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Original Article

Effect of a refined nursing model based on nursing quality feedback on the postoperative mental state of patients with laryngeal cancer

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Abstract: Objective: To evaluate the impact and effect of a refined nursing model based on nursing quality feedback on the postoperative mental state of patients with laryngeal cancer. Methods: According to the principle of a randomized controlled trial, 102 patients undergoing laryngeal cancer surgery were divided into two groups with 51 patients in each group. The control group received a conventional nursing model, and the research group received a refined nursing model based on nursing quality feedback. Patients' mental status, illness perception, finding of benefits, cancer-related fatigue, changes in quality of life before and 3 months after operation were observed, and postoperative complications and nursing satisfaction were collected. Results: The scores of the Self-Rating Anxiety Scale (SAS), the Self-Rating Depression Scale (SDS), the Brief Illness perception Questionnaire (BIPQ), and Revised Piper Fatigue Scale in the research group were lower than those in the control group at 3 months after operation, and the scores of benefit finding, EORTC QLQ-C30, and La Monica-Oberst Patient Satisfaction Scale (LOPSS) were higher than those in the control group ($P < 0.05$); and the complication rate of the research group (7.84%) was lower than that of the control group (23.53%) ($P < 0.05$). Conclusion: For patients undergoing laryngeal cancer surgery, the use of the refined nursing model based on nursing quality feedback can reduce patients' negative emotions, increase the benefits found, reduce their negative perceptions and cancer-related fatigue, improve their quality of life, reduce complications, and enhance the nurse-patient relationship.

Keywords: Laryngeal cancer, nursing quality feedback, refined nursing model, mental state

Introduction

Laryngeal cancer is a head and neck malignant tumor that usually occurs in the glottis or supraglottic area. Patients with laryngeal cancer are mainly middle-aged and elderly men and the symptoms often include dyspnea, swollen lymph nodes in the neck, and dysphagia. The early symptoms of laryngeal cancer are not obvious, most of the patients are in the middle and late stages at the time of diagnosis, and the prognosis is not good [1-3]. Therefore, early detection, early diagnosis and early treatment are key to improve the survival rate of patients after surgery, preserve the function of laryngeal function and reduce postoperative complications. At present, surgical treatments such as total laryngectomy and partial laryngectomy are the main clinical treatments for laryngeal cancer. Although it can effectively remove the lesions and restore word pronunciation, maintain swallowing and breathing function of the larynx, the operation can easily destroy the normal anatomical structure of the larynx and induce nerve damage with various problems after the operation such as impaired body image, changes in respiratory function, and coughing after eating. In addition, the lack of correct rehabilitation knowledge and the changes in interpersonal relationships, social roles and lifestyles leads to physical and psychological wounds of the patients, which affects the postoperative rehabilitation and reduces the quality of life [1, 4, 5]. Therefore, medical staff need to reduce the patients' negative emotions as much as possible from the perspective of love and care, so as to speed up their postoperative recovery process.

Conventional nursing is mainly based on general nursing and the implementation of medical advice, which lacks flexibility and often ignores the overall needs of patients' psychological, spiritual, social and cultural needs, and the nursing effect often fails to meet patient expectations [6]. Nursing quality feedback refers to the feedback of problems encountered in nursing work. By summarizing the causes of potential problems, and implementing accurate and dynamic nursing plans, its aim is to provide patients with a holistic, systematic and sophisticated nursing service [7, 8]. In recent years, the theory of nursing quality feedback has gradually been applied to the treatment of cerebral infarction, lung cancer, esophageal cancer and other diseases with great benefits. However, there are few reports on the effect of this nursing model in the perioperative period of laryngeal cancer. In view of this, this research implemented the refined nursing model based on nursing quality feedback for patients undergoing laryngeal cancer surgery, and evaluated the impact of this model on patients' mental state, quality of life, cancer-related fatigue, etc., for reference. The report is as follows.

