Impact of Excessive Digital Screen Exposure on Ocular Health and Ayurvedic Preventive Measures: A Literature Review.

Abstract

The increasing dependence on smartphones, computers, tablets, and various digital technologies has considerably elevated screen exposure among individuals of all age groups. Excessive use of digital screens has become a significant public health issue because of its detrimental impact on eye health. Extended screen viewing is linked with conditions such as Digital Eye Strain (DES), Computer Vision Syndrome (CVS), dry eye disorder, blurred vision, headaches, visual tiredness, and accommodative abnormalities.

Ayurveda highlights the importance of preserving vision through preventive and health-promoting measures. This narrative review aims to assess the effects of prolonged digital screen exposure on ocular health and examine Ayurvedic preventive interventions for sustaining visual well-being. Relevant literature was gathered from classical Ayurvedic texts, PubMed, Scopus, Google Scholar, and ophthalmology journals published between 2010 and 2025. The findings suggest that prolonged screen usage is closely related to ocular discomfort, decreased blinking frequency, instability of the tear film, and visual exhaustion. Ayurvedic principles including *Netra Rakshana*, *Dinacharya*, *Chakshushya Ahara*, *Tarpana*, *Nasya*, *Anjana*, and *Rasayana* therapy may serve as supportive preventive strategies to minimize screen-induced ocular strain. The combined application of Ayurvedic preventive practices and contemporary ergonomic guidelines may help enhance ocular health in the modern digital age.

Keywords: Digital Screen Exposure, Digital Eye Strain, Computer Vision Syndrome, Ocular Health, Ayurveda, Netra Rakshana, Chakshushya.

Introduction

Digital technology has become an integral part of modern living. Academic learning, workplace tasks, social communication, and recreational activities are increasingly conducted through digital devices. Although technological progress has enhanced connectivity and accessibility, excessive dependence on screen-based technologies has given rise to several health-related problems, particularly those affecting ocular health.[1]

Screen addiction can be described as excessive and compulsive use of digital devices, often leading to adverse physical, psychological, and social outcomes. Recent evidence indicates that people spend a considerable portion of their day using smartphones, computers, and tablets, frequently surpassing recommended screen-time limits.

Continuous interaction with digital displays demands prolonged visual focus, sustained accommodation, reduced blink frequency, and repeated exposure to artificial light, thereby contributing to increased ocular strain.

The eyes are among the most delicate and functionally important sensory organs. Prolonged exposure to digital screens may result in symptoms such as ocular dryness, irritation, burning sensation, redness, blurred vision, photophobia, headache, and visual fatigue. These symptoms are collectively recognized as Digital Eye Strain (DES) or Computer Vision Syndrome (CVS)[2].

Ayurveda considers vision to be one of the most valuable sensory faculties essential for maintaining quality of life. Classical Ayurvedic literature provides detailed guidance on preserving eye health and preventing visual disorders. Preventive measures such as *Dinacharya*, *Ritucharya*, *Netra Kriya Kalpa*, *Nasya*, and *Rasayana* therapies have been recommended for the maintenance of optimal visual function. In the present digital age, these principles may offer beneficial preventive strategies for minimizing screen-related ocular problems.

Screen exposure has risen considerably since the COVID-19 pandemic owing to the widespread adoption of online education, remote work practices, and increased reliance on digital communication platforms. Multiple studies have documented a significant increase in the prevalence of Digital Eye Strain among students, healthcare professionals, and office workers during this period[3].

Need for the Study

The prevalence of excessive digital screen exposure has risen markedly among children, adolescents, and adults in recent years. The increasing occurrence of Digital Eye Strain highlights the need for holistic and preventive healthcare interventions[4]. While contemporary medicine primarily focuses on symptomatic relief through lubricating eye preparations and ergonomic adjustments, Ayurveda presents a broader perspective that emphasizes disease prevention, healthy lifestyle practices, and the preservation of ocular function through rejuvenative measures[5].

A thorough review of the existing literature is necessary to examine the association between prolonged digital screen use and ocular health outcomes, as well as to assess the potential contribution of Ayurvedic preventive strategies in minimizing ocular complications related to excessive screen exposure[6].

Aim

To assess the influence of excessive digital screen use on ocular health and explore the potential of Ayurvedic preventive strategies for the maintenance and enhancement of visual wellness.

