Dry Eye Disease Management in Primary Care: Diagnosis and Treatment Approaches

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ABSTRACT

Objective: Dry eye disease (DED) is a multifactorial disorder that affects the ocular surface, causing discomfort, visual disturbances, and reduced quality of life. Its global prevalence is increasing due to aging populations, digital screen usage, and environmental changes. This review aims to provide a comprehensive overview of the epidemiology, risk factors, diagnostic approaches, and treatment strategies for DED, with a focus on primary care settings.

Methods: An evidence-based analysis of current literature on DED was conducted, highlighting practical strategies for diagnosis and management suitable for primary care physicians, who often lack access to advanced diagnostic tools.

Results: Family physicians play a critical role in the early detection and management of DED. Symptom-based diagnostic methods and first-line treatments such as lifestyle modifications, artificial tears, and anti-inflammatory therapies are practical and effective. Timely referrals to specialists are essential for managing complex or refractory cases.

Conclusion: By increasing awareness and adopting evidence-based strategies, primary care physicians can significantly reduce the burden of DED on patients' quality of life. Enhancing diagnostic and management capabilities in primary care is crucial for addressing the growing prevalence of this condition.

Keywords: Dry eye disease, primary care, family medicine, diagnosis, treatment approaches

INTRODUCTION

Dry eye disease (DED) is defined as a multifactorial disease that disrupts the functional integrity of the ocular surface (1). This disease is caused by insufficient tear production or increased tear evaporation, disrupting the homeostasis of the ocular surface and causing discomfort in patients (2). Although DED is a common problem worldwide, it is often underestimated and underdiagnosed (1). According to the TFOS DEWS II (Tear Film and Ocular Surface Society Dry Eye Workshop) report, dry eye disease can have serious impacts on visual quality and standard of living (3). Increased use of screens in daily life, environmental pollution and systemic diseases have increased the prevalence of this disease (4).

In primary health care, family physicians are very important as they are the first point of contact for addressing eye-related problems (1). Family physicians appear to play a critical role in the diagnosis and management of a common problem such as dry eye disease. However, limited ophthalmological equipment and lack of access to advanced diagnostic methods may limit practice in this area (5). Nevertheless, the potential of family physicians in symptom-based approaches and patient awareness is important in reducing the impact of dry eye disease (5).

Understanding the definition, mechanisms and clinical manifestations of dry eye disease may help primary care physicians manage this disease more effectively. The tear film has a complex structure consisting of lipid, aqueous and mucus layers (6). Dysfunction in any one layer can cause dry eye, which often occurs as a result of hyposecretory or evaporative mechanisms (6). In

addition, modern lifestyle factors such as prolonged screen use and contact lens wear are also important risk factors.

The diagnosis of dry eye disease in primary care can be supported by careful assessment of the patient's complaints and simple examination methods (7). Taking anamnesis is one of the most important parts of this process. Symptoms such as burning, stinging, itching and blurred vision can be considered early signs of dry eye (7). In addition, a good patient history can reveal when the symptoms started, what factors aggravated them and how they affected quality of life (1).

This review aims to provide up-to-date information on the management of dry eye disease in primary care. The aim is to facilitate family physicians' approach to this disease and to help them identify effective treatment strategies that will improve the quality of life of patients. Diagnostic methods, treatment approaches and practical methods that can be applied in primary care will be the main focus of the study. At the same time, the effects of the disease in the public health dimension and the importance of awareness raising programmes will also be emphasised.

Epidemiology and Risk Factors of Dry Eye Disease

DED is a multifactorial disease and a public health problem whose prevalence is increasing with the ageing world population. The prevalence of DED varies between 5% and 35% worldwide, depending on the diagnostic criteria used (8). In an Australian study, the prevalence of DED was reported to vary between 8.6 per cent and 16.3 per cent according to specific criteria (9). An Asian meta-analysis shows that the prevalence is higher in women (21.7%) and increases with age (10).

Recent studies have also highlighted the role of occupational exposure and lifestyle changes in contributing to DED prevalence. Prolonged exposure to air-conditioned environments, common in office settings, has been associated with increased tear evaporation and ocular dryness. Similarly, a growing reliance on digital devices across all age groups exacerbates the condition, particularly in younger populations. These findings emphasize the need for targeted public health interventions to address environmental and behavioral contributors to DED (11).

Major risk factors for DED include older age, female gender, certain systemic diseases (e.g. Sjögren's syndrome, diabetes), hormonal changes and environmental factors (e.g. low humidity, use of digital screens) (8).

