, including artificial tears, anti-inflammatory agents, punctal plugs, and lifestyle changes. However, there is considerable variability in how these treatments are applied in clinical practice. Effectively addressing the challenges of DED requires a comprehensive approach, with artificial tear drops often being the first-choice treatment due to their ease of use, wide availability in different formulations, and low risk of side effects [7].

The severity of DED can vary among individuals, which influences their choices of artificial tears based on the stage of the condition.

Healthcare professionals need to evaluate each patient's specific needs and consider the active ingredients present in artificial tear formulations. By understanding individual symptoms, the characteristics of the tear film, and the underlying factors contributing to DED, healthcare providers can more effectively select appropriate artificial tears and determine if adjustments or changes to the treatment plan are necessary. Combination formulations tend to be more effective than those containing a single active ingredient [8].

Among the widely used formulations, the combination of polyethylene glycol (PEG) and propylene glycol (PG) has gained prominence due to their complementary lubricating properties [1]. PEG and PG act as demulcents that protect and hydrate the ocular surface by forming a barrier over the epithelium, reducing friction, and enhancing moisture retention [9]. When combined with additional agents like hydroxypropyl guar (HP-Guar), as in the case of Systane Ultra, these lubricants have demonstrated improved residence time and bio-adhesion, offering enhanced relief in patients with moderate to severe DED [10]. Several clinical studies have validated the efficacy of PEG + PG formulations in improving tear film break-up time, reducing corneal and conjunctival staining, and alleviating patient-reported symptoms, making them a reliable therapeutic option in the long-term management of DED [11, 9]. This study aims to gain clinicians' perspectives on diagnostic approaches, treatment preferences, and influencing factors in the management of DED in routine Indian settings.

Methodology

A cross-sectional study was carried out to gather opinions from clinicians experienced in treating DED in Indian settings from June 2024 to December 2024.

Questionnaire

The questionnaire booklet titled GEM (Glaucoma Management: Indian Clinicians Perspective Study) was sent to the doctors who were interested in participating in this study. The 23-item questionnaire explored various aspects, including clinician demographics, prescription practices, treatment preferences, and challenges in clinical practice, with a specific focus on the use of fixed-dose combinations such as brinzolamide and brimonidine. The study was performed after obtaining approval from Bangalore Ethics, an Independent Ethics Committee, which was recognized by the Indian Regulatory Authority, the Drug Controller General of India.

Participants

An invitation was sent to Ophthalmologists across India based on their expertise and experience in treating glaucoma in the month of March 2024 for participation in this Indian survey. About 35 clinicians from major cities of all Indian states, representing the geographical distribution, shared their willingness to participate and provide necessary data. Clinicians were instructed to complete the questionnaire independently without consulting colleagues. Written informed consent was obtained from each participant before the study began.

Survey design

The cross-sectional survey used a multiple-response questionnaire to gather opinion from clinicians experienced in treating DED in Indian settings. These professionals received the survey between 2023 and 2024 via email or an online platform. The questionnaire comprised 23 questions focusing on the demographic and clinical characteristics of patients with DED, as well as treatment strategies involving various combinations. It assessed clinicians' views on DED burden, diagnosis, risk factors, treatment preferences, clinical scenarios, follow-up practices, and barriers to adherence. Participants were allowed to skip any questions they chose not to answer and were instructed to complete the questionnaire independently, without consulting colleagues. Each participant provided written informed consent prior to the study. As this was an opinion-based survey involving clinicians and no patient data, ethics committee approval was not deemed necessary.

Statistical analysis

The data were analyzed using descriptive statistics. Categorical variables were presented as percentages to provide a clear understanding of their distribution. The frequency of occurrence and the corresponding percentage were used to represent the distribution of each variable. To visualize the distribution of the categorical variables, pie and bar charts were created using Microsoft Excel 2019 (version 16.0.17928.20114).

Results

The survey included 54 clinicians, and the majority (68.52%) reported that, on a monthly average, more than 15 patients were diagnosed with DED. Half of the participants (51.85%) stated that dry eye is equally diagnosed among males and females. According to 72% of respondents, the urban region accounts for a greater number of DED cases. Around 56% of clinicians opined that patients in the 30 to 50 years age group most commonly suffer from DED. As per 67% of clinicians, DED is most prevalent among individuals in professions involving digital screen exposure.