Material and methods

Clinical material

A total of 102 patients with laryngeal cancer who underwent surgery in our hospital from March 2017 to August 2019 were included in this research, including 60 males and 42 females, and their ages were 39-67 years old with an average age of (58.2±4.6) years. Inclusion criteria: patients who met the diagnostic criteria in the "Expert Consensus on Surgery and Comprehensive Treatment of Laryngeal Carcinoma" [9] and were diagnosed by postoperative pathological detection; patients were expected to live for ≥ 6 months; patients with first onset; patients who signed the informed consent. Exclusion criteria: patients with chronic diseases of the heart and lungs; patients with preoperative neuromuscular function or structural abnormalities; patients receiving preoperative radiotherapy and chemotherapy; patients with previous brain injury and history of serious physical diseases; patients with advanced laryngeal cancer that had metastasized; patients who were confused, unconscious, or had cognitive dysfunction; patients with malignant tumors in other body parts; patients who were lost to follow-up or unable to complete the research due to various reasons. This study was approved by The Fifth People's Hospital of Nanchong.

Methods

The control group received the conventional nursing model, which mainly included nursing with trachea cannula, nasal feeding guidance, routine examination, medication guidance, routine health education, vocal rehabilitation training, etc. In addition, the nursing staff answered patients' questions patiently. After discharge from the hospital, the primary nurses were responsible for telephone follow-up and instructing the patients to be reviewed regularly.

Based on the nursing quality feedback, the specific measures of the refined nursing model in the research group were as follows: ① a refined nursing team based on quality feedback was established, which included an attending physician (responsible for diagnosis and treatment, medication adjustment, *etc.*), a head nurse (responsible for training, supervision, *etc.*), a rehabilitation physician (responsible for formulating training programs for communication and language reconstruction), a primary nurse (responsible for post-discharge telephone follow-up, *etc.*) and 5 nurses (responsible for specific implementation). The team conducted training of quality feedback theory and laryngeal cancer related knowledge in the department, and conducted division of responsibilities. ② After admission, the team had a detailed understanding of the patients' condition, comprehensively evaluated patients' psychological and physiological conditions based on their age, gender, and examination results, and analyzed patients' nursing needs, so as to continuously improve the nursing work by patiently meeting the patients' demands. The implementation effect was evaluated at 11:30 am and 5:30 pm every day. A weekly summary meeting was held to discuss potential problems and existing problems based on the feedback information in order to continuously improve the nursing content and formulate the nursing procedures and implementation of plans at the next stage. ③ Refined nursing. a. Preoperative nursing. The team instructed patients to quit smoking, reduce respiratory

secretions, and keep the respiratory tract clean; the team instructed patients to rinse with hydrogen peroxide after meals, brush the teeth frequently, avoid spicy, irritating, and greasy foods, and mainly have high-vitamin, high-protein, and high-calorie foods. The team strengthened communication with patients, informed patients of the precautions and the necessity of treatment, and earnestly answered the questions of patients and their families. The team organized a patient-to-patient communication once a month to encourage successful anti-cancer patients to introduce their experience with 15 minutes of free exchange and 25 minutes of lectures each time. The team encouraged family members to give patients spiritual support, love them and take the initiative to care for patients, and use positive language to encourage patients to reduce their feelings of loneliness. The team instructed patients to divert their attention and enhance their will by abdominal breathing, meditation and other methods. The team used narrative nursing methods for psychological counseling, and encouraged patients to express their inner thoughts and feelings to help them accurately find the crux, and respond to negative emotions with a positive attitude. b. Intraoperative nursing. The team strictly performed various inspections to ensure the normal use of surgical instruments. The team ensured aseptic an environment during the operation and carefully bandaged the incision. c. Postoperative nursing. For patients with postoperative nasal feeding, the amount of each injection was controlled within 200 mL, and the temperature was around 38-40°C; sputum suction, back flapping, turning over and other operations were prohibited 30 minutes after nasal feeding; swallowing training was performed 1 day before extubation. The head end of the bed was raised 30-45° after the operation to make the head and neck tilt forward slightly; according to the viscosity of the patients' respiratory secretions, the frequency of nebulization was adjusted, and the self-controlled pump was used for continuous humidification treatment. When symptoms such as decreased blood oxygen saturation, breathing difficulties, and wheezing cough appeared, the team helped the patients excrete sputum in time with a silicone suction tube to suck sputum 15 minutes before the meal. After the extubation, the team conducted pronunciation training for the patients from easy to difficult to correct inaccurate pronunciation and fix air leakage. The team instructed patients to train their swallowing function and strengthen their tongue movement ability after operation by oral sensory stimulation, tongue exercises, cold pharyngeal stimulation, empty pharynx training, breath-holding training, Mendelssohn exercises, etc. d. A file template for the discharge plan was established, including perioperative precautions (incision care, dressing change, tracheal tube care, etc.), language communication training, swallowing training, introduction to laryngeal cancer disease, accident management, follow-up review, etc. Discharge follow-up records, follow-up forms, and discharge plan files were collected and sent to the patients via WeChat; according to the follow-up evaluation form, the patients were followed up via telephone and WeChat every 4 weeks.