Risk Factors

Age: The prevalence of DED increases significantly with age. Physiological changes in the lacrimal glands contribute to a decline in tear production and stability. Studies estimate that DED affects up to 30% of individuals over the age of 50, with higher rates reported in populations over 60 years old (12). This correlation underscores aging as a key risk factor for the development and exacerbation of DED symptoms.

Gender: Gender plays a significant role in the prevalence of DED Women are more likely to develop DED, largely due to hormonal fluctuations, particularly during menopause. Decreased levels of estrogen and progesterone can adversely affect tear production. Research shows that the risk of DED in women is approximately 1.5 to 2 times higher than in men, highlighting the hormonal contribution to this disparity (13).

Digital Screen Usage: Prolonged use of digital screens significantly increases the risk of DED. Reduced blink rates during screen use contribute to tear film instability and faster evaporation. Studies report that individuals using digital devices for more than six hours a day have up to a 35% higher prevalence of DED symptoms. This has particularly contributed to the increasing incidence of DED among younger populations (11).

Contact Lens Usage: Contact lenses can disrupt the tear film and increase tear evaporation, which are significant contributors to the development of DED. Studies have shown that prolonged use of contact lenses is associated with a 25% increase in the risk of DED symptoms (3).

Systemic Diseases and Medications: Systemic diseases, such as Sjögren's syndrome and diabetes, are strongly associated with an increased prevalence of DED.

Additionally, medications like antihistamines, antidepressants, and diuretics, which affect lacrimal gland function or tear film stability, significantly exacerbate DED symptoms. These conditions and medications are recognized as key risk factors for DED (8).

Geographic and Environmental Factors: Environmental conditions, including low humidity, high altitudes, and exposure to air pollution, increase the prevalence of DED. In arid regions, the prevalence of

DED can reach up to 40%. Similarly, individuals living in areas with high levels of air pollution are more likely to experience ocular surface irritation, which can exacerbate DED symptoms (14).

Each of these factors plays an important role in the development of DED and should be carefully considered for individual risk management.

RESULTS

DED is influenced by various factors such as age, gender, digital screen use, contact lenses and environmental exposure. These data show that KGH should be evaluated by considering individual and environmental risk factors. Early diagnosis and preventive measures can reduce the negative effects of the disease on quality of life.

Diagnosis in Primary Care

When diagnosing dry eye by family physicians, symptom-based approaches can be used since detailed ophthalmological examination and devices are often not available (1). Patient history and physical examination play a critical role in the diagnosis of DED (5). This increases the importance of practical, rapid and effective methods in primary health care. Family physicians can reach the diagnosis by carefully evaluating the patient's complaints and applying basic examination methods.

Practical Methods for Diagnosing Dry Eye Disease

Anamnesis: Anamnesis is crucial for identifying DED. Patients should be asked to describe their symptoms in detail, including onset, daily variations, and the impact on their quality of life. Common symptoms such as burning, stinging, itching, and blurred vision should be discussed, along with potential aggravating factors like prolonged screen use or environmental changes. The use of medications, including antihistamines, antidepressants, and diuretics, which may reduce tear production, should also be evaluated (7). Seasonal variations in symptoms may further aid in diagnosis (1).

Visual Examination: Physical examination of the eyes can reveal signs of DED. Key observations include eyelid position, conjunctival redness, and inflammation. Signs of meibomian gland dysfunction, such as lid swelling or lash debris, should be documented. A simple light source or magnifier can help evaluate tear film stability, conjunctival vascular changes, and surface dryness. Blink rates and patterns should also be observed, as reduced blinking during prolonged screen use is a strong indicator of DED (15).

Surveys and Evaluation Tools: The Ocular Surface Disease Index (OSDI) and other questionnaires such as the McMonnies Dry Eye Questionnaire are invaluable for quantifying symptom severity and their impact on daily activities. These tools are particularly useful in primary care settings, enabling a systematic evaluation even without advanced diagnostic devices (16).

Additional Considerations: DED can be associated with systemic conditions such as Sjögren's syndrome or diabetes. In such cases, it is vital to assess related symptoms, including dry mouth, joint pain, or skin rashes. These may necessitate further systemic evaluation (17).

Combining these methods can facilitate effective diagnosis of DED in primary care. Accurate history-taking and physical examination remain the cornerstone of early detection, while questionnaires provide objective measures to support diagnosis and track treatment efficacy.

