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Reviving Ancient Eye Cures: The Role of Traditional Medicine in Modern Optometric Science

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ABSTRACT

Background: For centuries, people have used traditional eye care practices using mineral-only treatments and herbal medicines to optimize their eye health. Many practices are documented in older texts, including the Sushruta Samhita, Ebers Papyrus, and Islamic texts. In a world moving towards integrative medicine, optometry is now reflecting on these traditional practices.

Purpose: The purpose of this study was to review traditional eye treatments and their potential place in modern optometric treatment by exploring their historical context, current use, pharmacological evidence, and clinical outcomes.

Methods: A literature analysis was carried out using Google Scholar, PubMed, Scopus, and Web of Science databases. Key search terms were 'herbal remedies,' 'traditional ophthalmic medicine,' and 'ocular health.' Reports published in English articles from 2016 to 2025 that included information on traditional medicine and the way it is used in modern eye care were included in the study.

Results: Prevalence percentages of traditional medicines were found to be quite variable in rural and underserved areas; in rural India it's at 25%, and Zimbabwe had 65.7%. Minerals, honey, ghee, and herbal extracts have anti-inflammatory, neuroprotective, and antioxidant properties. Catastrophic misuse can cause corneal ulcers or blindness; however, data summarize that it offers potential therapeutic benefits for glaucoma, diabetic retinopathy, cataracts, age-related macular degeneration (AMD), and dry eye syndrome.

Conclusion: Conventional eye medications may be available for use as an adjunct treatment; however, their safe incorporation into modern ocular care requires further clinical validation, standardization, and large studies.

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1. Introduction

Traditional medicine has great and long-lasting contributions to eye health based on centuries of observational practice and cultural transmission. The *Sushruta Samhitā*, an ancient Sanskrit text, is one of the earliest surviving treatises on surgery and medicine (Syniachenko *et al.*, 2021). The clouded lens of a cataract is moved aside from the optical axis using a small probe, clarified butter, and bandaging in an astounding process called cataract couching (Leffler *et al.*, 2020). This vivid historical usage demonstrates both the existence of intrusive procedures to regain vision before the birth of modern-day ophthalmology and the depth of knowledge regarding ocular pathology in the ancient systems of categorizing ocular diseases (Gandhi & Patil, 2024). These older approaches to pathology should not be considered as alternatives to evidence-based treatments but are avenues that potentially offer cultural significance, affordability, and accessibility, especially when other resources may not be available to the population, as the current optometric sciences progress (Albietz & Schmid, 2017).

Globally, ethnomedical research indicates that traditional eye medicines are still utilized by at least 13 percent to 82 percent of the population (Hu *et al.*, 2023). In communities with little access to modern optometric services, traditional medicine is still crucial for primary health care, including eye care. As many as 60% of the population in Cameroon and other sub-Saharan African locations rely on traditional medicine for primary healthcare (Abd Rashid *et al.*, 2022). However, there are risks associated with traditional ocular medicine. Eye complications, such as corneal edema, ulcers, and perforations, have been reported; in extreme cases, these may even result in significant blurring of vision (Pasupuleti *et al.*, 2017). These risk factors underscore the importance

of approaching the integration of traditional medicines with modern optometry with caution and a focus on safety (Zhang *et al.*, 2018).

1.1. Historical Foundations of Traditional Eye Medicine

The range and long history of eye care and eye treatment are built upon the accomplishments of several civilizations (Sim *et al.*, 2022). Because of cultural differences and limited access to natural resources, traditional eye medicine developed independently in many areas of the world, including South Asia, the Middle East, North Africa, and the Americas (Salazar-Gómez *et al.*, 2023). These systems of care combined scientific knowledge with spiritual and cultural beliefs to manage simple ocular disorders (Boroughani *et al.*, 2024). Incorporating natural medicines, herbal remedies, and surgical interventions, understanding these historic contexts will inform us about how traditional knowledge can complement and add to contemporary optometric practices (Sanie-Jahromi *et al.*, 2024). We will examine the impact of culturally unique performance-based innovations on contemporary eye care and eye health in the following sections (Nafees *et al.*, 2022).