Observation indicators

Mental state. The Self-Rating Anxiety Scale (SAS) included anxiety-affective symptoms, psychomotor disorders and psycho-affective symptoms, which contained 20 items, with points above 50 labeled as anxiety. The anxiety was positively correlated with the scores. The Self-Rating Depression Scale (SDS) included depressive affective symptoms, sleep disorders, etc., which contained 20 items, with points above 53 labeled as depression. The depression was positively correlated with the scores [10].

Illness perception and benefit finding. The Brief Illness perception questionnaire (BIPQ) included 8 items, each with 0-10 points, representing no impact or serious impact, respectively. The total score was 80 points. The higher the scores were, the more severe the symptoms of illness perception were. The Benefit Finding Scale included 6 items and 22 sub-items such as social relations, family relations, personal growth, and world outlook, with a total score of 22-110 points. The higher the scores were, the higher the benefit findings were [11].

Cancer-related fatigue. It was evaluated from 4 items of cognition/emotion, perception, emotion, and behavior/severity with the reference to the Revised Piper Fatigue Scale. Each item contained 0-10 points. The higher the scores were, the more serious the fatigue was.

Table 1. Comparison of general data in the two groups (n/χ ± SD)

Group	Male/ Female	Age (years)	Course of disease (years)	BMI (kg/m^2)	Educational background	Method of operation	Type of illness
					Junior high school and below/high school and technical secondary school/ junior college and above	Total laryngectomy/partial laryngectomy	Supraglottic cancer/glottic cancer/subglottic cancer
The control group (n=51)	32/19	57.2±4.9	3.12±1.26	21.96±3.02	23/17/11	20/31	12/27/12
The research group (n=51)	28/23	58.6±5.3	3.29±1.37	22.38±2.68	20/22/9	17/34	14/30/7
χ^2/t	0.648	1.385	3.390	0.743	1.050	0.382	1.628
P	0.421	0.169	0.516	0.459	0.592	0.537	0.443

Quality of life. EORTC QLQ-C30 involved 5 dimensions, each with 100 points. The higher the scores were, the better the quality of life was [12]. The evaluation time of the above indicators was before surgery and 3 months after.

Complications. Whether the patients had drug-induced pharyngitis, drug-induced dermatitis, airway obstruction, swallowing dysfunction and other uncomfortable symptoms within 3 months after the operation were counted.

Nursing satisfaction. The La Monica-Oberst Patient Satisfaction Scale (LOPSS) includes patients' dissatisfaction with nursing (10 items) and interpersonal support (14 items). The higher the scores were, the higher the satisfaction was.

