

## Original Research Article

# Satisfaction and quality of life of patients treated with tobramycin-dexamethasone suspension in daytime surgery managed by integrated nursing model

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### Abstract

**Purpose:** To investigate the effect of an integrated nursing model in day surgeries, treated with tobramycin-dexamethasone suspension, and its influence on patient satisfaction, quality of life, and indicators of immunity recovery.

**Methods:** Ninety-eight patients with ophthalmic diseases admitted to Anhui No. 2 Provincial People's Hospital, Anhui, China from January 2021 to June 2022 were scheduled for surgery and treated with tobramycin-dexamethasone. They were randomly divided into two groups (control and study groups, with 49 cases in each group). All patients received routine nursing intervention, and an integrated nursing model was applied to the study group on this basis. Improvement in ocular symptoms, SF-36, changes in immune-related lymphocyte subsets in peripheral blood, and nursing satisfaction were compared.

**Results:** Ocular symptom score at 24 h after operation in the study group was lower than in control group ( $p < 0.05$ ). The SF-36 scores (physical status, cognitive ability, social function, emotional and mental status), immune-related lymphocyte subsets, and overall satisfaction rate after intervention in the study group were higher than those in the control group ( $p < 0.05$ ).

**Conclusion:** Integrated nursing model achieves ideal nursing effect in day surgery managed with tobramycin-dexamethasone. It also facilitates the recovery of patient's eyes and plays a significant role in improving the quality of life, restoration of immunity, and nursing satisfaction of patients. A multicenter investigation will, however, be required prior to its full-scale clinical application.

**Keywords:** Ophthalmology, Day surgery, Tobramycin, Dexamethasone, Integrated nursing model, Quality of life

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## INTRODUCTION

Daytime surgery, also known as same-day surgery, refers to the process of admission, operation, and discharge within 1 working day after admission. Generally, the time from

admission to discharge is  $\leq 48$  h [1,2]. Ophthalmic surgery is more convenient to operate and has a short operation time. In most cases, the time required for ophthalmic surgery is within 2 h. Therefore, day surgery is the main surgical treatment for ophthalmic diseases, so

that patients can receive effective treatment in a shorter time, fully mobilize advantageous medical resources and improve their overall condition. Tobramycin-dexamethasone suspension is a formulation commonly used for ophthalmic diseases. It consists of tobramycin (an aminoglycoside antibiotic) and dexamethasone (an anti-inflammatory and anti-allergic steroid). It is used in the treatment of inflammation after ophthalmic surgery [3,4]. However, in actual diagnosis and treatment, the eye acts to form vision in order to maintain a normal life and functional state of the body.

Although ophthalmic surgery is safe with modern medical technical support, postoperative medication, and recovery still have a significant impact on its overall treatment outcome. Routine care has some limitations, which results in the application of the integrated nursing model. This model is a relatively new type of care, which can facilitate improvement in patients' post-surgical recovery process by employing a new trinity of collaboration among patients, doctors, and nursing staff [5]. The integrated nursing model is a patient-centered implementation of continuous nursing, which emphasizes the integrity of nursing and avoids interruption in the implementation of nursing measures that are conducive to the provision of a better, scientific, and comprehensive nursing intervention for patients.

At present, there are few studies on the integrated nursing model for day surgery and the use of tobramycin-dexamethasone treatment in China. This study compares the efficacy of routine nursing and integrated nursing model, in order to explore the effect of integrated nursing model on patient satisfaction, quality of life, and immunity recovery, and also provide a reference for the selection of clinical nursing methods for patients that have undergone day-time ophthalmic surgeries.

## METHODS

### Patients

From January 2021 to June 2022, 98 patients with ophthalmic diseases were treated via day surgery and tobramycin-dexamethasone. They were randomly divided into two groups (control and study groups) with 49 patients in each group. All the patients received routine nursing intervention while the integrated nursing model was applied as an addition to the study group. Patients and family members voluntarily signed the informed consent form, and the study was approved by Anhui No. 2 Provincial People's

Hospital Ethics Committee (approval no. AH2PP202012034). All procedures and patient handling were in accordance with the ophthalmic disease diagnosis and treatment standards in the "Code of Practice for Ophthalmic Ultrasound Examination in China" [6].

### Inclusion criteria

Patients that met the ophthalmic disease diagnosis and treatment standards in the "Code of Practice for Ophthalmic Ultrasound Examination in China" [6], with symptoms such as blurred vision and decreased visual acuity, visual acuity examination, fundus examination, slit lamp examination, intraocular pressure examination, and ophthalmic ultrasound examination, suggesting the presence of an ophthalmic disease were included in the study. Additional criteria for inclusion include patients aged  $\geq 18$  years, with complete baseline data, clear cognition, and a high degree of cooperation.

