

## Original Article

# The effects of seamless nursing on the nursing quality and patient satisfaction in the perioperative nursing of sinusitis patients

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**Abstract:** Objective: This study aimed to analyze the effects of seamless nursing on the perioperative nursing of sinusitis patients. Methods: Eighty sinusitis patients admitted to our hospital from January 2016 to June 2019 were selected as the cohort for a retrospective analysis and randomly divided into an observation group (n=40) and a control group (n=40). The patients in the control group were routinely nursed in the perioperative period, while the patients in the observation group were subject to seamless nursing accordingly. The two groups were compared in terms of their unhealthy emotions, quality of life, length of stay, medical expenses, pain intensity, compliance with their doctor's instructions, and nursing satisfaction after the nursing. Results: Compared with the control group after the nursing, the observation group reported lower scores on the Hamilton Anxiety Rating Scale (HAMA), the Hamilton Depression Rating Scale (HAMD), the WHO pain intensity scale at 1 d, 3 d, 7 d, and 14 d, better compliance with the doctor's advice, quality of life scores, psychological function, social function, material life state and body function, and nursing satisfaction (90.00% vs 67.50%), shorter length of stay in the hospital and lower medical expenses ( $P<0.05$ ). Conclusion: In the perioperative nursing of sinusitis patients, seamless nursing is a tool worthy of popularization as it can relieve unhealthy emotions, postoperative pain intensity, and the medical burden, and it can improve the postoperative compliance with the doctor's advice, the patients' quality of life, their nursing satisfaction, and it can shorten the length of their hospital stays.

**Keywords:** Sinusitis, surgery, perioperative period, seamless nursing, nursing quality, nursing satisfaction

## Introduction

Endoscopic surgery is a major therapeutic method in the clinical treatment of sinusitis, which examines and treats lesions with endoscopes of high resolution and variable visual angles to ensure that the pathological tissues are removed under visual guides [1]. It is simple and time-saving, the quality is guaranteed, and there is a low incidence of complications [2] without obvious bleeding or severe damage to the nasal cavities. Nevertheless, the location of the lesions prevents us from creating a broad field of view during the surgery, and its deep position leads to obvious anatomical variations, such that the markers in different patients may have significantly different shapes, increasing the surgical difficulty [3]. Perioperative nursing is the key to ensuring a smooth surgery and the quality of the surgery.

Studies have shown that preoperative preparation is necessary for sinusitis patients to receive surgical treatment, including psychological counseling. Furthermore, they are required to cooperate with the doctors effectively during the surgery. In the postoperative nursing process, medical staff pay attention to relieving patients' pain, reducing their postoperative complications and improving their quality of life [4]. Previously, Perioperative nursing focused more on patients' cooperation with the doctor during the surgery rather than on preoperative and postoperative nursing, so the overall nursing quality was not guaranteed [5]. Seamless nursing is a specific embodiment and an important part of high-quality nursing. It takes the process from admission to discharge as a whole, to make sure patients have access to high-quality nursing when they are in the hospital [6].

Seamless nursing not only emphasizes the nursing quality, but also its carefulness. This study specifically aims to analyze the effects of seamless nursing in the perioperative nursing of sinusitis patients.

### Materials and methods

#### *Materials*

The clinical materials of 80 sinusitis patients admitted to our hospital from January 2016 to June 2019 were included in the study for retrospective analysis. The patients were randomly divided into the observation group (n=40) and the control group (n=40). Patients in the control group ranged in age from 34 to 59 years with a course of disease of 1-5 years, of which 9 reported unilateral lesions and 31 bilateral lesions; 12 graduated from primary school or below, 15 from junior high school or special schools, and 13 from college or university or higher. The patients in the observation group ranged in age from 35- to 60 years with a course of disease of 1-6 years, of which 11 had unilateral lesions and 19 had bilateral lesions; 11 received education only in primary school or below, 14 from junior high school or a special school, and 15 from college, university or higher. (1) Inclusion criteria: patients who satisfied the diagnostic criteria [7] of sinusitis and who demanded surgical treatment and who had satisfactory surgical indications were included. Before surgery, a sinus CT examination was performed to identify the degree and nature of the lesion. The patients were required to be lucid and alert before and after surgery in order to cooperate with the investigation at various scales. All the patients provided their informed consent to participate in this study, and the study was approved by the Ethics Committee of the First People's Hospital of Fuzhou. (2) Exclusion criteria: some patients were excluded as they had allergic rhinitis, concurrent malignant tumors, and diseases in the nervous system, heart, liver, or kidneys. Pregnant and lactating women were also excluded.

