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Research on the Impact of Evidence-Based Predictive Nursing on Elderly Cataract Patients During the Perioperative Period

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Abstract: Objective: To explore the impact of evidence-based predictive nursing intervention on psychological stress and physiological indicator stability of elderly cataract patients during the perioperative period (1 day before surgery to 1 day after surgery), and to provide a basis for optimizing clinical nursing plans for elderly cataract surgery. Methods: A retrospective selection of 90 elderly patients (aged ≥ 60 years) who underwent cataract surgery in the Ophthalmology Department of our hospital from August 2024 to December 2024 was conducted. They were divided into an observation group (n = 45) and a control group (n = 45) using a random number table method. The control group received routine nursing for cataract surgery, while the observation group implemented evidence-based predictive nursing intervention (including the establishment of a multidisciplinary evidence-based team, hierarchical psychological intervention, perioperative environment optimization, intraoperative personalized cooperation, and video-based health education). Psychological stress indicators [Self-Rating Anxiety Scale (SAS), Self-Rating Depression Scale (SDS), General Self-Efficacy Scale (GSES)] on the 1st day before surgery and 1st day after surgery, and fluctuations of physiological indicators [Heart Rate (HR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP)] on the 1st day before surgery and during surgery were compared between the two groups. *Results:* Before intervention, there were no statistically significant differences in SAS, SDS, GSES scores, HR, SBP, or DBP between the two groups ($p > 0.05$); after intervention, the SAS score (33.62 ± 5.72) and SDS score (32.14 ± 4.86) of the observation group on the 1st day after surgery were significantly lower than those of the control group [(41.05 ± 5.56), (43.59 ± 4.75)], and the GSES score (31.15 ± 3.28) was significantly higher than that of the control group (24.84 ± 3.52) (all $p < 0.05$); during surgery, the fluctuations of HR (74.0 ± 6.0) beats/min, SBP (127.0 ± 15.8) mmHg, and DBP (75.0 ± 5.9) mmHg in the observation group were significantly smaller than those in the control group (all $p < 0.05$). *Conclusion:* Evidence-based predictive nursing intervention can effectively alleviate anxiety and depression in elderly cataract patients during the perioperative period, improve self-efficacy, stabilize intraoperative physiological status, and enhance surgical cooperation, which is worthy of clinical promotion.

Keywords: Evidence-based nursing; Predictive nursing; Elderly patients; Cataract; Perioperative period; Psychological stress; Physiological stability; Self-efficacy

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1. Introduction

Cataract is a common degenerative ophthalmic disease in the elderly. The incidence of cataract in people over 60 years old in China reaches 80%, accounting for more than 50% of the causes of visual impairment. Surgery is currently the only effective clinical treatment for this disease [1]. Due to factors such as declining physical function, insufficient understanding of surgery, and unfamiliarity with the operating room environment, elderly patients are prone to obvious psychological stress reactions during the perioperative period. Preoperative anxiety and depression can lead to increased blood pressure and heart rate during surgery, which not only reduces surgical cooperation but also may increase the risk of postoperative complications [2]. Evidence-based nursing, with "best scientific research evidence + clinical experience + patient needs" as the core, formulates personalized intervention plans through systematic retrieval and evaluation of evidence, which can effectively improve nursing accuracy [3]; predictive nursing emphasizes "early assessment - advance intervention" and formulates measures for potential risks to reduce the incidence of adverse events [4]. This study combines the two to construct a multidisciplinary evidence-based predictive nursing model, exploring its impact on psychological stress and physiological stability of elderly cataract patients during the perioperative period, aiming to provide practical reference for elderly ophthalmic surgical nursing.

2. Materials and methods

2.1. Research objects

A retrospective inclusion of 90 elderly patients who underwent phacoemulsification combined with intraocular lens implantation for cataracts in the Ophthalmology Department of our hospital from August 2024 to December 2024 was conducted.

2.1.1. Inclusion criteria

(1) Meets the diagnostic criteria for cataracts in Ophthalmology and plans to undergo elective surgery;
(2) Aged ≥ 60 years
(3) Clear consciousness and able to complete scale scoring independently
(4) No severe dysfunction of heart, liver, kidney and other organs
(5) Informed consent from patients and their families.