### Exclusion criteria

Patients with surgical contraindications, severe allergic reactions to tobramycin-dexamethasone, malignant tumors, mental illness, low cooperation, a variety of ophthalmic diseases, or withdrew midway from this study, or had participated in other trials were excluded from the study.

### Patients' handling and treatments

Routine nursing was performed in the control group. The ward environment and the work functions of each medical staff were briefly described to the patients and their families. Patients' families received health education and health publicity brochures. Patients were guided to complete the preoperative examination and assist doctors to achieve effective preoperative preparation. Monitoring was enhanced after surgery, the changes in vital signs of patients were observed and recorded. Any observed abnormalities were reported in a timely manner and recorded. The study group received comprehensive integrated nursing in addition to conventional nursing. The comprehensive integrated nursing model included the following.

#### Preoperative care

##### *Preoperative health guidance*

The nursing staff inquired and recorded the basic data of patients in detail, and understood and analyzed patients' cognition of their own

symptoms. The staff introduced the patients and their families to more comprehensive health knowledge, appropriately combined with pictorial explanations or videos, and explained the pathological knowledge, surgical and drug treatment mechanisms, and related precautions in detail. The nurse used question-and-answer methods to understand and assess the patients' understanding and memory of the knowledge imparted and corrected patients' misconception.

### ***Preoperative psychological care***

Before ophthalmic surgery, most patients are prone to negative emotions such as anxiety and depression. Therefore, preoperative nursing staff offered psychological care, strengthen communication with patients, understood and assess the main factors affecting the emotional state of patients, and solved related problems, in order to help patients to overcome negative emotions. Patients that were too anxious and fearful, were further encouraged by informing them about past successful operations from medical records. They were also informed about the necessity and effectiveness of taking relevant treatment measures. This approach helped to improve patients' confidence in a successful cure. In some cases, interventions such as receptive music therapy, deep breathing method, patients listening to light music, and adjusted breathing were used to divert patients' attention from anxiety, depression, and other negative emotions.

### ***Intraoperative care***

The nursing staff assisted patients in properly adjusting body position and constantly massaging operation areas affected by long-term compressed sites during the operation. Ophthalmic day surgery mostly uses local anesthesia, therefore, patients with clear intraoperative consciousness, exhibit fear, anxiety, and other negative emotions. Nursing staff rendered intraoperative psychological counseling to patients, and adjusted operating room temperature, and humidity, so that patients could be in a more comfortable surgical environment. This helped patients to be more relaxed and calmer during surgery. Blood stains were quickly removed and the skin was kept clean and warm.

### ***Post-operative care***

Postoperative changes in vital signs were closely monitored, complexion was observed, and postoperative pain was analyzed. If postoperative pain was severe, analgesic and

sedative drugs were appropriately given according to doctor's advice.

### ***Drug monitoring***

After the operation, a drop of tobramycin-dexamethasone suspension was administered 4 times daily. Patients were instructed to master the correct way of administering the medication. The drops were instilled into the conjunctival sac of the eye, then the eye was closed and turned. Both hands were used to gently press both sides of the bridge of the nose to avoid the eye drops flowing into the mouth through the nasolacrimal duct and to prevent the hands from touching the eye after using the drug in order to prevent infection.

### ***Diet and life care***

Patients were advised to take a light diet after surgery. Increase the intake of foods rich in vitamin C such as oranges and lemons, as well as the intake of high-quality proteins such as eggs and shrimp, and prohibited the intake of stimulating foods such as spicy and strong tea. Patients were guided to understand the correct way of eye massage and were given routine eye exercises. Patients had eye massages 2 - 3 times a day for about 5 min each time to promote eye-blood circulation.

### ***Evaluation of parameters/indices***

#### ***Improvement in ocular symptoms***

Ocular sensory abnormality interrogation score standard, which refers to the improvement of ocular symptoms in the two groups from the time of admission and 24 h after surgery was recorded, with a total score of 0 - 85, the score was negatively correlated with improvement of ocular symptoms.

#### ***MOS item short-form health survey (SF-36)***

The SF-36 scale was used to assess quality of life at the time of admission and after the intervention (up to 6 h postoperatively), with a total of 34 - 142 points covering four items: physical status (16 - 50 points), cognitive ability (8 - 44 points), social functioning (2 - 12 points), and emotional and mental status (8 - 36 points). The scores were positively correlated with the degree of good quality of life.

