

Research Progress on Influencing Factors and Interventions of Self-efficacy in Glaucoma Patients

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Abstract: *Glaucoma is a chronic eye disease characterized by progressive optic nerve damage and visual field defects, and is the leading cause of irreversible blindness worldwide. It requires long-term intraocular pressure control and self-care from patients. Self-efficacy reflects an individual's confidence in their ability to persistently complete disease-related management behaviors and plays an indispensable role in the long-term care process of glaucoma patients. This article systematically organizes the multiple factors influencing self-efficacy levels in glaucoma patients, covering sociodemographic characteristics, disease-related features, psychological status, and social support environment. It also summarizes effective intervention strategies that have been proven domestically and internationally, providing reliable evidence and feasible ideas for developing more targeted nursing strategies in clinical practice.*

Keywords: Glaucoma, Self-efficacy, Influencing factors, Intervention measures, Nursing care.

1. Introduction

Glaucoma, a chronic blinding eye disease accompanied by progressive optic nerve damage and visual field defects, has become the leading cause of irreversible blindness worldwide. According to statistics, there are currently approximately 80 million glaucoma patients globally, and this number is expected to exceed 110 million by 2060 [1]. The prevention and control situation in China is particularly severe, with over 21.8 million confirmed patients, accounting for 28.7% of the global total, and nearly 865,000 new cases each year, resulting in a disease burden significantly higher than the global average [2]. Current treatments for glaucoma mainly include medication, surgery, and laser therapy, among which surgery is one of the core treatment modalities. However, the postoperative prognosis for patients is not optimistic. The 5-year surgical success rate for patients with advanced glaucoma is only 56.5%, and poor postoperative intraocular pressure control significantly increases the risk of continued visual field damage [3]. This situation means that glaucoma patients need to adhere to long-term standardized medication and regular follow-up, and self-management ability directly determines disease control outcomes. Self-efficacy, as the core belief underlying self-management ability and a key intrinsic driver of self-management behavior, has been shown by existing research to be significantly positively correlated with patients' self-management levels. Moreover, self-efficacy can independently influence an individual's self-management level [4]. Most studies suggest that the overall self-efficacy of glaucoma patients is relatively low and is influenced by multiple factors [4]. This article, based on existing research findings, reviews the core connotation of self-efficacy, commonly used assessment tools, related influencing factors, and clinical intervention measures, hoping to provide a more systematic and comprehensive reference for clinical nursing practice.

2. Overview of Self-Efficacy Theory

2.1 Origin of Self-efficacy Theory

Self-efficacy theory was formally proposed by renowned

American psychologist Albert Bandura in 1977 in his work *Self-efficacy: Toward a Unifying Theory of Behavioral Change* and is a core construct of social cognitive theory. Bandura conducted in-depth investigations into the drivers of individual behavior, breaking through the limitations of traditional behaviorism's "stimulus-response" model and the instinct-driven theory of psychodynamics. He emphasized the decisive role of cognitive processes, particularly individuals' beliefs about their own abilities, in regulating behavioral motivation, choice, effort, and persistence. After the theory was introduced into nursing and health fields, it promoted a shift from solely focusing on overt behaviors or pathological changes to emphasizing patients' internal psychological resources and empowerment support, laying a solid theoretical foundation for understanding and promoting self-management behaviors in patients with chronic diseases.

2.2 Core Content and Framework of Self-efficacy Theory

Self-efficacy is not a stable personality trait but a dynamic cognitive evaluation system closely related to specific tasks and situations. According to Bandura's social cognitive theory [2], self-efficacy represents an individual's subjective judgment of their ability to successfully complete a specific behavior. Its formation, change, and improvement are primarily influenced by four sources of information. Direct experience—successes and failures that individuals personally experience in real situations—is the most core and stable basis for building self-efficacy. People become more confident in their abilities after continuously gaining successful experiences, while frequent setbacks gradually reduce their recognition of their own abilities. Vicarious experience comes from observing individuals similar to oneself. When people see similar others completing a goal, they also develop the confidence that "I can do it too"; the higher the similarity, the more pronounced this effect. Verbal persuasion comes from positive encouragement and feedback from healthcare providers, family members, or peers. Although such support is not as powerful as direct experience, it can effectively alleviate patients' self-negating emotions, especially when patients lack practical experience. Physiological and emotional states reflect how individuals