Objectives

1. To examine the impact of prolonged digital screen exposure on ocular health and visual function.
2. To analyze the underlying mechanisms and clinical features associated with screen-related ocular disorders.
3. To explore Ayurvedic principles concerning eye health maintenance and the preservation of vision.
4. To evaluate the effectiveness and relevance of Ayurvedic preventive interventions in minimizing ocular complications arising from excessive screen use.

Research Methodology

Study Design

The present work was designed as a narrative review of the existing literature.

Sources of Data

Relevant information was obtained from classical Ayurvedic texts such as *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*, as well as from scientific databases including PubMed, Scopus, Google Scholar, and Web of Science.

Search Strategy

A systematic literature search was carried out for publications between January 2010 and March 2025. The search included keywords such as “Digital Eye Strain,” “Computer Vision Syndrome,” “Screen Time,” “Dry Eye Disease,” “Ocular Health,” “Ayurveda,” *Netra Rakshana*, *Chakshushya*, and “Ayurvedic Eye Care.”

Method of Analysis

The collected studies were screened, organized, and analyzed in a descriptive manner to determine the relationship between prolonged digital screen exposure and ocular health conditions, as well as to assess the relevance of Ayurvedic preventive approaches.

Impact of Excessive Digital Screen Exposure on Ocular Health

The human visual system is not naturally designed for sustained interaction with digital screens. Extended exposure to digital devices places considerable strain on accommodation, convergence mechanisms, and the stability of the ocular surface[7].

Recent research suggests that nearly 50–90% of habitual users of digital devices report at least one symptom consistent with Digital Eye Strain. The condition is especially prevalent among students, information technology professionals, and individuals who spend prolonged periods engaged in online activities. Increased screen exposure has been recognized as a key risk factor for ocular discomfort, dryness, and visual fatigue[8].

One of the most frequently reported outcomes is Digital Eye Strain, which refers to ocular discomfort arising after prolonged use of electronic screens. Commonly documented symptoms include eye strain, dryness, irritation, blurred vision, headaches, and even associated neck and shoulder pain[9].

A significant contributing factor is the reduction in blink rate during screen use. Under normal conditions, individuals blink around 15–20 times per minute; however, this rate may decrease by nearly 50% during intensive screen engagement. This reduction accelerates tear film evaporation, contributing to dry eye symptoms and instability of the ocular surface[10].

The role of blue light emitted from digital devices has also received considerable attention due to its possible biological effects. Prolonged exposure may lead to visual discomfort, increased glare sensitivity, and disruption of circadian rhythms, resulting in sleep-related disturbances. Nevertheless, current evidence does not firmly establish that typical screen exposure causes irreversible retinal damage, although it may contribute to retinal oxidative stress and increased visual fatigue.

Extended near-work activities associated with continuous screen use have been implicated in the progression of myopia, particularly among children and adolescents. Reduced outdoor exposure combined with increased screen-based learning may be contributing to the rising global burden of refractive errors. Sustained accommodation during prolonged viewing may also result in accommodative stress and temporary visual disturbances.

Continuous near focusing can further lead to accommodative dysfunction and transient myopic shifts. Children and adolescents are especially susceptible due to increased academic and recreational screen exposure. A growing body of evidence supports a link between excessive near work and the progression of refractive errors.

In addition, prolonged screen use may negatively affect posture, contributing to musculoskeletal discomfort, which can indirectly intensify visual fatigue and reduce overall quality of life[11].

Ayurvedic Perspective of Ocular Health

Ayurveda describes the eyes (*Netra*) as the principal site of *Alochaka Pitta*, which governs the process of visual perception. Normal vision is sustained through the balanced functioning of *Doshas*, *Dhatus*, and the sensory apparatus[12].

In Ayurvedic theory, excessive utilization of the visual sense (*Atiyoga of Chakshurindriya*) may disturb *Dosha* equilibrium and give rise to ocular disorders. Prolonged engagement with digital screens can be understood as continuous visual overexertion, leading primarily to aggravation of *Vata* and *Pitta Dosha*[13].

Aggravated *Vata* is associated with symptoms such as dryness, ocular fatigue, and instability of visual function, whereas increased *Pitta* may manifest as burning sensation, redness, irritation, and discomfort in the eyes. As a result, many features of Digital Eye Strain closely resemble those described in *Vata-Pittaja* ocular conditions[14].