The majority (81.48%) of participants indicated that DED is diagnosed based on history and symptoms, Schirmer test, tear film break-up time (TBUT), ocular surface staining with fluorescein, and slit lamp examination. About 56% of clinicians stated that they occasionally screen for DED symptoms using questionnaires such as the Ocular Surface Disease Index (OSDI) or Dry Eye Questionnaire-5 (DEQ-5). As reported by 39% of participants, 26-50% of OPD patients have evaporative DED, while 35.19% reported that 11-25% of OPD patients are affected.

Around 44% of the respondents preferred PEG + PG combination eye drops for the management of aqueous-deficient DED (Table 1). Approximately 48% favored the same combination for the management of evaporative DED (Table 2).

Table 1: Distribution of responses to the preferred drug for the management of aqueous deficient DED

Drugs	Response rate (N=54)
Carboxymethylcellulose eye drops 0.5%	11.11%
Carboxymethylcellulose eye drops 1%	18.52%
PEG + PG combination eye drops	44.44%
Sodium hyaluronate eye drops	25.93%

Table 2: Distribution of responses to the preferred drug for the management of evaporative DED

Drugs	Response rate (N=54)
PEG+PG combination eye drops	48.15%
Carboxymethylcellulose eye drops 0.5%	1.85%
Carboxymethylcellulose drops 1.0%	3.7%
Sodium hyaluronate eye drops	46.3%

As reported by 57% of the participants, the combination of sodium hyaluronate + PEG + PG is commonly recommended for patients with severe dry eye (Figure 1). According to 44% of the experts, lipid-based lubricants are occasionally preferred in cases of evaporative DED, while 35% reported frequent use (Figure 2). Approximately 57% of the participants indicated that, for patients unresponsive to carboxymethylcellulose 0.5% eye drops, the preferred strategy is to switch to PEG + PPG (Table 3). Around 48% of the experts stated that eyelid hygiene, warm compresses, or eyelid massage are the preferred medical management approaches for meibomian gland dysfunction (MGD). Most respondents (90.74%) reported that minimizing digital screen exposure, following the 20-20-20 rule, adopting a diet rich in omega-3 fatty acids, and practicing intermittent blinking are the preferred adjunctive measures for patients with DED.

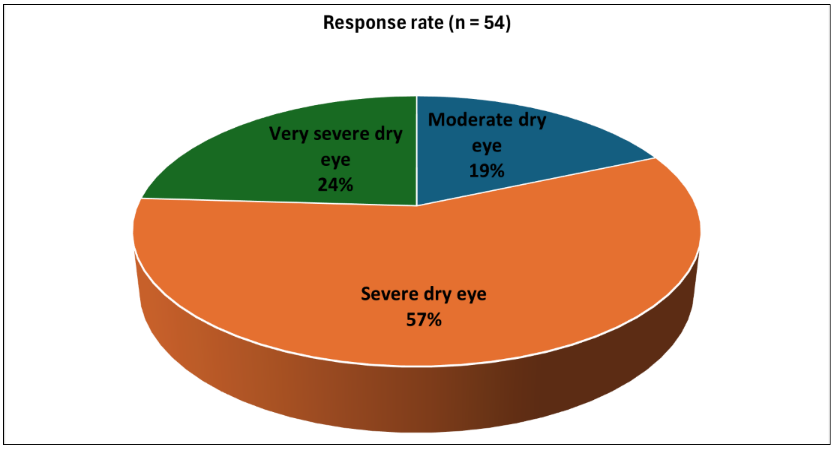

Fig 1: Distribution of response to the clinical severity of DED in patients prescribed sodium hyaluronate + PEG + PPG

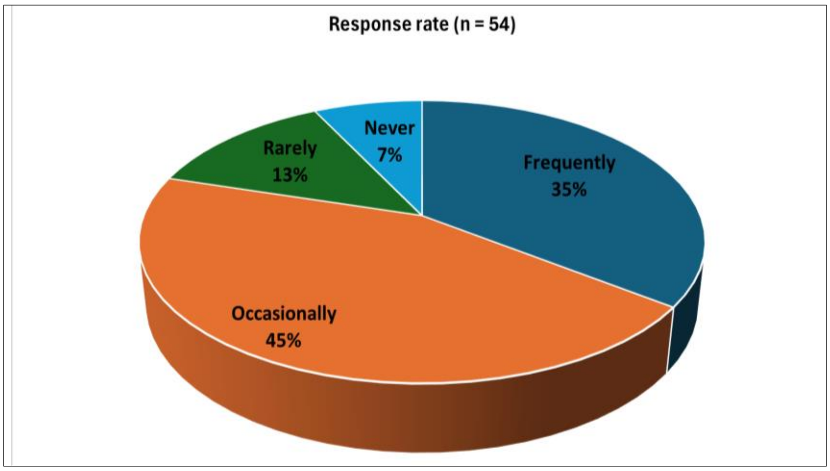

Fig 2: Distribution of responses to the frequency of lipid-based lubricant use in evaporative DED