interpret their own tension, fatigue, or anxiety when facing tasks. If people view moderate tension as a normal response to a task rather than a sign of incompetence, their self-efficacy will also increase accordingly. The theoretical framework further distinguishes two important cognitive components [3]: efficacy expectations and outcome expectations. Efficacy expectations refer to an individual's judgment of "whether I have the ability to complete the behavior," while outcome expectations concern the individual's prediction of "whether the expected effect will be achieved after completing the behavior." Both jointly influence the initiation and continuation of behavior and need to be targeted separately in practical interventions. In the process of self-efficacy influencing behavior, individuals form an overall perception of their abilities based on the four types of information mentioned above. This perception directly affects people's behavioral choices, the degree of effort they invest, and how long they persist when encountering obstacles [4]. In the context of glaucoma chronic disease management, this theoretical framework also has strong explanatory power and applicability. Research has confirmed that good communication levels significantly predict medication self-efficacy in glaucoma patients, thereby influencing long-term medication adherence and regular follow-up behaviors [5]. Nursing interventions designed based on the four sources of self-efficacy, such as collaborative skills training [6], family and peer support nursing [7], exercise rehabilitation combined with CICARE communication nursing [8], have been clinically proven to effectively enhance patients' self-efficacy and self-management abilities.

2.3 Assessment Tools for Self-efficacy

Accurate assessment of self-efficacy is a prerequisite for conducting research and implementing interventions. Currently, assessment tools used in the glaucoma field are mainly divided into two categories: generic scales and disease-specific scales.

Generic self-efficacy scales are suitable for the general population and can assess general confidence levels or overall confidence in chronic disease management. The General Self-Efficacy Scale (GSES), developed by Schwarzer et al., is the most widely used generic tool internationally. Its Chinese version has good reliability and validity, with Cronbach's α coefficients often above 0.80. The scale is concise and general, facilitating cross-cultural comparisons, but it lacks disease specificity and cannot accurately reflect patients' confidence in specific scenarios such as regular medication use and adaptation to visual changes in glaucoma. The Chronic Disease Management Self-Efficacy Scale (SEMCD) [10], derived from the Stanford Patient Education Research Center, consists of six items and assesses patients' overall confidence in symptom management, role function, and other aspects.

Self-efficacy assessment tools in the chronic disease field are generally divided into generic and disease-specific types. Generic tools [9] are suitable for various chronic disease populations, among which the SEMCD [10] is the most classic. It is concise, quickly assesses patients' overall confidence in symptom management, medication, role function, and other aspects, has good reliability and validity, and facilitates cross-disease comparisons. Disease-specific

tools [11] [12] are designed for specific disease management tasks, such as the Diabetes Management Self-Efficacy Scale (DMSES) [13] for assessing confidence in diet control and blood glucose management in diabetic patients, and the Arthritis Self-Efficacy Scale (AES) [14] for assessing confidence in pain management and daily activities in patients with joint diseases. From early single-disease-specific scales, the field has gradually developed into generic scales applicable to multiple diseases and multicultural revised versions, providing multidimensional and personalized assessment options for clinical and research use. (2) Disease-specific self-efficacy scales: Disease-specific self-efficacy scales are designed for specific disease management tasks and have higher content validity. Currently, the specialized scales used for assessing self-efficacy in glaucoma patients include the shortened version of the Glaucoma Medication Self-Efficacy Scale (GMSES), which covers two dimensions: medication adherence and operational skills, suitable for assessing specific confidence in glaucoma management. Generic scales such as the GSES [15] are used to reflect patients' overall confidence in coping with life challenges and facilitate cross-population comparisons.