Statistical analysis

The statistical analysis of data was processed by SPSS 23.0. The figures were illustrated by GraphPad Prism 8. The measurement data was expressed by $\bar{x} \pm s$. The independent *t* and paired sample *t* were used for inter-group comparison and intra-group comparison. Count data was expressed in percentage, and χ^2 test was adopted. $P < 0.05$ was considered as statistically significant.

Results

General materials

There was no statistically significant difference in general information including as gender, age, course of disease, BMI, Educational background, method of operation and type of illness between the two groups ($P > 0.05$), and the data were comparable (**Table 1**).

Mental state

The two groups showed no significant difference in the SAS and SDS scores before operation ($P > 0.05$). At 3 months after operation, the SAS and SDS scores in the two groups were lower than those before operation. The SAS and SDS scores of the research group were lower than those of the control group at 3 months after operation ($P < 0.05$), indicating that the refined nursing model based on nursing quality feedback can alleviate the negative emotions of patients with laryngeal cancer after surgery (**Figure 1**).

Illness perception and benefit finding

The two groups showed no significant difference in the BIPQ score and benefit finding before operation ($P > 0.05$). At 3 months after operation, the BIPQ score was lower and benefit finding score was higher in both groups than that before operation ($P < 0.05$). The BIPQ score of the research group was lower than that of the control group at 3 months after the operation, and the score of benefitsfound was higher than that of the control group ($P < 0.05$), indicating that the refined nursing model based on nursing quality feedback can reduce patients' negative perception and improve the finding of benefits (**Figure 2**).

Cancer-related fatigue

There was no significant difference in the scores of behavior/severity, emotion, cognition/emotion, and perception of the Revised Piper Fatigue Scale ($P > 0.05$). At 3 months after operation, the scores of behavior/severity, emotion, cognition/emotion, and perception of the Revised Piper Fatigue Scale in both groups were lower than those before operation, and

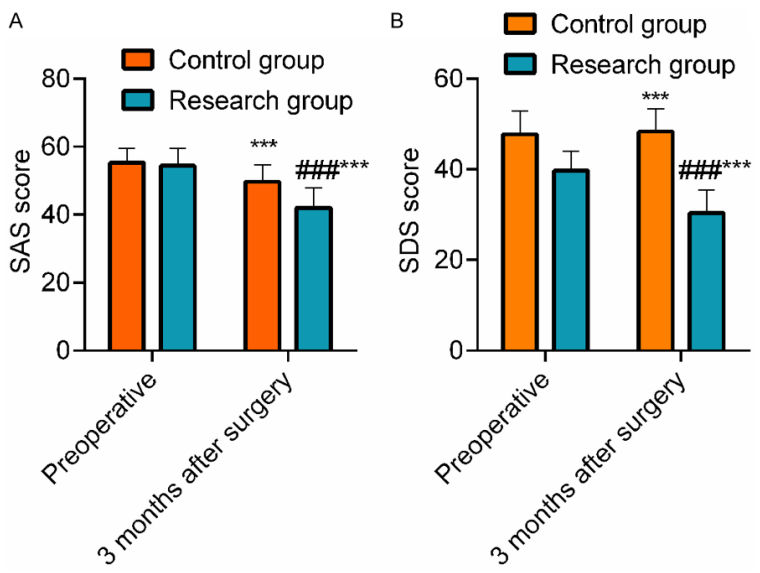

Figure 1. Comparison of SAS and SDS scores between the two groups (points). Note: (A) SAS score; (B) SDS score. Compared with the control group, ###$P < 0.001$; compared with the same group before operation, ***$P < 0.001$.

