

A Qualitative Study on Barriers to Maintaining Self-management Behaviors among Patients with Dry Eye Disease Based on the Temporal Self-Regulation Theory

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Abstract: Dry eye disease (DED) is a chronic ocular surface disorder requiring long-term self-management; however, maintaining self-management behaviors remains challenging for many patients. This study aimed to explore the lived experiences and barriers associated with the maintenance of self-management behaviors among patients with DED and to provide a basis for developing targeted nursing interventions. A descriptive qualitative study was conducted using purposive sampling. From March to April 2026, 16 patients with DED were recruited from the ophthalmology outpatient clinic of a tertiary hospital in Shaanxi Province, China. Data were collected through face-to-face semi-structured in-depth interviews guided by the Temporal Self-Regulation Theory (TST). The data were managed and coded using NVivo 12.0 software and analyzed through directed content analysis. Three themes and six subthemes were identified: a short-term benefit orientation weakening motivation to maintain self-management behaviors; real-life contextual factors reducing the feasibility of implementing self-management behaviors; and insufficient support resources hindering the long-term maintenance of self-management behaviors. The maintenance of self-management behaviors among patients with DED is influenced by multiple interacting factors, including temporal perspective, perceived behavioral utility, and self-regulatory capacity. Nursing interventions should extend beyond traditional health education and focus on long-term behavior maintenance by enhancing patients' perception of future health benefits, improving the compatibility between self-care behaviors and daily contexts, and establishing digital and home-based support systems. These findings provide insights for developing individualized interventions to promote sustained self-management among patients with DED.

Keywords: Dry eye disease; Self-management; Behavioral maintenance; Temporal Self-Regulation Theory; Qualitative study

1. Introduction

Dry eye disease (DED) is a multifactorial ocular surface disorder characterized by the loss of tear film homeostasis, and its course is typically chronic and recurrent. The global prevalence ranges from 5% to 50%, whereas the prevalence in China ranges from 21.0% to 68.3% [1-2], with an increasing trend among younger populations[3]. Clinical manifestations include ocular dryness, foreign body sensation, eye pain, and visual fatigue, which severely affect patients' visual function and quality of life. In recent years, awareness of dry eye disease prevention and management has generally increased; however, adherence to self-management behaviors and self-efficacy remain insufficient. Existing research indicates that adherence to self-management among patients with dry eye disease is generally low[4], and issues such as behavioral discontinuation, irregular implementation, and difficulties in sustaining self-management behaviors are common during long-term management[5-6]. Current studies have mainly focused on preliminary explorations of health behavior management among patients with dry eye disease, with most interventions emphasizing short-term symptom relief. However, limited research has explored patients' lived experiences regarding the maintenance of self-management behaviors, making it difficult to develop evidence-based strategies for sustained nursing interventions. The Temporal Self-Regulation Theory (TST)[7] was proposed by Fong and Hall in 2007. Building upon the

intention–behavior model, TST emphasizes the combined effects of temporal perspective, perceived behavioral utility, and self-regulatory capacity on health behaviors. As a theoretical framework for promoting health behaviors, TST has demonstrated positive effects in improving behavioral adherence^[8]. To date, this theoretical model has been applied among patients with coronary heart disease and heart failure^[9]. Therefore, this study adopted TST as the theoretical framework and employed a qualitative research approach to explore the lived experiences and barriers encountered by patients with dry eye disease in maintaining self-management behaviors. The findings may provide insights for optimizing nursing interventions and developing long-term self-management strategies.

2. Subjects and Methods

2.1 Subjects

Purposive sampling was used to recruit patients with dry eye syndrome who attended the ophthalmology outpatient clinic of our hospital between March and April 2026. The inclusion criteria were as follows: (1) meeting the diagnostic criteria for dry eye syndrome; (2) aged ≥ 18 years; (3) willing to participate in the study, fully informed of the study procedures, and providing written informed consent; (4) having complete and accurate clinical records; and (5) being able to complete questionnaires and relevant ocular surface examinations. The exclusion criteria were as follows: (1) presence of severe organ dysfunction (e.g., cardiac, hepatic, or pulmonary failure) or malignant tumors; (2) a history of psychiatric disorders or current mental disorders; (3) impaired consciousness or severe cognitive impairment; (4) participation in other clinical studies; and (5) dry eye syndrome secondary to other pathological conditions. The sample size was determined based on the principle of data saturation. Ultimately, 15 patients were included in the study (numbered N1–N15). This study was approved by the Institutional Review Board of the hospital (Approval No.: [2026] IRB No. 22).