#### *Methods*

After receiving the same surgical treatment by the same medical team, both groups were nursed. For the control group, it was routine nursing in the perioperative period, including basic education before and after surgery, close

cooperation with the doctors during the surgery, and the prevention of complications and pain nursing after surgery.

The patients in the observation group received seamless nursing in the perioperative period. The number of nursing staff was the same as in the control group, but there were differences in staff collocation and working hours. The salary of the nursing staff was based on their working hours and performance assessments. The specific implementation of seamless nursing was as follows.

Establishment of a seamless nursing team: all nurses from the department were divided into three nursing teams to take charge of one group of the patients. Each team consisted of newcomers and experienced members and was led by one leader who directed and supervised the team members to implement nursing measures.

Seamless scheduling: the schedules were arranged flexibly, including an 8 hour day and a 24 h accountability system. The nurses evaluated the demands of the shifts 1 week in advance, based on which, the chief nurse arranged the schedules, and when necessary involved additional paramedics to cope with the demand during peak hours. Scheduling also took into account the nurses' years of service and qualifications, etc., to ensure the nursing continuity and safety.

Implementation of seamless nursing: (1) Pre-operative nursing: upon admission, the patients had a certain understanding of the hospital and ward surroundings, the departmental director and nurses, the other patients from the same ward, and the medical team's qualifications, in order to eliminate their sense of strangeness, improve their familiarity, and preliminarily establish an amicable relationship between the nurses and patients. Furthermore, the patients learned about the specific surgical processes, expected cooperation, notes and the recovery process from the doctors, as well as the advantages of the surgery, in order to improve their sense of safety and eliminate the sense of fear. Some successful cases of surgical treatment involving similar diseases were also described to the patients to raise their confidence. The nurses directed the patients to master their buccal respiration skills in order to

help them adapt to the postoperative nasal packing. (2) Intraoperative nursing: upon transfer to the operating room, the patients' personal information was validated, followed by oral cleaning, skin preparation, venipuncture, and surgical field disinfection with iodophor. The apparatuses to be used were connected and set to standby state. Other medical appliances were placed in the proper order and correctly passed to the doctor at his request. During the surgery, the patients' blood pressure was closely monitored. In addition, the temperature, humidity, and color of the peripheral skin, extremities and lips, and any traces of swelling were monitored. Medicines were administered to patients according to the doctor's instructions, and blood transfusion was performed if and when necessary. (3) Postoperative nursing: the ward area was patrolled positively, and the patients were encouraged to express their inner feelings and make known what their needs were. For patients with unhealthy emotions, an active counseling service was provided. For patients suffering from pain after the surgery, they were told that the pain is normal. Minor pain can be alleviated by distracting attention. In the case of severe pain, painkillers can only be taken according to the doctor's instructions. The nurses actively introduced the patients to the need for, and the specific methods of, resting in a semi-reclining position after the surgery. A cold compress was provided on the nose and forehead. The head of the bed was raised about 40° to reduce the stimulation of air flow on the nasal cavities, control bleeding, accelerate breathing and drainage, and alleviate swelling of the nose and orbital parts. The patients were encouraged to drink small amounts of water frequently and keep their lips moistened using lip balm. Five times each day, mint oil was dropped into the nasal cavities to prevent dryness. The patients were prohibited from swallowing oral secretions in order to maintain a clean oral cavity. The patients were allowed consume easily digestible semifluid food high in proteins and vitamins. They also learned to rinse their nasal cavities with nasal lavage fluids. 24-48 h after surgery, and the nasal packing was removed after they had a meal to reduce the chance of fainting. After discharge, the patients were informed of their follow-up appointments and the importance keeping the appointments. The doctors learned

about patients' recovery by telephone and gave them proper guidance.

### *Observation indexes*

Unhealthy emotions: the Hamilton Depression Rating Scale (HAMD) and the Hamilton Anxiety Rating Scale (HAMA) [8, 9] were relied on to evaluate the patients' depression and anxiety before (upon admission) and after the nursing (upon discharge). Severe anxiety is defined as a total HAMA score at or over 29, prominent anxiety as between 21 and 28, general anxiety as between 14 and 20, possible anxiety as between 7 and 13, and no anxiety as between 0 and 7. For HAMD, a normal patient is judged to have a score under 8, a possibly depressed patient to have a score between 8 and 20, a depressed patient to have a score between 21 and 35, and a severely depressed patient to have a score over 35.