2.1.2. Exclusion criteria

(1) Complicated with mental illness or cognitive impairment (Mini-Mental State Examination score < 24 points);
(2) Has a history of ophthalmic surgery or other severe ophthalmic diseases (such as glaucoma, retinal detachment);
(3) Unable to cooperate with intraoperative body position fixation (such as severe spinal deformity).

2.1.3. Grouping method

Patients were divided into an observation group and a control group using a random number table method, with 45 cases in each group. There were no statistically significant differences in baseline data such as age, gender, educational level, history of hypertension, and lens opacity degree (LOCS III classification) between the two

groups ($p > 0.05$), which were comparable, as shown in **Table 1**.

Table 1. Comparison of baseline data of elderly cataract patients in two groups

Group	Number of cases	Average age (Years, $\bar{x} \pm s$)	Male [n (%)]	Average educational level (Years, $\bar{x} \pm s$)	History of hypertension [n(%)]	Lens opacity degree (LOCS III Classification, n) Grade II
Observation group	45	68.41 ± 13.26	33(62.23)	13.37 ± 2.40	15(33.33)	12
Control group	45	66.90 ± 13.04	31(68.88)	12.92 ± 2.85	13(28.95)	14
t/χ^2 value	-	0.915	2.094	0.736	1.763	0.382
p-value	-	> 0.05	> 0.05	> 0.05	> 0.05	> 0.05

2.2. Nursing methods

2.2.1. Control group: Routine nursing

(1) Preoperative

Verbally inform patients of the surgical process, intraoperative precautions (such as keeping the head fixed), and postoperative nursing key points; assist in completing preoperative examinations (such as intraocular pressure, corneal curvature).

(2) Intraoperative

Monitor vital signs (HR, SBP, DBP), observe the patient's mental state, and provide simple comfort when obvious restlessness occurs.

(3) Postoperative

Guide patients in eye medication (such as antibiotic eye drops) and inform them of taboos such as avoiding rubbing eyes, bowing, and bending over after surgery.

2.2.2. Observation group: Evidence-based predictive nursing intervention

Follow the process of "evidence-based question - evidence retrieval - evidence evaluation - plan formulation - implementation of intervention", as follows:

(1) Establish a multidisciplinary evidence-based nursing team

Led by the deputy head nurse of the operating room (leader) and the head nurse of ophthalmology (deputy leader), the team includes 2 senior nurses from ophthalmology, 2 senior nurses from the operating room, 1 attending physician from anesthesiology, 1 attending physician from ophthalmology, and 2 secretaries (1 undergraduate from the operating room and 1 graduate student from ophthalmology, responsible for literature retrieval and data statistics); invite directors of ophthalmology and anesthesiology to serve as consultants to ensure the professionalism of the plan.

(2) Evidence-based practice steps

① Raise questions: Focus on core issues such as "influencing factors of psychological stress in elderly cataract patients during the perioperative period" and "effects of predictive nursing intervention on the psychological and physiological status of cataract surgery patients". ② Retrieve Evidence: Retrieve CNKI, Wanfang, VIP, and PubMed databases from January 2019 to December 2024 with keywords including "cataract", "elderly patients", "perioperative nursing", "evidence-based nursing", "predictive nursing", "psychological stress", and "anxiety". A total of 86 literatures were retrieved. After excluding low-quality (JBI

evidence grade ＜ Grade B) and duplicate literatures, 12 core literatures were included [3–12]. ③ Evaluate Evidence: Using the JBI Evidence-Based Nursing Center's evidence grading standards, "video-based health education can improve elderly patients' disease cognition", "hierarchical psychological intervention can targetedly relieve anxiety", and "intraoperative music + physical comfort can stabilize physiological indicators" were adopted as Grade A evidence and included in the nursing plan.