3. Main Factors Influencing Self-efficacy

Glaucoma requires patients to engage in lifelong rigorous disease management, and self-management level directly affects treatment adherence, daily management behaviors, and quality of life. Self-efficacy, as an individual's confidence in their ability to complete specific management behaviors and achieve expected goals, plays a central role in disease management in glaucoma patients. This section systematically reviews the main factors influencing self-efficacy in glaucoma patients from three dimensions: sociodemographic, disease-related, and social environment.

3.1 Sociodemographic Factors

Sociodemographic characteristics are fundamental factors affecting self-efficacy in glaucoma patients. Studies have shown that advanced age, low educational level, financial difficulties, and inadequate medical insurance coverage are significantly associated with lower self-efficacy levels [16]. Taking elderly patients as an example, those aged 60 years and older often experience instillation failure due to decreased manual dexterity and cognitive function, such as failing to accurately dispense drops into the eye or allowing the dropper tip to contact the eye [17]. Patients' educational level directly affects their acceptance and understanding of disease-related knowledge. Those with better educational backgrounds often master care skills more smoothly, demonstrate stronger execution ability in self-management, and consequently have higher self-efficacy. Family economic conditions and medical insurance also affect patients' management status. Existing research shows that patients with a monthly per capita household income of less than 150 yuan are more likely to experience insufficient ability in disease self-management, with a significantly increased risk of poor overall management levels [18]. Economic pressure not only directly poses a treatment barrier but also triggers psychological burden in patients due to worry about "becoming a family burden" [19]. Social cognitive theory points out that environmental conditions such as economic resources and

medical insurance accessibility are important external supports for self-efficacy formation [20]. Medical expense burden is a key mediating factor through which socioeconomic status affects self-efficacy [21]. Real-world studies in multiple countries (European countries) have confirmed that in regions with more adequate medical insurance coverage, the risk of treatment non-adherence due to economic reasons is lower, providing a basic guarantee for maintaining stable self-efficacy [22].

3.2 Disease-related Factors

Patients' own disease characteristics also significantly influence self-efficacy levels. The degree of visual function impairment, disease duration, and treatment complexity all directly affect patients' management confidence. For example, patients with moderate-to-advanced glaucoma generally have low self-efficacy due to worsening visual field defects and limitations in daily living [23]. The degree of patient cooperation in treatment and actual intraocular pressure control effects are also closely interrelated with self-efficacy, forming a reciprocal relationship. Good medication adherence and stable intraocular pressure control can effectively enhance patients' treatment confidence, creating a virtuous cycle of "high adherence → stable IOP → increased confidence" [24] [25]. Furthermore, disease duration and treatment complexity have different effects: newly diagnosed patients usually need time to adapt to the disease state, while patients with longer disease duration may gain efficacy through accumulated coping experience [26]; conversely, overly complex treatment regimens (high medication frequency, difficult instillation) increase patients' management burden and reduce their confidence in disease self-management [27].

3.3 Social Environmental Factors

Social environmental factors play a crucial external supportive role in the construction of self-efficacy in glaucoma patients. Adequate social support and a stable, harmonious family atmosphere provide solid support for patients in long-term disease management. Medication reminders, daily care, and emotional companionship from family members can directly enhance patients' confidence in disease management, thereby significantly improving their self-efficacy levels [28]. Smooth and effective doctor-patient communication also provides key support and assurance for patients' disease management process. Supportive medical relationships can effectively strengthen patients' understanding and recognition of treatment plans, increase their active participation in disease management [5] [29], and thus lay a solid foundation for improving self-efficacy.

4. Interventions to Enhance Self-efficacy in Glaucoma Patients

Domestic and international studies have shown that self-efficacy levels in glaucoma patients are not determined by a single factor but are influenced by multiple conditions, including basic characteristics such as age and education level [30], as well as factors closely related to patients' medical insurance status and psychological resilience [31]. Psychological resilience plays an important mediating role, producing a mediating effect between sociodemographic

characteristics and self-efficacy [32]. This finding makes psychological interventions even more important in clinical care. A perfect medical insurance system can help patients maintain treatment confidence and adherence by reducing economic burden. At the intervention strategy level, emotional support and experience sharing from family and peers can effectively enhance patients' self-efficacy and quality of life. Research on stroke patients has confirmed that self-management interventions can improve self-efficacy and health-related quality of life in chronic disease patients, providing cross-disease references for glaucoma. In addition, psychological support such as cognitive behavioral therapy [33] can alleviate anxiety and enhance domain-specific self-efficacy, guiding patients to develop positive disease perceptions, thereby strengthening their coping confidence [34] [35], and ultimately improving self-efficacy and quality of life. Based on the above mechanisms, this section categorizes existing intervention measures into three types: educational interventions, psychological and supportive interventions, and technology-assisted interventions.