2.2 Methods

2.2.1 Formation of the Research Team

The research team consisted of one Chief Nurse, two master's degree students, and one senior nurse. None of the researchers were involved in the participants' clinical care, diagnosis, or treatment, which helped minimize potential bias caused by role overlap. During the interviews, the researchers maintained a neutral attitude, avoided leading questions, and encouraged participants to express their experiences and perspectives freely.

2.2.2 Developing the Interview Guide

Based on a review of the relevant literature and guided by the Temporal Self-Regulation Theory (TST), a preliminary semi-structured interview guide was developed. After group discussions, consultation with ophthalmic nursing experts, and pilot interviews with two patients, the final interview guide was refined as follows: ① How has dry eye syndrome affected your daily life? ② In your daily life, what self-management practices do you find helpful in relieving eye discomfort? How long do the effects of these practices usually last? ③ When you perform these self-management practices, how do you perceive the changes or benefits they bring? ④ How do you usually plan and arrange these practices to maintain them over time? ⑤ What difficulties or barriers have you encountered in maintaining these practices? How have you managed these challenges? ⑥ If these self-management practices could become more convenient or effective, what kinds of support or changes would you like to receive?

2.2.3 Data Collection Methods

In-depth face-to-face interviews were conducted by a researcher trained in qualitative research and experienced in outpatient ophthalmology nursing. Interviews were conducted in a quiet and private examination room after outpatient examinations. Before the interviews, participants were informed of the study purpose, confidentiality, voluntary participation, and audio-recording procedures, and written informed consent was obtained. Data were collected through audio recordings and field notes. The researcher maintained a neutral attitude, encouraged free expression, and adjusted questions according to participants' responses. Each interview lasted approximately 20–40 minutes.

2.2.4 Data Analysis Methods

Within 24 hours after each interview, two researchers independently transcribed the audio

recordings verbatim and organized the transcripts. NVivo software was used to assist with data management and analysis. The interview data were analyzed using thematic analysis^[10]. Two researchers independently coded and analyzed the interview data and identified themes and subthemes. Any disagreements during the analysis process were discussed within the research team until consensus was reached and the final themes were determined.

2.2.5 Quality Control Methods:

All members of the research team received systematic training in qualitative research and were familiar with relevant data collection and analysis methods. Interviews were conducted in a quiet and private examination room within the ophthalmology outpatient clinic to ensure participant confidentiality and comfort. During the interviews, the researchers used active listening, probing, and clarification techniques while avoiding leading questions. In addition, nonverbal information, including participants' facial expressions and body language, was recorded to enhance the credibility and completeness of the collected data.

3. Results

3.1 Theme 1: Lack of Motivation to Sustain Self-Management Behaviors Due to a Focus on Short-Term Benefits

Patients reported having attempted various self-management strategies, including artificial tears, warm compresses, eye patches, and resting with their eyes closed. However, these approaches mainly provided short-term relief and failed to achieve sustained symptom improvement. Because patients found it difficult to perceive the cumulative benefits of sustained self-management, their behaviors gradually shifted from proactive prevention and long-term maintenance toward symptom-driven management.

3.1.1 Self-Management Behaviors Are Primarily Triggered by Changes in Symptoms

This study found that many participants did not establish regular self-care routines. Instead, they tended to initiate self-care behaviors only when noticeable eye symptoms occurred. For example, patients used eye drops, applied warm compresses, or reduced screen time mainly when they experienced severe ocular dryness, discomfort, eye fatigue, or blurred vision. This pattern indicated that self-care behaviors were primarily symptom-driven rather than planned according to long-term disease management needs. N5 stated, "I usually only use eye drops when my eyes feel really dry." N6 reported, "Most of the time, I do not remember to use eye drops until my eyes start to feel uncomfortable." Some patients reported that when symptoms temporarily improved, they perceived less need to continue self-care and reduced or discontinued related behaviors. As a result, their self-management behaviors showed a clear intermittent pattern.