(3) Specific intervention measures

Preoperative: Hierarchical Psychological Assessment and Education: ① Assess psychological status using SAS and SDS scales 1 day before surgery, divided into mild (SAS 50–59 points / SDS 53–62 points), moderate (SAS 60–69 points / SDS 63–72 points), and severe (SAS ≥ 70 points / SDS ≥ 73 points) stress; ② Mild stress: Conduct one-on-one communication, explaining safety combined with surgical diagrams (such as "the operation only takes 15–20 minutes, with no obvious pain during the operation"); Moderate Stress: Arrange postoperative recovered patients to share experiences, and simultaneously guide deep breathing relaxation training, 3 times a day, 10 minutes each time; Severe Stress: Conduct joint anesthesiology assessment, recommend general anesthesia, and provide psychological counseling 2 hours before surgery; ③ Produce a short video of "the whole process of cataract surgery", including the operating room environment, surgical operations, and postoperative rehabilitation cases, generate a QR code, and patients can scan and watch repeatedly to eliminate unfamiliarity with the environment [5]. Intraoperative: Environment Optimization and Personalized Cooperation: ① Adjust the operating room temperature to 23–25 ℃ and humidity to 50–60% 30 minutes before surgery, play soft piano music with a volume of 30–40 decibels [13]. ② After the patient enters the operating room, the nurse holds the patient's non-surgical hand and gently informs "the operation is about to start, and I will be with you throughout"; inform the patient of the surgical progress every 5 minutes during the operation, such as "lens emulsification has been completed, and intraocular lens implantation is about to begin"; ③ Closely observe changes in HR and SBP. If SBP > 150 mmHg or HR > 90 beats/min, suspend the operation and provide verbal comfort, and continue after the indicators stabilize. Postoperative: Continuous Support: Conduct a follow-up visit 1 day after surgery, assess self-efficacy using the GSES scale, and encourage patients with low scores (< 25 points): "You are recovering well now, and you can recover smoothly by taking medication as guided" to strengthen treatment confidence.

2.3. Observation indicators

2.3.1. Psychological stress indicators

Evaluated using the following scales on the 1st day before surgery and 1st day after surgery:

(1) SAS: 20 items, standard score ≥ 50 points indicates anxiety, with higher scores indicating more severe anxiety;

(2) SDS: 20 items, standard score ≥ 53 points indicates depression, with higher scores indicating more severe depression;

(3) GSES: 10 items, using a 1–4 grade scoring method, total score 10–40 points, with higher scores indicating stronger self-efficacy [14].

2.3.2. Physiological indicators

Record HR (beats/min), SBP (mmHg), and DBP (mmHg) on the 1st day before surgery and during surgery, and

calculate the difference (fluctuation range) between intraoperative indicators and preoperative baseline in the two groups.

2.4. Statistical methods

SPSS 22.0 software was used for data analysis. Measurement data were expressed as "$\bar{x} \pm s$", and inter-group comparison was conducted using independent sample *t*-test; count data were expressed as "n(%)", and inter-group comparison was conducted using χ^2 test. A p value < 0.05 was considered statistically significant.

3. Results

3.1. Comparison of perioperative psychological stress indicators between the two groups

Before intervention, there were no statistically significant differences in SAS, SDS, or GSES scores between the two groups ($p > 0.05$); after intervention, the SAS and SDS scores of the observation group were significantly lower than those of the control group, and the GSES score was significantly higher than that of the control group (all $p < 0.05$), as shown in **Table 2**.

Table 2. Comparison of perioperative psychological stress indicators of elderly cataract patients in two groups (scores, $\bar{x} \pm s$)

Group	Number of cases	SAS	SDS	GSES
		1st day before surgery	1st day after surgery	1st day before surgery
Observation group	45	53.62 ± 4.88	33.62 ± 5.72	51.27 ± 5.06
Control group	45	52.86 ± 5.21	41.05 ± 5.56	50.96 ± 4.93
t value	-	0.706	6.178	0.291
p value	-	0.482	< 0.001	0.772

3.2. Comparison of perioperative physiological indicators between the two groups

Before intervention, there were no statistically significant differences in HR, SBP, or DBP between the two groups ($p > 0.05$); during surgery, the fluctuations of HR, SBP, and DBP in the observation group were significantly smaller than those in the control group (all $p < 0.05$), as shown in **Table 3**.