4.1 Educational Interventions

Educational interventions enhance patient self-efficacy through knowledge transfer and skills training. Stage-based health education grounded in the transtheoretical model can provide targeted guidance according to patients' different stages of behavioral change, significantly improving medication adherence and self-management ability [36]. There is a complex relationship between glaucoma patients' disease knowledge level and treatment adherence [37]. Health education focused solely on knowledge transmission often has limited effects [38]. Comprehensive educational interventions that combine skills training, problem-solving training, and ongoing support—by systematically teaching disease knowledge, medication techniques, and self-monitoring methods—can more effectively promote changes in patient adherence behavior and enhance their self-management ability and treatment confidence. Furthermore, structured education programs that include knowledge dissemination, skills training, and problem-solving have also been shown to significantly improve self-management levels and self-efficacy in glaucoma patients [39]. Patient self-efficacy is influenced by multiple factors including disease cognition, family supervision, and doctor-patient communication. To effectively improve treatment adherence, multifaceted and comprehensive intervention strategies that combine health education, skills guidance, and continuous support are needed [40]. A randomized controlled trial of 312 cases by Tsihla et al. [41] found that nurse-led structured health education significantly improved patients' health literacy levels and self-management abilities, with the intervention group achieving higher scores on the PAM-13, and the between-group difference was statistically significant ($P < 0.001$). Health literacy is positively correlated with self-management level. In clinical care, patients' health literacy should be assessed first, and simplified educational materials should be designed for patients with low literacy. A Cochrane systematic review [42] also confirmed that multifaceted behavioral plans—including medication reminders, multimedia assistance, medication aids, and mindfulness-based stress reduction—can effectively improve medication adherence in glaucoma patients.

4.2 Psychological and Supportive Interventions

Psychological interventions represented by cognitive behavioral therapy and motivational interviewing can effectively alleviate patients' anxiety, depression, and other negative emotions during the disease course, while helping patients gradually build stable confidence in long-term disease management. Family and peer support have also been shown to significantly enhance patient self-efficacy, particularly in medication reminders and emotional companionship. Relevant studies have shown that patient self-efficacy is not only directly related to intraocular pressure control and disease stability [43] but also significantly affects psychological adaptation and quality of life [44]. Among these, negative emotions such as anxiety and depression, as well as disease uncertainty, are negatively correlated with self-efficacy [34], with this effect being particularly pronounced during acute disease episodes or the initial diagnosis period. Psychological resilience is an important positive predictor of self-efficacy [5] and can effectively promote patients' active coping with the disease. The higher the patient's psychological resilience, the better their adaptation to various pressures from glaucoma, and the higher their overall self-efficacy level. Routine follow-up should include screening for anxiety and depression, with timely cognitive behavioral intervention or peer support for high-risk individuals, and involve family members to form a "patient-family-provider" triadic support network. A 2025 systematic review [45] found that cognitive behavioral therapy improved treatment adherence by 76%, and biofeedback intervention significantly reduced intraocular pressure by 4.8 mmHg. A domestic randomized controlled trial of 103 cases [46] also showed that staged cognitive behavioral intervention significantly improved medication self-efficacy in glaucoma surgery patients (GMSES scores and HPLP-II dimension scores were better in the intervention group than in the control group, $P < 0.05$). Moreover, a review covering 635 articles [47] confirmed that peer coaching, peer support based on the health belief model, digital peer support, and similar interventions can effectively improve self-efficacy and quality of life in chronic disease patients and can be used as supplementary forms of routine care in clinical nursing and primary health services.