Treatment Approaches for Dry Eye Disease

Lifestyle Modifications: Patients are encouraged to adopt behavioral changes to reduce dry eye symptoms. These include limiting screen time, using humidifiers to increase environmental moisture, avoiding smoking, and ensuring adequate hydration. Strategies like the "20-20-20 rule," where patients look at something 20 feet away for 20 seconds every 20 minutes during screen use, can help reduce eye strain. Avoiding direct air currents in air-conditioned environments can also alleviate symptoms. Smoking cessation is critical, as it negatively impacts tear production (18). Patients should aim to consume at least eight glasses of water daily to support overall hydration levels (18, 19).

Artificial Tears: Artificial tear drops remain a cornerstone of DED treatment, especially for mild to moderate cases. Preservative-free formulations are recommended for long-term use to avoid irritation to the ocular surface. Patients can adjust the frequency of use based on symptom severity. For night-time relief, gel or ointment formulations are particularly effective as they minimize tear evaporation and reduce morning dryness (20).

Anti-Inflammatory Therapy: In moderate to severe cases, addressing inflammation on the ocular surface is critical. Topical cyclosporine A and lifitegrast are commonly used to modulate the immune response and reduce inflammation. These treatments may take several weeks to show full efficacy and are relatively expensive.

In acute cases, short-term corticosteroid eye drops may be used but require monitoring due to risks of increased intraocular pressure (21). Autologous serum eye drops may be considered for severe refractory DED, providing growth factors and anti-inflammatory benefits (21).

Omega-3 Fatty Acids: Dietary or supplemental omega-3 fatty acids have been shown to improve meibomian gland function and reduce inflammation, thereby stabilizing the lipid layer of the tear film. Sources include fish oil, walnuts, and flaxseeds. Regular use may reduce tear evaporation and alleviate symptoms. However, patients should be informed about potential side effects, such as gastrointestinal discomfort (22).

Eyelid Hygiene: For patients with meibomian gland dysfunction, eyelid hygiene is essential. This includes daily warm compresses to unblock gland secretions and eyelid massages to enhance lipid secretion. Specialized eyelid cleaning solutions or wipes can be used for better hygiene. Patients should establish this routine as part of long-term care, particularly if they wear contact lenses (18).

Additional Supportive Interventions: In severe cases, punctal occlusion may be used to retain natural and artificial tears by blocking tear drainage. Advanced options, such as autologous serum tears or scleral lenses, may be indicated for complex cases, especially those linked to autoimmune diseases like Sjögren's syndrome (23).

These approaches, tailored to disease severity and patient preferences, aim to alleviate symptoms, restore ocular surface health, and improve quality of life. Regular follow-ups are essential to adjust treatment plans based on response and evolving patient needs.

Referral Criteria from Primary Care to Specialist Levels

In the diagnosis and treatment of DED, referral to an ophthalmologist is essential when interventions at the primary care level prove insufficient or when the disease shows signs of progression. Timely referral helps prevent complications and ensures appropriate management.

Conditions Requiring Referral

Resistance to Treatment: When basic treatments, such as artificial tear drops and lifestyle modifications, fail to alleviate symptoms or if symptoms worsen, further evaluation by a specialist is necessary (19).

Vision Loss: Any significant reduction in visual acuity or quality suggests possible corneal involvement or severe ocular surface damage, warranting urgent referral to prevent irreversible complications (20).

Severe Inflammation: Signs of marked ocular redness, swelling, or engorged conjunctival vessels indicate advanced inflammation requiring targeted treatments, such as anti-inflammatory or immunomodulatory agents, that may not be available in primary care (20).

Autoimmune Conditions: Patients with DED linked to systemic autoimmune diseases, such as Sjögren's syndrome, require a multidisciplinary approach. Referral to a specialist ensures proper systemic and ocular management (22).

Advanced Diagnostic and Therapeutic Needs: When primary care lacks advanced diagnostic tools (e.g., tear osmolarity testing) or treatments like serum eye drops, punctal plugs, or scleral lenses, referral is necessary to provide patients with appropriate care (22).

CONCLUSION

Dry eye disease is a common condition that can be diagnosed and treated in primary health care settings, but it can seriously impair quality of life. By implementing simple and effective treatment protocols, family physicians can alleviate patients' symptoms and make it easier for them to cope with the disease. In addition, timely referral of complicated or refractory cases to ophthalmology is a critical step to improve treatment success.

From a public health perspective, campaigns to raise awareness of dry eye and patient education programmes can help individuals better understand their symptoms and seek early medical support. Such initiatives have an important place in primary health care, both to reduce the burden of disease and to promote better eye health awareness throughout the community.

DECLARATIONS

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