Table 3: Distribution of responses to the preferred strategy for patients who fail to respond to carboxymethylcellulose 0.5% eye drops for managing dry eyes

Management strategy	Response rate (N=54)
Change from carboxymethylcellulose 0.5% to carboxymethylcellulose 1.0%	9.26%
Change from carboxymethylcellulose to PEG + PPG	57.41%
Change from carboxymethylcellulose to sodium hyaluronate	33.33%

About 48% of the clinicians stated that they occasionally prescribe lubricants containing emollients such as mineral oil and paraffin at bedtime for severe dry eye. According to 59% of the participants, they follow up monthly with patients having severe DED. As reported by 48% of clinicians, cost is a major reason why patients with DED discontinue or stop treatment before completing the prescribed course. The majority of clinicians (74.07%) opined that cost is only sometimes a limiting factor in the treatment of DED. Around 41% of respondents reported that 11-25% of patients receiving treatment for glaucoma present with DED. Nearly 48% stated that PEG + PG combination eye drops are the preferred treatment for digital eye strain/computer vision syndrome (Fig. 3). According to 58% of the clinicians, sodium hyaluronate eye drops are the preferred treatment in patients following refractive surgery.

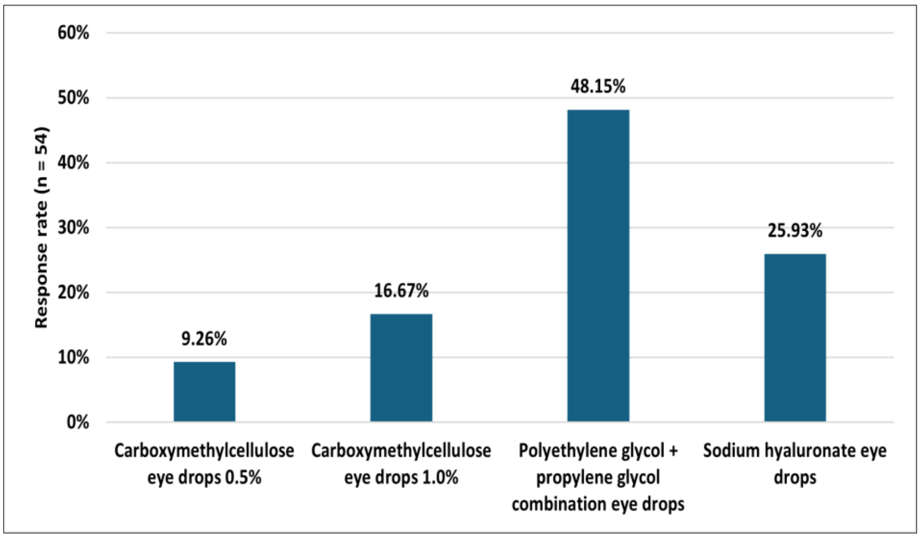

Fig 3: Distribution of responses to the preferred lubricating eye drops for digital eye strain/computer vision syndrome

Discussion

The study highlights DED as a prevalent and clinically significant condition, particularly in urban, digitally exposed adults, requiring multimodal diagnosis and personalized, cost-conscious management strategies to improve patient outcomes. Clinicians reported a preference for PEG and PG combination eye drops for both aqueous-deficient and evaporative forms of DED. Several studies have reported this preference. PEG and PG-based lubricants, particularly when combined with gelling agents such as hydroxypropyl guar, have been shown to be effective in stabilizing the tear film lipid layer and improving symptoms in patients with evaporative DED [12, 9]**.** Craig *et al.* stated that PEG and PG-based artificial tears, especially those with gelling agents like hydroxypropyl guar (HP-Guar), are effective for evaporative DED due to their ability to stabilize the tear film lipid layer [13]. Srinivasan and Manoj concluded that PEG/PG with HP guar is effective and safe in alleviating the signs and symptoms of DED [10].