Classical Ayurvedic texts also highlight the importance of preventive eye care through *Dinacharya* and other protective practices aimed at preserving visual function and preventing disease progression[15].

From this standpoint, manifestations such as dryness, burning sensation, irritation, redness, blurred vision, and visual fatigue observed in Digital Eye Strain can be correlated with conditions like *Netrashosha*, *Shushkakshipaka*, and *Vata-Pittaja Netra Vikara*. Continuous screen viewing may therefore be interpreted as *ChakshurindriyaAtiyoga*, resulting in imbalance of *Vata* and *Pitta Dosha* and subsequent ocular discomfort[16].

Ayurvedic Preventive Measures

Ayurveda describes multiple preventive strategies that may help in minimizing ocular strain associated with excessive screen exposure.

Dinacharya

Daily routine practices form the foundation of preventive healthcare. Adequate sleep, a balanced diet, regular physical activity, and appropriate regulation of sensory activities collectively support ocular health and overall visual well-being[17].

Netra Prakshalana

Cleansing the eyes with cool and pure water is recommended to alleviate eye fatigue and provide a refreshing effect to the visual system. Periodic eye washing is considered useful in maintaining ocular hygiene and comfort[18].

Nasya Karma

The administration of medicated oils through the nasal route is believed to nourish structures located above the clavicular region and enhance the functioning of sensory organs. *Nasya* is traditionally advised for supporting visual function and preventing degenerative ocular changes[19].

Anjana

Application of medicinal collyrium is described as a routine ocular care practice. *Anjana* is believed to assist in clearing ocular impurities, improving visual clarity, and maintaining eye health[20].

Tarpana

Tarpana is a specialized therapeutic procedure in which medicated ghee is retained around the eyes for a defined duration. This therapy is considered to nourish ocular tissues, improve tear film stability, relieve dryness, reduce visual fatigue, and enhance overall eye comfort. Contemporary Ayurvedic studies have reported its potential benefits in conditions comparable to dry eye syndrome and Computer Vision Syndrome[21].

Rasayana Therapy

Rasayana formulations such as *Triphala*, *Yashtimadhu*, *Amalaki*, and *Guduchi* are known for their antioxidant and rejuvenating properties. These agents may help protect ocular tissues from oxidative stress associated with prolonged digital screen exposure[22].

Chakshushya Ahara

Ayurveda also emphasizes the intake of vision-supportive foods. Nutrient-rich substances such as ghee, milk, green leafy vegetables, fruits, and antioxidant-rich dietary components contribute to ocular nourishment and help maintain optimal visual function[23].

Discussion

The available literature shows a strong link between prolonged digital screen use and the development of ocular problems, particularly Digital Eye Strain, which is increasingly common across all age groups.

The symptoms observed in screen users closely align with features of *Vata-Pitta* imbalance described in Ayurveda. From this perspective, concepts such as *ChakshurindriyaAtiyoga* provide an explanatory framework for screen-related visual stress.

Preventive measures including regulated screen time, proper blinking, ocular relaxation techniques, along with *Tarpana*, *Nasya*, and *Rasayana* therapy may help reduce visual discomfort and support ocular health.

An integrative approach combining modern ergonomic practices with Ayurvedic preventive strategies may offer an effective way to manage and reduce screen-induced ocular strain.

Conclusion

Excessive exposure to digital screens has emerged as a major factor contributing to ocular discomfort and visual fatigue in the present era. Prolonged engagement with digital devices is linked to conditions such as Digital Eye Strain, dry eye syndrome, accommodative disturbances, and decreased visual comfort. Ayurveda provides a holistic preventive approach for maintaining ocular health through lifestyle regulation, eye care practices, dietary guidance, and rejuvenation therapies. Measures such as *Netra Prakshalana*, *Nasya*, *Anjana*, *Tarpana*, *Rasayana* therapy, and *Chakshushya Ahara* may assist in reducing screen-induced visual stress and promoting ocular well-being. A combined application of Ayurvedic preventive principles with modern ergonomic practices may offer an effective strategy for preserving eye health in the digital era. However, further robust clinical research is necessary to develop standardized, evidence-based Ayurvedic protocols for managing screen-related ocular disorders.

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