#### ***Immunity indicators***

Peripheral venous blood (2 - 3 mL) was collected at the same time point 24 h after operation from

both groups and stored in a cryogenic refrigerator at 4°C for future use. Exactly 100 µL peripheral blood cells were collected from each patient and incubated with human lymphocyte subset antibodies. The proportion of total T cells (CD3 + cells), helper induced T cells (CD3 + CD4 + cells), inhibitory toxic T cells (CD3 + CD8 + cells), B cells (CD3-CD19 + cells), and NK cells (CD3-CD56 + 16 + cells) in the peripheral blood of each patient was determined by flow cytometry to reflect the immune status of each patient.

**Nursing satisfaction**

Patient satisfaction questionnaire for nursing care was used. Patients were instructed to complete the satisfaction survey when they were discharged from the hospital. The questionnaire comprised a total of 20 to 100 points on the scale. Values ≥ 90 indicated very satisfied and meant that the nursing staff helped to solve relevant problems when patients had questions or difficulties, provided health guidance for patients before and after surgery, and combine patients' wishes or opinions to develop a targeted care plan. Values ranging from 90 and ≥ 70 indicated satisfaction and meant that nursing staff provided feasible guidance, although they could not solve difficulties encountered by patients, or the nurse was not able to effectively combine patients' wishes or opinions but had developed an acceptable nursing care plan. Values < 70 were unsatisfactory and meant that nursing staff failed to help patients when they encountered difficulties and did not combine patient's opinions to develop a personalized nursing care plan, and the patient's overall evaluation of the nursing staff's inputs was unsatisfactory. The total satisfaction rate (S) is calculated as shown in Eq 1 where D is the dissatisfaction rate.

$$S = 100 \% - D \dots\dots\dots (1)$$

**Statistics analysis**

Data analysis was performed using SPSS 23.0 statistical software. Measurement data are presented as mean ± standard deviation (SD)

and compared between groups using *t*-test. Enumeration data are presented as (n (%)) and compared between groups using  $\chi^2$  test. *P* < 0.05 was considered statistically significant.

**RESULTS**

**Baseline information**

In control group, the male-to-female ratio was 22:27, mean age was 49.05 ± 5.11 years, duration of disease ranged from 3 months to 8 years, mean duration of disease was 4.13 ± 0.42 years, and the ratio of operated left and right eye, and both eyes were 20:21:8, respectively. In study group, the male-to-female ratio was 24:25, the mean age was 48.02 ± 5.04 years, the duration of disease ranged from 4 months to 8 years, and mean duration of disease was 4.17 ± 0.45 years. The ratio of operated left eye, right eye, and both eyes was 18:20:11, respectively. Comparing the above baseline data, the difference was not statistically significant (*p* > 0.05).

**Eye symptoms**

Ocular symptom score at 24 h after operation in the study group was significantly lower than in control group (Table 1, *p* < 0.05).

**Table 1:** Comparison of ocular symptoms between the two groups (mean ± SD, n = 49)

Group	Admission	24 h after surgery
Study	52.88±8.64	33.12±6.88
Control	52.92±8.71	46.51±7.01
T	0.023	9.543
P-value	0.982	< 0.001

**SF-36 scores**

There was no significant difference in SF-36 scores between the two groups at admission (*p* > 0.05). The physical status, cognitive ability, social function, emotion, and mental status scores of the study group after intervention were significantly higher than those of control group (Table 2, *p* < 0.05).