4.3 Technology-assisted Interventions

Digital interventions based on mobile health platforms, such as WeChat-based continuous care and case management systems, break through temporal and spatial limitations, giving patients a stronger sense of control over their disease management and have high practical value for dissemination [48]. Motivational interviewing also plays a positive role, effectively enhancing patients' confidence in medication adherence and improving their overall cooperation with treatment [49]. Regular push of disease knowledge, medication reminders, and online interactive support can effectively improve self-management behaviors and quality of life in glaucoma patients [50]. This model has also been shown to enhance self-management ability and disease confidence in patients with chronic diseases such as diabetes [51]. Furthermore, intervention programs guided by relevant theories are more effective. For example, interventions based on Bandura's cognitive theory [52], combining mastery

experiences, vicarious experiences, and other core sources of self-efficacy, have shown significant effects in enhancing patient self-efficacy, highlighting the key role of theoretical guidance in intervention design. Relevant research indicates [53] that knowledge-based education alone is insufficient to truly improve medication adherence; only interventions designed based on behavioral change theories and tailored to patients' specific barriers can form effective programs. This finding provides an important reference direction for clinical development of self-efficacy enhancement programs for glaucoma patients. In clinical practice, WeChat patient groups can be used to regularly send personalized medication reminders and health education. For elderly patients who are not proficient with smartphones, family members can assist or telephone follow-up can be used. Moghaddasi et al. [54] developed a mobile application "INOOR" for postoperative glaucoma care, with user satisfaction ratings reaching an "acceptable" level, helping patients with self-care and reducing the burden on healthcare providers. The "Informationized 5P Medical Model" at the Shanghai Eye Disease Prevention and Treatment Center [55], rely on the "Qingsong Plan" platform, through weekly public account science popularization, monthly Online and offline health education, medication reminders, and dynamic intraocular pressure tracking, has improved patients' regular follow-up rates, achieved more stable intraocular pressure control, and enabled patients to adhere to standardized medication for longer periods.

5. Summary and Outlook

This study provides a comprehensive review and analysis of factors influencing self-efficacy in glaucoma patients and existing intervention measures. The results show that self-efficacy levels in glaucoma patients are generally low [56], influenced by multiple dimensional variables including demographic characteristics (e.g., age, education level) [57], disease characteristics (e.g., degree of visual function impairment) [58], psychological factors (e.g., negative emotions, psychological resilience) [59], and social environmental factors (e.g., social support, family function) [60]. These factors are interrelated and interact with each other, jointly determining patients' confidence and actual ability in disease management. Psychosocial factors such as social support and self-efficacy have a dual impact on health outcomes in glaucoma patients: on the one hand, they directly affect patients' quality of life; on the other hand, they indirectly produce significant effects on disease control and prognosis by improving health behaviors such as treatment adherence [61]. Existing intervention practices have confirmed that family and peer support nursing [28] [62], multifaceted health education [42], positive experience-oriented intervention models [63], and digital case management systems [64] can all effectively enhance self-efficacy levels in glaucoma patients. High self-efficacy not only improves patients' treatment adherence but also enhances their psychological adaptation ability to cope with the disease, ultimately achieving improved quality of life [65] [66]. This indicates that enhancing self-efficacy has become an indispensable core component of comprehensive glaucoma management.

Looking to the future, intervention research and clinical

practice for self-efficacy in glaucoma patients need to further integrate theoretical frameworks with digital technology tools [67] [68] [69] while emphasizing long-term outcome tracking and cultural adaptability optimization of intervention programs. Additionally, focusing on patients' multiple barriers at the cognitive, behavioral, psychological, and social environmental levels, individualized comprehensive support programs should be developed to promote the refinement and scientific development of chronic disease management for glaucoma, providing healthcare professionals with more precise and practical pathways to optimize patients' long-term health outcomes. Based on existing evidence, thoroughly carding the various influencing factors of self-efficacy in glaucoma patients and constructing precise intervention programs based on these factors have important practical significance and application value for improving chronic disease management models, stabilizing patients' conditions, and enhancing quality of life [69].

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