1.1.1. Sushruta's Legacy in Ancient India

In the 6th century BCE, Sushruta gave us a massive framework of medical knowledge, some of which included procedures for the eye, in the *Sushruta Samhita.* The final section, entitled *Uttara Tantra,* exclusively concerns eye diseases (Singh *et al.*, 2023). It discusses 76 unique eye conditions and proposes surgical treatment for 51 of these conditions. It includes the details for malignancies of the eyelid (pacchmakopa), the eye (gambhirika), and the optic nerve (adhi-mantha), as well as the procedures for pterygium excision and cataract couching (Shah, 2018). The book also describes surgical instruments and surgical procedure choices in enough detail to demonstrate that the authors possessed an understanding of the eye and the surgical practice several years beyond its time (Bhattacharya, 2022).

1.1.2. The First Oculists and Home Remedies in Ancient Egypt

An ancient legacy of ophthalmology existed in ancient Egypt. Court-appointed specialists used honey, malachite, ochre, and goose grease in their herbal remedies, ointments, and salves intended for all eye ailments (Majeed *et al.*, 2015; Magnus, 2018). Papyri such as the *Ebers Papyrus* detail a range of eye conditions treated, including trachoma, cataracts, trichiasis, and cloudy eyes, albeit none with surgical methods (Zubieta *et al.*, 2025).

1.1.3. Classifying Ophthalmology in the Islamic Golden Age

In the Middle Ages, Islamic civilization had a large part in the emergence of ophthalmology. Ali ibn Isa al-Kahhal (fl. c. 1010 CE) wrote *Tadhkirat al-Kahhalin* ("The Notebook of Oculists"), which, by its Latin name, *Jesu Occulist,* was meant to be used as a resource for future oculists. In *Tadhkirat al-Kahhalin,* he identifies more than 130 ocular diseases and has cited anatomical information, diagnostic tools, and surgical techniques (Ahmad & Faisal, 2025; Ahmad *et al.*, 2017). Future generations referring to *Jesu Occulist,* and its numerous versions, allowed ophthalmology to enjoy its theoretical and practical standards for years (Abudawood *et al.*, 2020). Investigators like Ibn al-Haytham (Alhazen) expanded our theoretical understanding of optics, vision, and the anatomy of the eye, leading to the beginning of the work that defines modern applied research in vision (Lashay *et al.*, 2016).

1.1.4. Indigenous Eye Practices in Pre-Columbian America

Traditional healers in pre-Columbian North America treated eye problems using herbs such as tomatoes, chili peppers, and tobacco, which were part of their normative inventory, to address inflammation or corneal opacity by administering the herbal supplement by rubbing it on their eyes or manipulating their eyelids (Kellogg *et al.*, 2017). In addition to the couching techniques that began to emerge in colonial periods, these customs emphasize a reliance on local and adapted botanical therapies based on knowledge that had been empirically tested (Leffler *et al.*, 2017).

1.2. Current Usage of Traditional Medicine

In many parts of the world, practitioners of traditional health care continue to believe that they manage eye health with traditional practices (Eticha *et al.*, 2023). This is particularly true in underserved and rural areas where one is less likely to locate contemporary optometric services. Traditional medicines and treatments for eye concerns and general safety for the eye are still utilized by many people in many areas of the world (Gupta *et al.*, 2017). An example of a home-based traditional treatment is kajal, an eyeliner made with soot, honey, ghee, or rose water, used for eye concerns. More than 25.7% of rural Indians are using this treatment for eye concerns (Aghaji *et al.*, 2018).

The use of traditional remedies for eye-related ailments is highly variable across various parts of the world, with an average of 12% of people using them in parts of Ethiopia and 65.7% in Zimbabwe, demonstrating various cultural beliefs and norms, economic dynamics, and access to healthcare

(Sitotaw, 2021; Bifari, 2021). The difficulty of integrating traditional eye care practices into statutory or mainstream eye care is apparent in that they are still relevantly used in much of Central Saudi Arabia, and although they can have both positive and negative ocular outcomes, new reports suggest cause for concern (Al-Ghadeer & Al-Amry, 2021). Uncontrolled use of traditional remedies, although symptomatically difficult and worth a positive contribution to preventive eye health, can in some instances pose infection and injury to the eye (Dorcas *et al.*, 2019).

Although traditional eye medicines have been in use for a long time, and despite their use to this day, limited information is available concerning their disease-specific applications and incorporation into optometric practice. Earlier reviews have primarily focused on pharmacological mechanisms or ethnomedicine, rather than combining these with current treatment frameworks. The purpose of this study is to comprehensively assess the contemporary and historical evidence (2016–2025), strengthen the emphasis on disease-specific treatment potentials, and highlight limitations that may delay the translation to clinical practice.