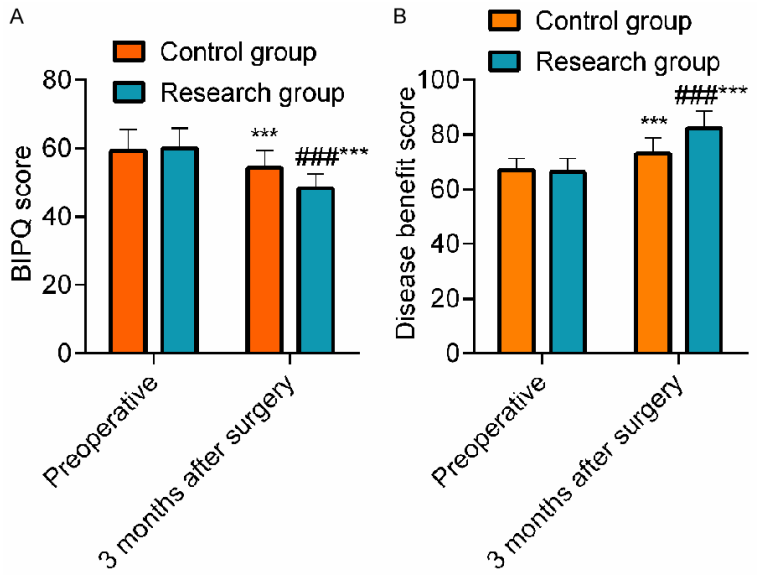

Figure 2. Comparison of BIPQ and benefit finding scores between the two groups (points). Note: (A) BIPQ score; (B) Benefit finding score. Compared with the control group, ###$P < 0.001$; compared with the same group before operation, ***$P < 0.001$.

the scores in the research group were lower than those in the control group at 3 months after operation ($P < 0.05$), indicating that the refined nursing model based on nursing quality feedback can alleviate patients' cancer-related fatigue (**Figure 3**).

Quality of life

There was no significant difference in the scores of emotional function, physical function, role function, cognitive function, and social function in the EORTC QLQ-C30 scale. At 3 months after operation, the scores of emotional function, physical function, role function, cognitive function, and social function in both groups were lower than those before operation, and the scores in the research group were lower than those in the control group at 3 months after operation ($P < 0.05$), indicating that the refined nursing model based on nursing quality feedback can improve the quality of life of the patients (**Figure 4**).

Complications

The incidence of complications in the research group (7.84%) was lower than that in the control group (23.53%) ($P < 0.05$), indicating that the refined nursing model based on nursing quality feedback can promote the reduction of complications (**Table 2**).

Nursing satisfaction

The LOPSS scores of patients' dissatisfaction with nursing and interpersonal support of the research group were higher than those of the control group, indicating that patients were more receptive to the refined nursing model based on nursing quality feedback (**Table 3**).

Discussion

With the continuous development of the bio-psycho-social medicine model, patients' demand for nursing has risen accordingly. While effectively controlling tumors, it is necessary to