3.1.2 Short-Term Benefits Are Difficult to Translate into Long-Term Motivation

Patients generally recognized that interventions such as artificial tears and warm compresses could relieve their immediate symptoms. However, because these effects were often temporary, patients found it difficult to develop a sustained expectation that consistent care could lead to long-term improvement. After repeated recurrences, some patients gradually realized that their current self-care practices mainly provided symptom relief rather than addressing the underlying causes. This change in perceived effectiveness weakened their motivation to maintain self-management behaviors. N5 stated, "I always feel that even if I do everything right today, it will be the same tomorrow." N15 reported, "Even if I take care of my eyes every day, the symptoms come back when I return to work the next day." However, patients also recognized that neglecting self-care could worsen their symptoms. Therefore, they continued to perform some self-care behaviors, but their main purpose gradually shifted from achieving symptom improvement to preventing further symptom deterioration.

3.2 Theme 2: Real-Life Situations Reduce the Feasibility of Self-Management Behaviors

3.2.1 Work Requirements Hinder the Timely Implementation of Eye Care Practices

Most patients identified occupational demands as an important factor influencing their self-management behaviors. Due to the need for sustained visual attention, maintaining work continuity, and limited opportunities to leave their work positions, patients often found it difficult to perform eye care activities in a timely manner, even when they recognized the importance of rest and eye protection.

N9 explained, “When I am at a critical point in coding, my eyes already feel very uncomfortable, but I cannot interrupt my train of thought.” For individuals with high visual workloads, work tasks often take priority over eye care needs. As a result, patients gradually developed a pattern of prioritizing work completion before engaging in eye care behaviors.

3.2.2 How Family Responsibilities and Daily Rhythms Affect the Implementation of Care Plans

In addition to work-related factors, family responsibilities further reduced the time available for self-care. Some participants reported that after work, they still needed to manage household chores and care for family members. As a result, planned self-care activities, such as applying warm compresses, were often postponed or even abandoned. N5 stated, “After a busy day, I feel even more exhausted than I do after work.” N7 reported, “After I get home from work, I still need to cook and take care of household matters. By the time everything is finished, it is already quite late.” These findings suggest that patients have the willingness to engage in self-care. Rather, when managing multiple roles and responsibilities, patients’ self-care behaviors are often displaced by more immediate daily demands.

3.3 Theme 3: Insufficient Support Resources Limit the Sustained Maintenance of Self-Management Behaviors

3.3.1 Lack of Systematic Guidance Leads to Inconsistent Care Practices

Some patients reported that their current self-management practices mainly relied on brief instructions from healthcare providers, online information, or personal experience. They lacked clear knowledge about specific aspects of self-care, such as the duration of warm compress therapy, frequency of self-care practices, and appropriate ways to perform these behaviors. N12 stated, “There is so much information online now, but I do not know which information is reliable or suitable for me.” N14 reported, “Doctor visits are usually very short, so I do not have enough time to ask many questions.” Due to insufficient guidance, patients found it difficult to establish consistent and standardized self-care routines, thereby hindering the long-term maintenance of self-management behaviors.

3.3.2 Expectations for Home-Based Care Approaches to Enhance Behavioral Sustainability

Most patients expressed a need for home care support and hoped that hospitals could provide simple and practical home-based care strategies, such as home nebulization, herbal pouch hot compresses, video-based guidance, and online consultations. Patients believed that care methods requiring less time and involving clear instructions for implementation would be easier to incorporate into daily life and maintain over time. N6 stated, “Can I do this myself at home?” N13 reported, “If I could do it at home and did not need to take time off work to visit the hospital so frequently, I think it would be easier to continue this care.”

4. Discussion

4.1 Recurrence of the Disease and a Focus on Short-Term Benefits Weaken Motivation to Maintain Healthy Behaviors

This study found that patients with dry eye disease experienced persistent symptoms, including ocular dryness, foreign body sensation, blurred vision, and eye fatigue. Although artificial tears, warm compresses, and eye rest provided short-term relief, these measures mainly produced immediate symptomatic benefits, making it difficult for patients to perceive the long-term benefits of standardized management. Consequently, self-management behaviors gradually became symptom-driven, with insufficient motivation for long-term maintenance.

Previous studies have shown that dry eye disease is a chronic and recurrent condition, and symptom improvement influences patients’ treatment expectations and adherence^[11-12]. This study further revealed that self-management difficulties were related not only to insufficient disease knowledge but also to patients’ perceptions of when health behavior benefits would occur. According to the Temporal Self-Regulation Theory (TST), behavioral maintenance is influenced by temporal perspective, perceived behavioral utility, and self-regulatory capacity^[13]. In this study, artificial tears and warm compresses provided strong immediate reinforcement due to rapid symptom relief, whereas long-term management behaviors, such as taking regular breaks and limiting prolonged visual tasks, required more time to demonstrate benefits, making sustained engagement difficult.