**Table 2:** Comparison of SF-36 scores between the two groups (mean ± SD, n = 49)

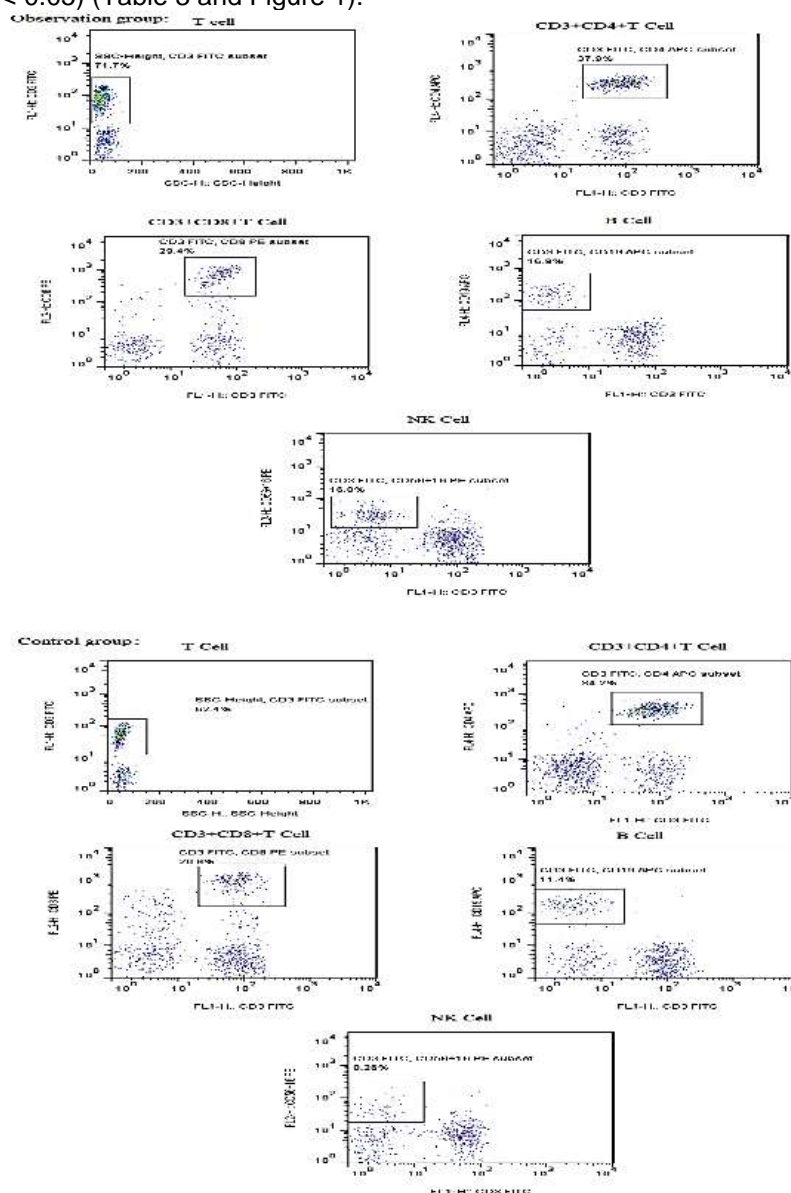
Group	Physiological state		Cognitive ability		Social functioning		Affect and mental status	
	Admission	Post intervention	Admission	Post intervention	Admission	Post intervention	Admission	Post intervention
Study	22.15±4.02	44.56±4.54	28.45±3.45	40.78±3.87	3.85±0.89	10.97±0.57	16.87±3.45	32.45±1.88
Control	22.31±4.11	39.41±4.27	28.97±3.66	34.87±3.75	4.01±0.97	8.14±1.03	16.92±3.75	28.87±2.12
t	0.195	5.784	0.724	7.677	0.851	16.828	0.069	8.844
P-value	0.846	< 0.001	0.471	< 0.001	0.397	< 0.001	0.945	< 0.001

**Table 3:** Comparison of changes in peripheral blood lymphocyte subsets in immune indicators between the two groups (mean ± SD, n = 49)

Group	Total T cells (CD3+cells)	Helper Induced T Cells (CD3+CD4+cells)	Suppression of toxic T cells (CD3+CD8+cells)	CD3+CD4/CD3+CD8+ratio	B cells (CD3-CD19+cells)	NK cells (CD3-CD56+16+cells)
Study	68.98±4.24	37.94±4.13	30.35±3.45	1.36±0.11	12.34±3.19	11.23±2.98
Control	61.12±4.11	33.24±3.57	22.31±4.04	1.22±0.08	11.39±3.04	8.71±2.66
T	6.266	4.943	5.282	3.522	1.034	4.041
P-value	< 0.05	< 0.05	< 0.05	< 0.05	> 0.05	< 0.05

**Changes in immune parameters**

There were significant differences in the proportion of immune cell subsets in peripheral blood between the two groups ( $p < 0.05$ ). The proportion of total T cells, the proportion of helper induced T cells, the proportion of suppressor toxic T cells, the ratio of CD3 + CD4 +/CD3 + CD8 + and the proportion of NK cells in the peripheral blood of study group were significantly higher than those of control group ( $p < 0.05$ ) (Table 3 and Figure 1).



**Figure 1:** Changes of peripheral blood lymphocyte subsets in the two groups obtained using Flow cytometry. Images include T cells, CD3 + CD4 + T cells, CD3 + CD8 + T cells, B cells, and NK cell subsets in patient's peripheral blood

**Table 4:** Comparison of satisfaction with care between the two groups (n=49)

Group	Very satisfied	Satisfied	Not satisfied	Overall satisfaction rate
Study	25 (51.02)	23 (46.94)	1 (2.04)	48 (97.96)
Control	11 (22.45)	30 (61.22)	8 (16.33)	41 (83.67)
$\chi^2$				12.241
P-value				< 0.001

### Satisfaction with care

The overall satisfaction rate in study group was significantly higher than that in control group (Table 4,  $p < 0.05$ ).