2. Methodology

This review followed a systematic literature search approach in line with the PRISMA 2020 guidelines. While a narrative synthesis is provided, a quantitative meta-analysis was not feasible due to the heterogeneity of the available studies.

2.1. Database Selection and Search Strategy

A comprehensive search was conducted across PubMed, Scopus, Web of Science, and Google Scholar. The primary search terms included *"herbal remedies," "traditional eye medicine," "ocular health,"* and *"ancient eye remedies."* Controlled vocabulary and Boolean operators were applied to refine results. For instance, a PubMed search string included: *("conventional ophthalmic treatments" OR "botanical ocular remedies" OR "herbal ocular therapy") AND ("glaucoma" OR "cataract" OR "retinopathy" OR "ocular surface").*

Equivalent queries were adapted for Scopus, Web of Science, and Google Scholar. Additionally, reference lists of relevant reviews and primary articles were manually screened to ensure comprehensive coverage.

2.1.1. Inclusion Criteria

Literature was categorized into two groups to integrate historical and contemporary perspectives:

- **Historical Sources** – ancient texts such as the *Sushruta Samhita*, *Ebers Papyrus*, and manuscripts from the Islamic Golden Age that documented traditional ocular practices.
- **Contemporary Evidence** – peer-reviewed research articles, clinical trials, and reviews published between 2016 and 2025. This timeframe was chosen to prioritize recent pharmacological and clinical evidence relevant to optometric integration, while historical texts provided contextual depth.

2.1.2. Exclusion Criteria

Excluded materials included:

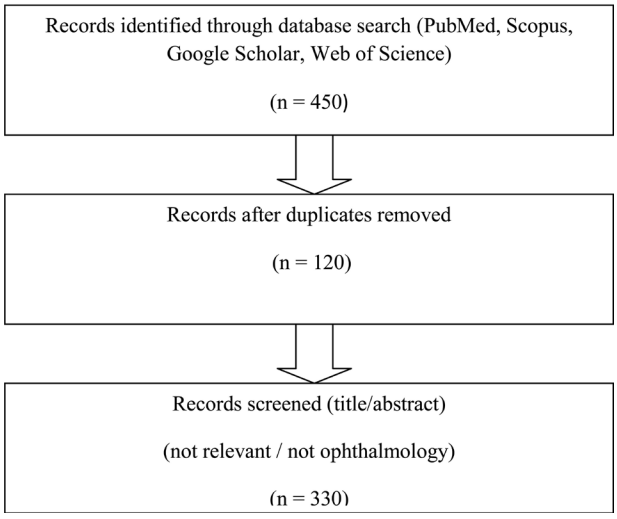
- Studies not pertaining to ocular health.
- Non-peer-reviewed publications.
- Case reports with small sample sizes (unless of significant historical relevance).
- Articles lacking rigorous scientific methodology.
- Non-English publications, due to challenges in accurate interpretation.

2.2. Data Extraction

From eligible publications, key information such as author(s), year, study area, results, and clinical significance was extracted. Contemporary studies were prioritized for outcomes related to ocular health, safety, and pharmacological mechanisms, while historical literature was evaluated for cultural relevance and traditional practices.

The initial database search retrieved 450 records. After removing 120 duplicates, 330 unique records remained. Title and abstract screening excluded 280 irrelevant articles. A total of 50 full-text papers were assessed, of which 10 met the inclusion criteria and were incorporated into the qualitative synthesis. Among the excluded studies, 4 were omitted due to irrelevant outcomes, 30 for inadequate sample sizes, and 6 for being published in non-English languages.

A summary of the selection process is presented in Figure 1 (PRISMA flowchart).