Therefore, nursing interventions should emphasize patients' understanding of long-term health benefits rather than focusing solely on symptom relief. Health education should help patients recognize the chronic nature of dry eye disease and the importance of continuous self-care. Symptom diaries, self-monitoring, and regular feedback may further help patients perceive gradual improvements and enhance motivation for maintaining self-management behaviors.

4.2 Work and Lifestyle Factors Increase the Difficulty of Behavior Implementation and Limit the Sustained Practice of Self-Management Behaviors

This study found that the maintenance of self-management behaviors among patients with dry eye disease was influenced not only by individual factors but also by work and lifestyle constraints. Some patients engaged in prolonged, high-intensity visual activities due to occupational demands; despite recognizing the importance of eye care, they found it difficult to reduce screen time or implement planned self-care behaviors. Previous studies have identified prolonged visual display terminal (VDT) exposure, sustained near work, and intensive visual tasks as important risk factors for dry eye development and progression^[14-16]. This study further revealed that for individuals engaged in prolonged visual work, such as teachers and programmers, the work environment not only contributed to symptom persistence but also acted as an external barrier to implementing health behaviors.

According to TST, behavioral maintenance is influenced by contextual factors that affect behavioral costs and self-regulatory capacity^[13]. In this study, prolonged visual tasks were often a necessary work requirement, whereas self-care behaviors, including warm compresses, eye rest, and blinking exercises, required additional time and were easily disrupted by work schedules and daily responsibilities.

Therefore, nursing interventions should not only focus on health education but also improve the compatibility between health behaviors and patients' real-life contexts. For individuals with prolonged visual tasks, individualized rest plans, brief behavioral training, and mobile health tools can be incorporated into daily routines to reduce implementation barriers and promote long-term behavior maintenance.

4.3 Insufficient Self-Regulation and Lack of External Support Jointly Hinder Long-Term Behavior Maintenance

The present study found that patients with dry eye disease lacked stable self-management patterns. Eye care behaviors were often initiated based on personal memory and symptom fluctuations and were easily interrupted by work stress, daily responsibilities, and environmental changes. Meanwhile, patients expressed a need for continuous support, including home-based care guidance, online consultations, and video education, indicating insufficient support systems for sustaining self-management behaviors in current dry eye management.

According to TST, self-regulatory capacity is essential for initiating and maintaining health behaviors and involves processes such as action planning, self-monitoring, and coping with environmental disruptions^[8]. This study showed that although patients had some awareness of eye care, the lack of clear behavioral plans and consistent implementation strategies prevented the formation of regular and automated self-care routines, making behaviors vulnerable to external influences.

Compared with the management of chronic diseases such as diabetes and hypertension, dry eye management remains primarily focused on disease education and treatment guidance, with limited attention to continuous behavioral support. Recent studies have demonstrated that mobile health technologies can improve chronic disease self-management through reminders, feedback, and individualized support^[17-18]. Therefore, future dry eye nursing should shift from traditional education models toward continuous behavioral support. Home-based care guidance, online follow-up, digital health tools, and safe home-based traditional Chinese medicine (TCM) nursing approaches may support the enhancement of self-regulatory capacity, improve accessibility, and promote long-term maintenance of self-management behaviors.

5. Conclusion

In summary, this study explored the lived experiences and needs of patients with dry eye disease regarding the maintenance of self-management behaviors through semi-structured interviews. The findings indicate that difficulties in sustaining self-management behaviors are not simply attributable to

insufficient knowledge but result from the interaction of multiple factors, including individual characteristics, environmental constraints, and self-regulatory capacity. Future nursing interventions should move beyond traditional health education toward behavioral support models, incorporating strategies such as digital health tools, context-based behavior management, and family-centered support to enhance patients' capacity to initiate and sustain healthy behaviors over time.

This study has several limitations. First, participants were recruited from a single tertiary hospital, which may limit the transferability of the findings to other contexts. Differences in healthcare systems, insurance policies, and access to medical resources across regions may influence patients' perceptions and expressions of self-management needs. Future research should adopt multicenter designs with larger and more diverse samples to further explore and extend these findings.

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