The current study respondents have recommended a combination of sodium hyaluronate, PEG, and PG for patients with severe dry eyes. This aligns with findings from a multicenter, randomized trial that assessed the efficacy and safety of a tear substitute combining sodium hyaluronate with PEG 8000, demonstrating significant improvement in ocular surface parameters and symptom relief without adversely affecting visual function, thus supporting its role in DED management [14]. Additionally, studies by Baudouin *et al.* and Simmons *et al.* reported that formulations containing sodium hyaluronate in combination with PEG or PG offer enhanced hydration, prolonged ocular surface retention, and better tolerability, especially in moderate-to-severe DED [15]. The synergistic effect of hyaluronate's viscoelastic and mucoadhesive properties with the wetting and spreading actions of PEG and PG makes this combination particularly effective for patients requiring intensive ocular surface protection [16].

According to the current study findings, lipid-based lubricants is recommended in evaporative DED patients. This is supported by Maulvi *et al.*, who concluded that lipid-containing eye drops are effective in improving symptoms and stabilizing the tear film in evaporative DED [17]. Similarly, a multicenter study by Jerkins *et al.* compared two lipid-based formulations and found that both significantly improved tear film breakup time (TFBUT) and reduced ocular discomfort over 35 days, highlighting their efficacy in restoring tear film stability and alleviating patient symptoms [18]. Additionally, a multicenter, double-masked clinical study demonstrated that a liposomal spray significantly improved DED symptoms and tear film stability, underscoring the efficacy of lipid-based products in treating evaporative DED [19].

The study results showed that the preferred strategy for patients who failed to respond to carboxymethylcellulose 0.5% eye drops for managing DED is a shift to PEG + PG combination drops. Maity *et al.* compared PEG 400 0.4% + PG 0.3% eye drops to carboxymethylcellulose sodium 1% in patients over 60 years old with senile dry eye. Patients using the PEG/PG formulation reported significantly better treatment satisfaction and symptom relief compared to those using carboxymethylcellulose [20]. Additionally, Cohen *et al.* demonstrated that PEG/PG-based lubricants significantly reduced corneal and conjunctival staining compared to carboxymethylcellulose, indicating improved ocular surface health in DED patients [12].

The majority of clinicians in the current study preferred PEG + PG combination eye drops for managing digital eye strain/computer vision syndrome. A cross-sectional survey among Indian ophthalmologists highlighted that PEG/PG combination drops were preferred by 44.44% of respondents for moderate DED [21]. Additionally, a systematic review of randomized controlled trials concluded that artificial tears containing PEG are more effective than those containing carboxymethylcellulose or hydroxypropyl methylcellulose in improving DED symptoms [8].

The current study provides valuable insights into clinicians' perspectives on the management of DED in Indian settings. It utilized a meticulously designed and validated questionnaire, enabling the collection of expert opinion based on evidence-based practices. This information can support informed decision-making regarding optimal treatment strategies, thereby enhancing patient outcomes in DED management. However, certain limitations must be acknowledged. The relatively small sample size of 54 participants may restrict the generalizability of the findings. Moreover, reliance on self-reported expert opinion introduces the possibility of response bias, as individual clinical experiences and preferences may have influenced the responses. Further research involving larger, more diverse populations and objective clinical data is essential to validate and expand upon these findings.

Conclusion

The study highlights clinical preference for PEG + PG combination eye drops in the management of various forms of DED across Indian settings. Clinicians favored PEG + PG formulations for both aqueous-deficient and evaporative DED, as well as for cases of digital eye strain and patients unresponsive to carboxymethylcellulose-based therapy. Additionally, a combination of sodium hyaluronate with PEG+PG was preferred for more severe DED presentations. These findings underscore the growing consensus on the effectiveness and clinical acceptability of PEG+PG based lubricants in current DED treatment strategies.