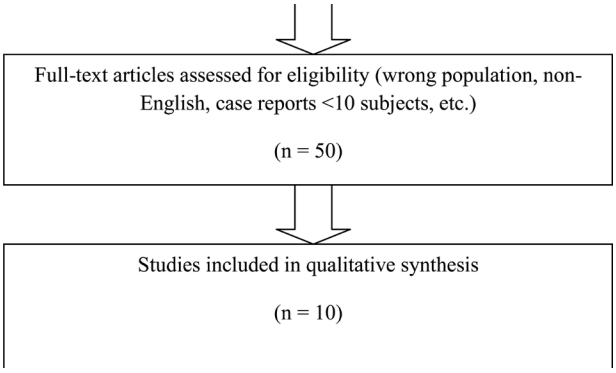


Figure 1: PRISMA Flow Diagram showing Identification, Screening, Eligibility, and Inclusion of Studies (N = 45)

3. Results

The literature reviewed provides compelling evidence that conventional ophthalmology has been historically and currently critical to ocular health. Historical texts, particularly the *Sushruta Samhita*, the *Ebers Papyrus*, manuscripts from the Islamic Golden Age, and pre-Columbian cultures, described extensive eye disorders and treatment strategies using a variety of herbal, mineral, and surgical methods. Evidence also suggests that these practices continue in rural and under-resourced locations. The reported prevalence varied considerably between studies, with estimates as high as 12% in Ethiopia and 65.7% in Zimbabwe. Over 25% of rural Indians reported the use of kajal or other medicines. Within sub-Saharan Africa, approximately 60% of individuals reported traditional medicine as their source of ophthalmic care. While honey, ghee, herbal extracts, and mineral compounds have displayed bioactive properties, there is a clear understanding of documented side effects. Comorbidity effects such as corneal edema, ulceration, perforation, and loss of vision demonstrate the need for formulations to be controlled and checked for quality and regulatory measures. Most of the studies examined in this sample were from Asia (consistent with India, Lebanon, and Saudi Arabia), with some limited studies from Africa (Ethiopia, Zimbabwe, and Cameroon) and the Americas (Mexico). About two-thirds of studies provided a disease-specific recommendation, mostly for glaucoma and diabetic retinopathy, followed by cataracts, age-related macular degeneration, and surface problems such as dry eye and eye strain.

Table 1: Overview of Studies on Herbal and Natural Products Interventions for Ocular Disorders

Title	Citation	Study Purpose	Outcomes	Conclusion	Result
Lebanese medicinal plants with ophthalmic properties	Andary *et al.*, 2025	To review Lebanese medicinal plants traditionally used for eye diseases and assess their pharmacological evidence	Identified multiple Lebanese plants with antioxidant, anti-inflammatory, and antimicrobial activities relevant to ophthalmic disorders such as conjunctivitis, cataract, and glaucoma	Lebanese flora offers promising sources for ocular therapies, but most lack clinical validation	Ethnopharmacological basis for developing plant-based eye treatments in Lebanon
Natural remedies proposed for the management of diabetic retinopathy	Khidr *et al.*, 2025	To investigate potential natural remedies and their mechanisms for diabetic retinopathy (DR) management, focusing on oxidative stress, inflammation, and angiogenesis pathways	Identified multiple phytochemicals (flavonoids, alkaloids, terpenoids, polyphenols) that reduce oxidative stress, suppress inflammatory mediators, and inhibit VEGF-induced angiogenesis in DR models	Natural remedies show promise as adjunct therapies for DR, but require large-scale human trials to confirm safety and efficacy	Supports therapeutic potential of natural products in DR prevention and treatment
The mechanisms of natural products for eye disorders by targeting mitochondrial dysfunction	Sun *et al.*, 2024	To summarize evidence on how natural products can prevent/treat eye disorders by modulating mitochondrial dysfunction	Found that certain plant-derived compounds improve mitochondrial biogenesis, reduce ROS, and restore ATP production in ocular cells; beneficial in glaucoma, AMD, DR, and cataract models	Natural products targeting mitochondrial health could be multi-target agents for various eye diseases	Mechanistic support for use of mitochondrial-protective botanicals in ocular health