Pain intensity: the patients' pain intensities at 1 d, 3 d, 7 d, and 14 d after surgery were evaluated according to the WHO classification criteria of pain [10], in which, 0 indicates no pain, I indicates slight and intermittent pain with no need for drug administration, II indicates mild and persistent pain affecting rest and requiring painkillers if necessary, III indicates severe and persistent pain requiring drug administration, IV indicates severe and persistent sharp pain with changes in blood pressure and pulse, which can't be controlled by drugs. The 4 grades correspond to 5 points from 0 to 4. A higher point indicates more severe pain.

Compliance with the doctor's advice: a questionnaire was designed for investigation before (upon admission) and after nursing (upon discharge). It consists of 25 items in 6 dimensions, including recognition, attitude, diet and movement, drug use, healthy behavior, and regular follow-up. A 3-class rating was adopted with a full mark of 75. A higher score indicates better compliance with the doctor's instructions.

Length of stay and medical expenses: the two groups were compared in terms of their lengths of stay, which is defined as the time elapsed from admission to discharge, and the medical expenses the patients have accrued during their stays in the hospital.

Quality of life: The patients in both groups were followed up for 3 months. The Generic Quality

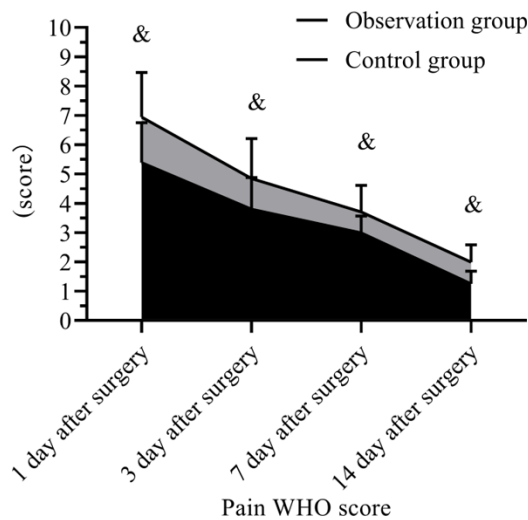
**Table 1.** Comparison of the observation and control groups in general characteristics (Mean  $\pm$  SD)/[n (%)]

Characteristic		Observation Group (n=40)	Control Group (n=40)	t/X <sup>2</sup>	P
Gender	Male	22 (55.00)	21 (52.50)	0.050	0.823
	Female	18 (45.00)	19 (47.50)		
Age (y)		45.75 $\pm$ 6.38	43.68 $\pm$ 5.94	1.502	0.137
Course of disease (y)		2.91 $\pm$ 1.28	2.86 $\pm$ 1.34	0.171	0.865
Diseased side	Unilateral	11 (27.50)	9 (22.50)	0.267	0.606
	Bilateral	29 (72.50)	31 (77.50)		
Educational background	Primary schools and below	11 (27.50)	12 (30.00)	0.623	0.527
	Junior high schools or special schools	14 (35.00)	15 (37.50)		
	Colleges, universities or above	15 (37.50)	13 (32.50)		

**Table 2.** Comparison of the observation and control groups in the improvements of unhealthy emotions (Mean  $\pm$  SD, score)

Group	n	HAMA		HAMD	
		Before nursing	After nursing	Before nursing	After nursing
Observation Group	40	13.26 $\pm$ 2.27	7.01 $\pm$ 1.14*	30.62 $\pm$ 3.38	10.08 $\pm$ 1.17*
Control Group	40	13.52 $\pm$ 2.54	10.89 $\pm$ 2.30*	30.29 $\pm$ 4.03	17.45 $\pm$ 2.41*
t		0.483	9.559	0.397	17.399
P		0.631	0.000	0.693	0.000

Note:  $P^* < 0.05$  for intragroup comparison before nursing.

**Figure 1.** Comparison of the observation and control groups in postoperative WHO pain scores. The observation group reported lower WHO pain scores at 1 d, 3 d, 7 d, and 14 d after surgery as compared with the control group ( $P < 0.05$ ). & indicates  $P < 0.05$  as compared between the two groups at the same time point.

of Life Inventory (GQOLI) [11] was used to evaluate the patients' quality of life from 4 dimensions of psychological function, social function, material life state, and body function before

(upon admission) and after nursing (at the end of follow-up). Each item is designated with a full mark of 100, and a higher score indicates better quality of life.