Table 3. Comparison of perioperative physiological indicators of elderly cataract patients in two groups ($\bar{x} \pm s$)

Group	Number of cases	HR (Beats/min)	SBP (mmHg)	DBP (mmHg)
		1st day before surgery	Intraoperative	1st day before surgery
Observation group	45	78.9 ± 6.5	74.0 ± 6.0	137.0 ± 11.6
Control group	45	80.4 ± 7.8	78.8 ± 7.4	145.0 ± 9.9
t value	-	1.018	3.490	1.360
p value	-	0.332	0.001	0.206

4. Discussion

4.1. Evidence-based predictive nursing can effectively alleviate perioperative psychological stress

The results of this study showed that the postoperative SAS and SDS scores of the observation group were significantly lower than those of the control group, and the GSES score was significantly higher than that of the control group ($p < 0.05$), which is consistent with the research conclusion of Liu Shuangdan et al. [8]. The reasons are as follows:

(1) Through "hierarchical psychological intervention", differentiated measures are formulated for patients with mild, moderate, and severe stress, avoiding the limitations of "one-size-fits-all" nursing - mild patients build confidence through cognitive education, moderate patients strengthen psychological resilience through peer experience + relaxation training, and severe patients reduce fear through anesthesia assessment + professional counseling [4];

(2) Video-based health education intuitively presents the surgical process, solving the problem of "poor memory of verbal education" in elderly patients, improving disease cognition and reducing anxiety caused by "unknown" [5];

(3) Continuous verbal comfort and physical contact during surgery make patients feel "cared for", further relieving intraoperative tension and ultimately improving self-efficacy [12].

4.2. Evidence-based predictive nursing can stabilize intraoperative physiological status

Elderly patients have weak cardiovascular regulation ability, and perioperative psychological stress is prone to cause severe fluctuations in HR and SBP, increasing the risk of intraoperative cardiovascular accidents [2]. In this study, the fluctuations of HR, SBP, and DBP in the observation group during surgery were significantly smaller than those in the control group ($p < 0.05$). The mechanism lies in:

(1) Preoperative relaxation training reduces sympathetic nerve excitability through "breathing regulation - autonomic nerve balance", reducing the release of stress hormones (such as cortisol) [15];

(2) Intraoperative environment optimization (temperature, humidity, music) directly acts on the sensory system, relieves physical tension, and indirectly stabilizes physiological indicators [13];

(3) Nurses dynamically monitor indicators throughout the operation and intervene in abnormal fluctuations in a timely manner, avoiding the vicious cycle of "stress - increased indicators - more anxiety" [9].

4.3. Clinical value and limitations of the multidisciplinary evidence-based model

The "operating room - ophthalmology - anesthesiology" multidisciplinary evidence-based team constructed in this study achieves the complementary advantages of "familiarity with surgical processes (operating room) + professional disease knowledge (ophthalmology) + anesthesia risk control (anesthesiology)", ensuring that the nursing plan takes into account both "safety and practicality" [9]. However, the study has limitations:

(1) It is a single-center retrospective study with a small sample size (90 cases), which limits the extrapolation of results;

(2) Long-term indicators (such as visual acuity recovery and complication rate) 3 months after surgery were not followed up. In the future, multi-center, prospective studies need to be conducted for further verification;

(3) Grassroots hospitals may be unable to replicate the "multidisciplinary team" model due to insufficient

human resources, and the plan needs to be simplified to improve promotion feasibility.

5. Conclusion

Evidence-based predictive nursing intervention can effectively alleviate anxiety and depression in elderly cataract patients during the perioperative period, improve self-efficacy, and stabilize intraoperative physiological status through "hierarchical psychological intervention, perioperative environment optimization, and intraoperative personalized cooperation". It provides an operable practical plan for the perioperative nursing of elderly cataract surgery patients, and is worthy of promotion and application in ophthalmology departments of secondary and above hospitals.

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Disclosure statement

The authors declare no conflict of interest.

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