Herbal and natural treatments for the management of glaucoma	Vitiello *et al.*, 2023	To review herbal and natural therapies used for glaucoma, assessing efficacy and safety	Ginkgo biloba, bilberry, green tea polyphenols, and cannabinoids showed neuroprotective and IOP-lowering effects in some studies	While some herbs have shown beneficial effects, clinical evidence is limited; more controlled human trials are necessary	Herbal therapies could complement standard glaucoma treatment, but should not replace it
The use of medicinal plants in common ophthalmic disorders	Alghamdi *et al.*, 2023	To document medicinal plants used globally for eye disorders including glaucoma, cataract, DR, and AMD	Recorded >100 plant species with reported ocular benefits; mechanisms included antioxidant, anti-inflammatory, and anti-angiogenic effects	Medicinal plants may serve as complementary therapies; need for standardization and clinical trials	Provides ethnobotanical basis for future pharmacological development
Treatment of glaucoma with natural products and their mechanism of action: An update	Sim *et al.*, 2022	To update on natural products used for glaucoma treatment, with emphasis on mechanisms	Summarized compounds like ginsenosides, resveratrol, curcumin, and baicalein with IOP-lowering and neuroprotective effects via antioxidant, anti-inflammatory, and anti-apoptotic pathways	Natural products can provide multi-target glaucoma benefits; clinical trials needed for translation	Supports development of botanical-based adjunct glaucoma therapies
Medication trends for age-related macular degeneration	Cho *et al.*, 2021	To review current medications for AMD and explore natural product candidates	Summarized device-based therapies, anti-inflammatory drugs, anti-VEGFs, and nutritional/ natural products; natural products effective mainly in early/intermediate AMD	Natural products could be integrated with conventional AMD therapy for early intervention	Highlights role of botanicals alongside anti-VEGF and device-based treatments
Herbal medicines in glaucoma treatment	Ige *et al.*, 2020	To examine evidence on herbal medicines used in glaucoma treatment	Ginkgo biloba and bilberry may protect retinal ganglion cells; marijuana lowers IOP briefly but with side effects	Herbal medicines may have neuroprotective roles, but insufficient evidence to alter glaucoma course	Recommends larger, long-term studies before clinical adoption
A novel botanical formula improves eye fatigue and dry eye	Kan *et al.*, 2020	To evaluate effects of lutein ester, zeaxanthin, blackcurrant, chrysanthemum, and goji berry formula on eye fatigue	All doses reduced eye fatigue scores, improved tear function, and increased macular pigment density vs. placebo	Botanical formula safe and effective for eye fatigue and dry eye without altering retinal structure	Could be a nutritional strategy for ocular comfort in VDU users
Medicinal plants and natural products used in cataract management	Tewari *et al.*, 2019	To review medicinal plants/natural products for cataract prevention and treatment	Identified 44 plants traditionally used; experimental evidence supports antioxidant and aldose reductase inhibition mechanisms	Natural products hold promise as non-surgical cataract interventions; need clinical validation	Provides pharmacological basis for anti-cataract plant research

Most of the studies came from Asia (India, Lebanon, and Saudi Arabia); fewer came from Africa (Ethiopia, Zimbabwe, and Cameroon) and the Americas (Mexico). Two-thirds of all publications provided disease-specific recommendations.

The order of the most discussed conditions was glaucoma and diabetic retinopathy, followed by cataracts, age-related macular degeneration (AMD), and surface conditions, for example, dry eye and eye fatigue. This distribution

emphasizes the global but imbalanced nature of research in traditional eye medicine.

4. Discussion

The literature reviewed indicates natural products have enormous potential as treatment or adjunctive treatment for a variety of eye diseases and conditions, including diabetic retinopathy (DR), glaucoma, cataract, age-related macular degeneration (AMD), and diseases of the ocular surface, such as dry eye and eye strain. The study by Andary *et al*. (2025) not only mentions the lack of clinical validation but also highlights the ethnopharmacological diversity of Lebanese flora, covering a range of medicinal plants with antioxidant, anti-inflammatory, and antimicrobial properties relevant to diseases such as glaucoma, cataract, and conjunctivitis. Khidr *et al*. (2025) elucidate various phytochemicals, including flavonoids, alkaloids, terpenoids, and polyphenols, that have been shown in preclinical models to reduce oxidative stress, inhibit inflammatory mediators, and inhibit vascular endothelial growth factor (VEGF)-mediated angiogenesis; in the absence of large-scale human trials, this provides evidence to support their use as adjunct therapy. Further mechanisms facilitating their use regarding glaucoma, age-related macular degeneration (AMD), diabetic retinopathy (DR), and cataract treatment are noted by Sun *et al*. (2024) in their notion of targeting mitochondrial dysfunction, in that certain naturally derived chemicals (plant-based) can enhance mitochondrial biogenesis, reduce reactive oxygen species (ROS), and restore ATP generation in ocular cells. While certain studies have illuminated the potential neuroprotective and intraocular pressure (IOP)-lowering effects of certain herbal agents such as *Ginkgo biloba*, bilberry, green tea polyphenols, and cannabinoids, Vitiello *et al*. (2023) would caution that the clinical evidence is limited and that these therapies are intended to be supplementary and not a replacement for conventionally used therapies for glaucoma. Stating the issues of standardization and clinical validation, Alghamdi *et al*. (2023) provide a global perspective on the use of medicinal plants in common ophthalmic disorders, documenting over 100 species that may have antioxidant, anti-inflammatory, and anti-angiogenic activities that may be beneficial for the eyes.