References

1. Stapleton F, Alves M, Bunya VY, Jalbert I, Lekhanont K, Malet F, *et al.* TFOS DEWS II Epidemiology Report. Ocul Surf. 2017 Jul;15(3):334-365.
2. American Academy of Ophthalmology [Internet]. 2018 [cited 2025 Apr 9]. Dry Eye Disease. Available from: https://www.aao.org/eyenet/article/dry-eye-disease.
3. Titiyal JS, Falera RC, Kaur M, Sharma V, Sharma N. Prevalence and risk factors of dry eye disease in North India: Ocular surface disease index-based cross-sectional hospital study. Indian Journal of Ophthalmology. 2018 Feb;66(2):207.
4. Shah S, Jani H. Prevalence and associated factors of dry eye: Our experience in patients above 40 years of age at a Tertiary Care Center. Oman J Ophthalmol. 2015;8(3):151-156.
5. McCann P, Abraham AG, Mukhopadhyay A, Panagiotopoulou K, Chen H, Rittiphairoj T, *et al.* Prevalence and Incidence of Dry Eye and Meibomian Gland Dysfunction in the United States: A Systematic Review and Meta-analysis. JAMA Ophthalmol. 2022 Dec 1;140(12):1181-1192.
6. Craig JP, Nichols KK, Akpek EK, Caffery B, Dua HS, Joo CK, *et al.* TFOS DEWS II Definition and Classification Report. Ocul Surf. 2017 Jul;15(3):276-283.
7. Lee SB, Kabat AG, Bacharach J, Karpecki P, Luchs J. Managing Dry Eye Disease and Facilitating Realistic Patient Expectations: A Review and Appraisal of Current Therapies. Clin Ophthalmol. 2020 Jan 14;14:119-126.
8. Semp DA, Beeson D, Sheppard AL, Dutta D, Wolffsohn JS. Artificial Tears: A Systematic Review. Clin Optom (Auckl). 2023 Jan 10;15:9-27.
9. Aguilar A, Berra M, Trédicce J, Berra A. Efficacy of polyethylene glycol-propylene glycol-based lubricant eye drops in reducing squamous metaplasia in patients with dry eye disease. Clin Ophthalmol. 2018 Jul 12;12:1237-1243.
10. Srinivasan S, Manoj V. A Decade of effective dry eye disease management with systane ultra (Polyethylene Glycol/Propylene Glycol with Hydroxypropyl Guar) Lubricant Eye Drops. Clin Ophthalmol. 2021 Jun 9;15:2421-2435.
11. Foulks GN. Clinical evaluation of the efficacy of PEG/PG lubricant eye drops with gelling agent (HP-Guar) for the relief of the signs and symptoms of dry eye disease: A review. Drugs Today (Barc). 2007 Dec;43(12):887-896.
12. Cohen S, Martin A, Sall K. Evaluation of clinical outcomes in patients with dry eye disease using lubricant eye drops containing polyethylene glycol or carboxymethylcellulose. Clin Ophthalmol. 2014;8:157-164.
13. Craig JP, Nelson JD, Azar DT, Belmonte C, Bron AJ, Chauhan SK, *et al.* TFOS DEWS II Report Executive Summary. The Ocular Surface. 2017 Oct 1;15(4):802-812.
14. Labetoulle M, Mortemousque B. Performance and safety of a sodium hyaluronate tear substitute with polyethylene glycol in dry eye disease: A Multicenter, Investigator-Masked, Randomized, Noninferiority Trial. J Ocul Pharmacol Ther. 2022 Nov 1;38(9):607-616.
15. Baudouin C, Messmer EM, Aragona P, Geerling G, Akova YA, Castillo BDJ, *et al.* Revisiting the vicious circle of dry eye disease: A focus on the pathophysiology of meibomian gland dysfunction. Br J Ophthalmol. 2016 Mar;100(3):300-6.
16. Simmons PA, Liu H, Wilcox CC, Vehige JG. Efficacy and safety of two new formulations of artificial tears in subjects with dry eye disease: A 3-month, multicenter, active-controlled, randomized trial. Clin Ophthalmol. 2015;9:665-75.
17. Maulvi FA, Desai DT, Kalaiselvan P, Dumpati S, Kuppusamy R, Masoudi S, *et al.* Lipid-based eye drop formulations for the management of evaporative dry eyes. Contact Lens and Anterior Eye. 2024 Jun 1;47(3):102154.
18. Jerkins G, Greiner JV, Tong L, Tan J, Tauber J, Mearza A, *et al.* A comparison of efficacy and safety of two lipid-based lubricant eye drops for the management of evaporative dry eye disease. Clin Ophthalmol. 2020;14:1665-73.
19. Garrigue JS, Amrane M, Faure MO, Holopainen JM, Tong L. Relevance of lipid-based products in the management of dry eye disease. J Ocul Pharmacol Ther. 2017 Nov;33(9):647-61.
20. Maity M, Allay MB, Ali MH, Basu S, Singh S. Effect of different artificial tears on tear film parameters in dry eye disease. Optom Vis Sci. 2025 Jan 1;102(1):37-43.
21. Labetoulle M, Messmer EM, Pisella PJ, Ogundele A, Baudouin C. Safety and efficacy of a hydroxypropyl guar/polyethylene glycol/propylene glycol-based lubricant eye-drop in patients with dry eye. Br J Ophthalmol. 2017 Apr;101(4):487-492.