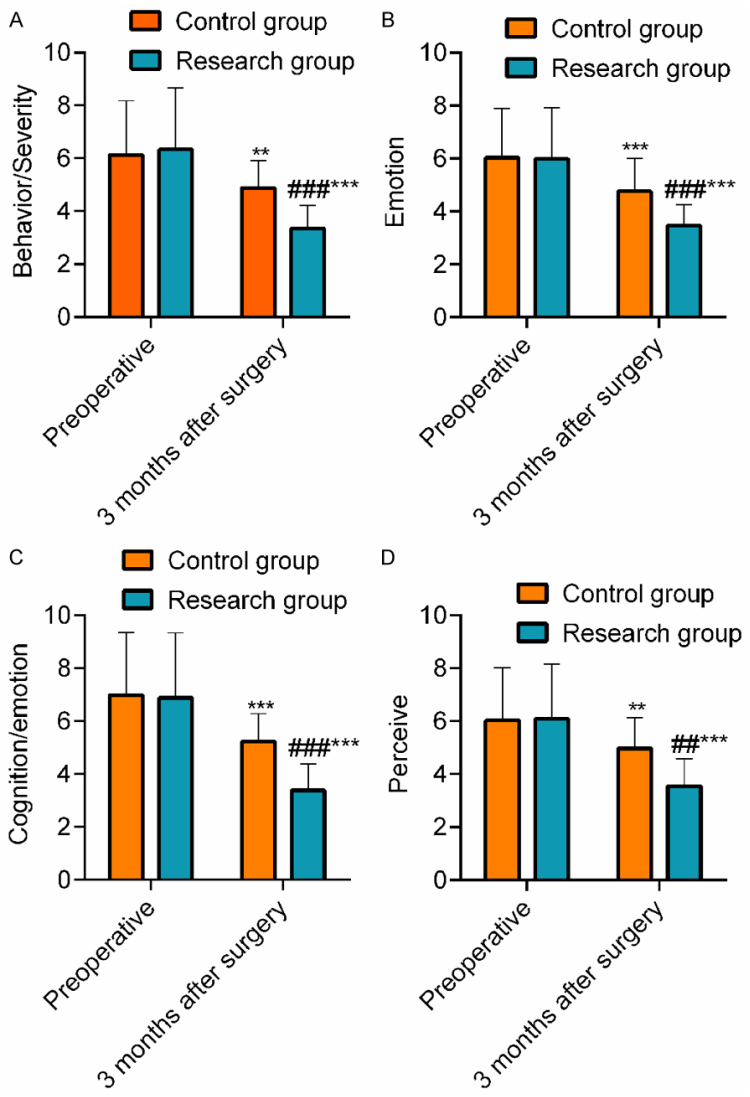

Figure 3. Comparison of the Revised Piper Fatigue Scale scores of two groups (points). Note: (A) Behavior/Severity score; (B) Emotion score; (C) Cognitive/Emotion score; (D) Perceptive score. Compared with the control group, $^{\#\#}P < 0.01$, $^{\#\#\#}P < 0.001$; compared with the same group before operation, $^{**}P < 0.01$, $^{***}P < 0.001$.

meet the goals of good social adaptation and mental health of patients [13]. A related study has found that applying nursing quality feedback theory to thoracic surgery patients can promote the improvement of surgical results and enhance the nurse-patient relationship [14]. In this research, a refined nursing model based on nursing quality feedback was used in the perioperative period of laryngeal cancer surgery. It was oriented to solve the patient's rehabilitation problems and required the nursing staff to evaluate the nursing effect and summarize the problems every day to form a dynamic nursing process and plan of implementation-feedback-improvement-optimization, and effectively solve the actual and potential problems in the nursing process, so as to enhance patients' rehabilitation effect, improve their quality of life, and relieve their negative emotions.

Affected by factors such as surgical concerns, not knowing how to the cure the illness, economic problems and other factors, patients with laryngeal cancer and their families suffer with physical and mental shock, and they are prone to many negative emotions, and some even gave up the idea of treatment [15]; besides, the pronunciation of the patients after the operation was damaged to varying degrees, resulting in partial loss of communication and social functions, and thus a heavy psychological burden. In this research, the scores of SAS, SDS, BIPQ, and the Revised Piper Fatigue Scale in the research group were lower than those in the control group at 3 months after operation, and the scores of benefit finding, EORTC QLQ-C30 and LOPSS were higher than those in the control group, indicating that the refined nursing model based on nursing quality feedback was more conducive to adjusting the postoperative mental state of patients with laryngeal cancer, improving the finding of benefits, reducing the degree of cancer-related fatigue, improving the quality of life, and had higher satisfaction. The reason was that the refined nursing model based on nursing quality feedback evaluated the implementation effect daily, held summary meetings regularly, and discussed potential problems and existing problems based on the feedback information, and continuously improved nursing work in a cyclical manner to make nursing measures were more targeted and ensured that nursing work was well-documented and evidence-