The use of bioactive compounds such as ginsenosides, resveratrol, curcumin, and baicalein, summarized by Sim *et al*. (2022), which mostly have multiple beneficial effects through antioxidant, anti-inflammatory, and anti-apoptotic pathways, needs to be evaluated in human studies. Cho *et al*. (2021) explore the use of herbal products in the management of age-related macular degeneration (AMD) and their potential for early intervention with anti-VEGF and device-based therapies, particularly in the early or intermediate phase of the disease. There is insufficient information to assume any neuroprotective impacts of *Ginkgo biloba* and bilberry (Ige *et al*., 2020); marijuana is characterized by its short-term intraocular pressure (IOP) reduction effects and negative effects. However, Kan *et al*. (2020) conducted a rare high-quality clinical trial that discovered a botanical formula with lutein ester, zeaxanthin, blackcurrant, chrysanthemum, and goji berry that improved tear quality, increased macular pigment density, and decreased eye fatigue without any negative structural changes, suggesting that this could be a dietary intervention to aid the comfort of people who obtain high screen exposure. Recently, Tewari *et al*. (2019), in their analysis of natural products and medicinal plants for cataract treatment, found 44 species that inhibit aldose reductase and may have antioxidant properties, thus supporting their use as non-surgical cataract treatments and raising the dire necessity for clinical verification of these proposals. Similarly, Albietz and Schmid (2017), Hu *et al*. (2023), and Sanie-Jahromi *et al*. (2024) also provide evidence supporting the use of honey-based products for dry eye disease, which is increasingly pertinent to optometric practice.

In combination, these findings suggest that conventional and natural therapies may be additional treatments for problems associated with optometry and eye care, such as dry eye disease, digital eye strain, and refractive stress, and therefore extend their potential relevance beyond diseases of the eye. In summary, these findings suggest natural products can treat multiple ocular conditions simultaneously, and the findings also demonstrate a substantial lag between solid preclinical evidence and a few high-quality clinical studies. To fill this gap and start incorporating natural products into evidence-based ophthalmic care, we need improved bioavailability techniques, standardized formulations, and robust randomized controlled studies.

5. Conclusion

Natural and conventional remedies hold significant potential for supporting eye health. Both traditional and scientific literature highlight their antioxidant, anti-inflammatory, neuroprotective, and anti-angiogenic properties, which can complement conventional practice and ocular health care. Although clinical data remain limited, research demonstrates potential benefits of lutein–zeaxanthin combinations, honey-based products, and botanicals rich in polyphenols for conditions such as glaucoma, diabetic retinopathy, cataracts, age-related macular degeneration (AMD), and ocular surface diseases. Their therapeutic indications have been validated through ethnobotanical and pharmacological research; however, most studies are either preclinical or involve limited human trials. It is therefore important that natural and conventional products be considered carefully

and supported by robust clinical evidence before integration into current practice.

6. Future Scope

Rigorous multicenter randomized controlled trials are urgently needed to establish the safety, efficacy, and appropriate dosage of these formulations. Standardization of bioactive constituents, optimization of bioavailability, and evaluation of long-term outcomes will be fundamental in developing clinical guidelines. Comparative studies across diverse geographic and cultural regions should further investigate how traditional therapies can address optometric-related issues such as dry eye, digital eye strain, and refractive stress. Additionally, regulatory frameworks and patient education will be essential to minimize risks and ensure the safe integration of traditional therapies with contemporary optometric practice, ultimately providing holistic, accessible, and culturally responsive solutions for eye health.

Abbreviations

DR: Diabetic retinopathy; **AMD:** Age related macular degeneration; **IOP:** Intraocular pressure; **ROS:** Reactive oxygen species; **VEGF:** Vascular endothelial growth factor.

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Authorship Contribution

All authors contributed equally to the work, reviewed the manuscript, and approved the final version for submission.

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Ethical Approvals

No ethical approvals were required for this study.

Declarations

The authors declare that they have followed all ethical standards in conducting this research. All data supporting the findings are available within the manuscript

Conflict of Interest

The authors declare no conflict of interest related to this study.

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