## DISCUSSION

Daytime surgery is a common surgical approach for ophthalmic diseases, and is mostly a selective surgery [7]. After patient's condition is defined, the appropriate operation time is selected. All procedures from the formal admission to completion of the operation and discharge are completed in less than 1 working day. Day surgery is widely used in small and medium-sized elective operations with low risks using advanced technologies [8]. The use of day surgery, results in shortening of length of hospital stay, and a significant reduction in the risk of nosocomial infection in patients.

Tobramycin-dexamethasone suspension is a commonly used drug after ophthalmic day surgery, and it is composed of tobramycin and dexamethasone [9]. It has a positive impact in improving post-operative disease prognosis. It is however necessary to pay attention to the use of antibiotics and anti-inflammatory drugs to avoid excessive impact on their overall surgical treatment effect due to medication problems.

The integrated nursing model had a positive effect on the recovery of ocular symptoms in patients. With improvement in patient compliance, patients more proactively cooperated with medical staff to complete the relevant treatment and nursing procedures. The outcome was a positive impact on their overall day surgery effect, and correspondingly, improved effect of postoperative ocular symptoms [10]. Patients were trained to master the correct mode of administering tobramycin-dexamethasone suspension [11,12]. Therefore, the improvement in ocular symptoms after intervention was significant, and the recovery of ocular function was better in study group.

The integrated nursing model improved the subjective initiative of patients and improved patients' compliance while avoiding the decline in

their quality of life due to adjustment and improvement of patients' dietary habits. Furthermore, postoperative nursing had a positive impact on shortening patients' recovery time. Correspondingly, with the recovery of eye function, the quality of life of patients showed a significant upward trend, thereby reducing the impact of day surgery and ophthalmic diseases on patients' life-style. The state of immune competence is essential for the recovery of the patient's body function after surgery, and it also directly reflects the patient's postoperative health status and degree of body recovery. The data of this study showed that after comprehensive integrated nursing intervention, the proportions of total T cells, helper-induced T cells, inhibitory toxic T cells, and NK cells in peripheral blood of patients in study group were significantly higher than those in control group. The CD3 + CD4 +/CD3 + CD8 + ratio was also significantly higher than in control group, indicating that the immune capacity recovery status of patients in study group was better. This would be more important for postoperative recovery of patients.

Integrated nursing model helped patients to recognize the necessity and effectiveness of relevant surgical and drug treatment measures, eliminate negative emotions, maintain a better and stable treatment mentality, change patient's subjective initiative, effectively improve patients' compliance, and ensure the effective implementation of subsequent treatment and nursing measures [13]. During operation, the nursing model also strengthened the monitoring of vital signs and offers appropriate psychological counseling in order to reduce stress response of surgery and ensure successful completion of surgery. After operation, by monitoring vital signs, drugs, and diet, patients were able to maintain a stable and good rehabilitation state by ensuring correct medication administration procedures and understanding the effect of basic medication. Recovery of eye function was also facilitated by modifying and improving the diet and living habits of patients.

### Limitations of this study

Although this study has provided valuable insights into the effect of integrated nursing

model on patients undergoing day surgery with tobramycin dexamethasone, there are some limitations to be considered. First, the study only included patients with ophthalmic diseases, limiting the generalizability of findings to patients with other conditions. Second, the study did not control for other variables that may have influenced the results, such as the severity of disease, patient's age, and surgical technique used. Third, the study was conducted in a single hospital, which may limit the generalizability of the findings to other healthcare settings. Fourth, the study did not assess the long-term effects of integrated nursing model on patient outcomes, such as the recurrence of symptoms and complications. Finally, the study did not assess cost-effectiveness of integrated nursing model, which is an important consideration for healthcare providers and policymakers.

## CONCLUSION

The application of a comprehensive integrated nursing model in day surgery in combination with tobramycin-dexamethasone treatment improves postoperative quality of life and promotes recovery of patients. Further research is needed to confirm the effectiveness of this model in different patient populations and healthcare settings, and to assess its long-term outcomes and cost-effectiveness.

## DECLARATIONS

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None provided.

### Funding

None provided.

### Ethical approval

None provided.

### Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### Conflict of Interest

No conflict of interest associated with this work.

### Contribution of Authors

The authors declare that this work was done by

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