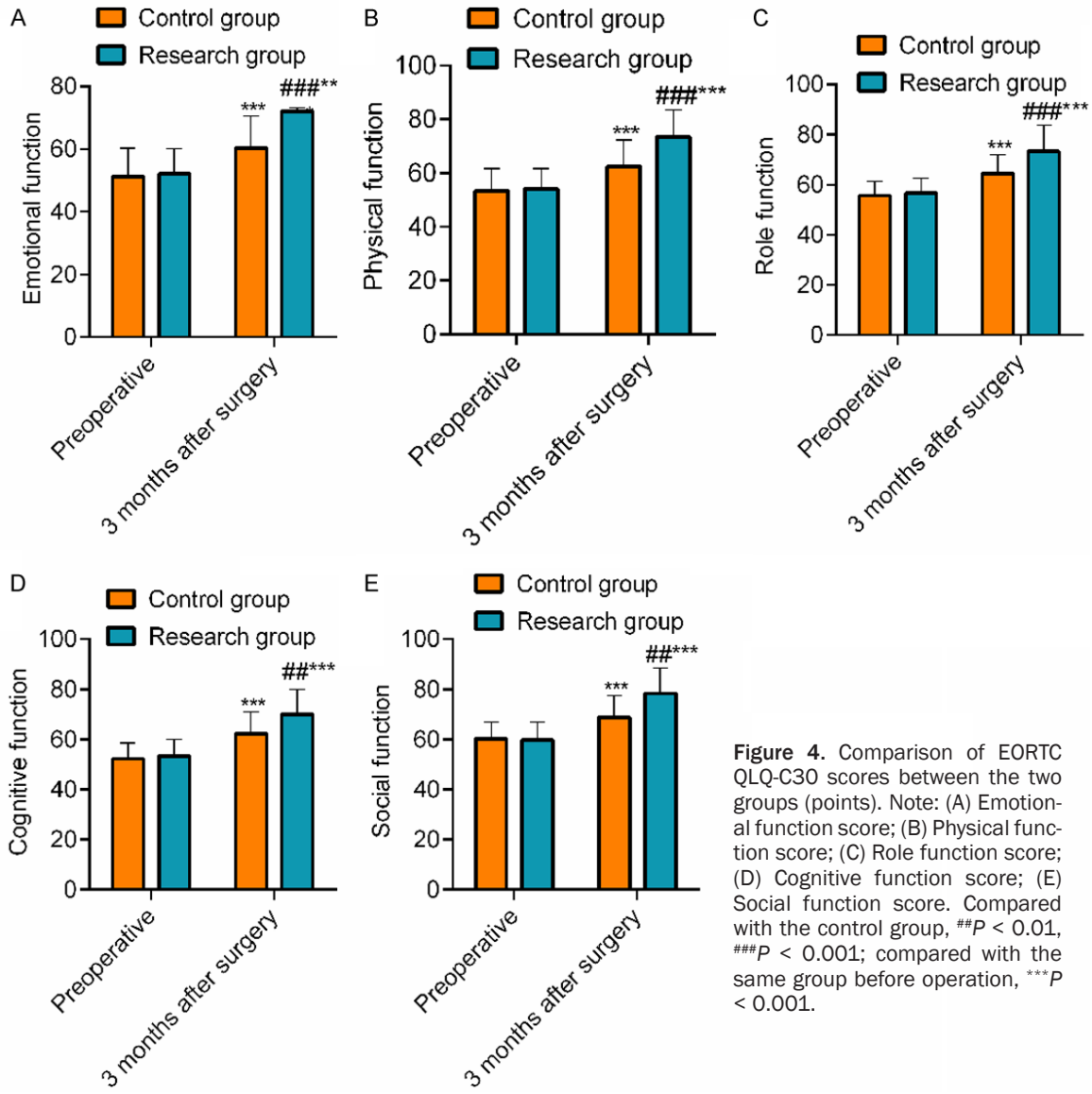

Figure 4. Comparison of EORTC QLQ-C30 scores between the two groups (points). Note: (A) Emotional function score; (B) Physical function score; (C) Role function score; (D) Cognitive function score; (E) Social function score. Compared with the control group, $^{\#\#}P < 0.01$, $^{\#\#\#}P < 0.001$; compared with the same group before operation, $^{***}P < 0.001$.

Table 2. Comparison of complications between the two groups n (%)

Group	Drug-induced pharyngitis	Drug-induced dermatitis	Airway obstruction	Swallowing dysfunction	Total
Control group (n=51)	4 (7.84)	2 (3.92)	5 (9.80)	1 (1.96)	12 (23.53)
Research group (n=51)	1 (1.96)	1 (1.96)	2 (3.92)	0 (0.00)	4 (7.84)#

Note: Compared with the control group, $^{\#}P < 0.05$.

Table 3. Comparison of LOPSS scores between the two groups ($\chi \pm SD$, points)

Group	Patients' dissatisfaction with nursing	Interpersonal support	Total score
Control group (n=51)	30.16±3.12	54.29±4.02	84.45±4.03
Research group (n=51)	35.59±3.21###	60.35±4.22###	95.94±3.21###

Note: Compared with the control group, $^{\#\#\#}P < 0.001$.

based [16, 17]. Medical staff actively communicated with patients and family members, listened to the various needs of patients, helped them build confidence during treat-

ment, enhanced their self-nursing ability, and improved their quality of life [18]. By regulating the patients' emotions, attention and cognition, this could help patients accept and face their own illness more calmly, relieve the uncomfortable symptoms caused by tumors, cope with stress actively and optimistically, avoid lowering self-worth, eliminate negative emotions, make social adaptation easier and physical function healthier; while listening patiently to the patients' complaints and explaining the disease-related knowledge to the patients helped correct past misunderstandings, improve their treatment compliance and illness perception, reduced patients' negative perception, and increased the benefit finding [19, 20]. By instructing patients with abdominal breathing, meditation, etc., this could divert patients' attention, enhance their will, and let patients clarify their self-change in the most intuitive way. In establishing a discharge plan file template, and sending discharge follow-up records, files, and tracking forms to patients via WeChat and other platforms, this could help patients receive scientific and professional nursing guidance during their home nursing, and encourage patients to return to society and their families quickly [21].

Patients with laryngocarcinoma surgery often have an established artificial airway through tracheostomy to maximize postoperative function and maintain perioperative ventilation, but this easily changes the patients' normal breathing channels, eliminates the normal protective effects such as heating, humidifying and purifying the air, and increases the incidence of serious complications such as postoperative airway obstruction and infection [22, 23]. The incidence of complications in the research group was lower than that in the control group, indicating that the refined nursing model based on nursing quality feedback can help reduce the risk of postoperative complications, speed up postoperative recovery, and contribute to a better prognosis. Hegland [24] et al. reported that the implementation of exhalation muscle strength training and postoperative rehabilitation guidance could promote the improvement of patients' swallowing function and coughing ability, protect the airway, enhance the strength of expiratory muscles, and prevent swallowing dysfunction. The reason for this was that in the refined nursing model based on nursing quality feedback, respiratory nursing and airway humidification could maintain the function of patients' respiratory mucociliary system, promote secretion discharge, and reduce airway obstruction complications [25]. Trainings such as oral sensory stimulation, tongue exercises, cold throat stimulation, and empty pharynx could improve the tongue movement ability of patients after surgery and prevent malnutrition, suffocation, aspiration and other adverse consequences caused by abnormal swallowing function.

In summary, the implement of refined nursing model based on nursing quality feedback for patients undergoing laryngeal cancer surgery can reduce their negative emotions, enhance their benefit finding, reduce their negative perception and cancer-related fatigue, improve their quality of life, reduce complications, and improve the patient-care relationship. The shortcomings of this research were the small sample size and the lack of long-term follow-up. Therefore, a multi-center, large sample size and prospective research are still needed in the future.

Disclosure of conflict of interest

None.

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