Nursing satisfaction: the patients were required to express their opinions of our psychological counseling services, health education, treatment environment, and nursing services and attitudes. Each item has a maximum of 25 points, and the total possible score is 100. The patients with a mark at or above 90 were fully satisfied, patients with a score between 70 and 90 indicated satisfied, and patients with a score at or under 70 indicated dissatisfied. The satisfaction = total satisfaction + tolerable satisfaction.

#### Statistical analysis

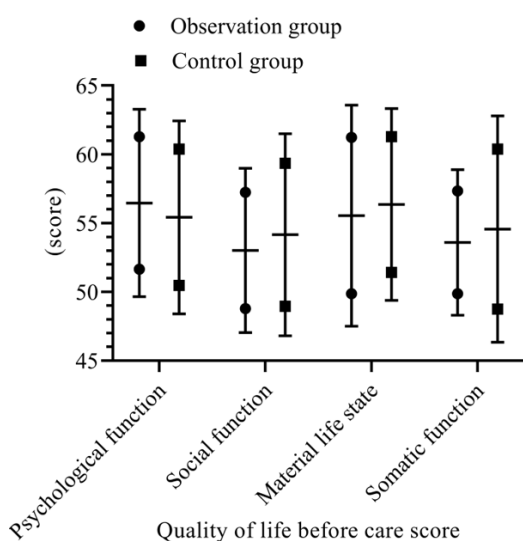
The statistical analysis was performed with SPSS 22.0. In the cases of numerical data expressed as the means  $\pm$  standard deviation, the intergroup and intragroup comparisons were carried out using independent-samples *t* tests; in the case of nominal data expressed as [n (%)], the intergroup and intragroup comparison studies were carried out using  $X^2$  tests. For all the statistical comparisons, significance was defined as  $P < 0.05$ .

**Table 3.** Comparison of the observation and control groups in compliance with the doctor's instructions before and after nursing (Mean  $\pm$  SD, score)

Group	n	Before nursing	After nursing	t	P
Observation group	40	38.49 $\pm$ 9.68	59.64 $\pm$ 12.43	8.490	0.000
Control group	40	36.78 $\pm$ 8.95	47.75 $\pm$ 10.37	5.065	0.000
t		0.820	4.645		
P		0.415	0.000		

**Table 4.** Comparison of the observation and control groups in length of stay and medical expenses (Mean  $\pm$  SD)

Group	n	Length of stay (d)	Medical expenses (RMB)
Observation Group	40	5.72 $\pm$ 1.69	6578.15 $\pm$ 359.38
Control Group	40	8.23 $\pm$ 1.75	8472.61 $\pm$ 527.81
t		6.525	18.764
P		0.000	0.000

**Figure 2.** Comparison of the observation and control groups in scores of quality of life before nursing. No significant differences were found between the observation group and the control group in psychological function, social function, material life state, or body function ( $P>0.05$ ) before nursing.

## Results

### *The comparison between the observation and control groups in general characteristics*

No significant differences were observed between the two groups in terms of the proportions of male and female patients, the mean ages, the mean courses of the disease, the proportions of unilateral and bilateral lesions, and

their educational backgrounds ( $P>0.05$ , **Table 1**).

### *Comparison of the observation and control groups in the improvements of unhealthy emotions*

Without any significant intergroup differences in the HAMA and HAMD scores before nursing ( $P>0.05$ ), the observation and control groups experienced a reduction ( $P<0.05$ ) in the two aspects after nursing, which was more significant in the observation group ( $P<0.05$ , **Table 2**).

### *Comparison of the observation and control groups in postoperative pain intensity*

The WHO scores for pains at 1 d, 3 d, 7 d, and 14 d after surgery were reduced in the two groups, namely, (5.16 $\pm$ 1.23), (3.86 $\pm$ 0.75), (2.94 $\pm$ 0.54) and (1.26 $\pm$ 0.34) in the observation group, (6.86 $\pm$ 1.29), (4.53 $\pm$ 0.78), (3.75 $\pm$ 0.61) and (2.05 $\pm$ 0.41) in the control group ( $t=6.057$ , 3.916, 6.288, 9.381,  $P=0.000$ , 0.000, 0.000 and 0.000, **Figure 1**).

### *Comparison of the observation and control groups in their compliance with the doctor's instructions*

Without a significant difference in terms of compliance with the doctor's instructions before the nursing ( $P>0.05$ ), both groups achieved an intragroup elevation after nursing ( $P<0.05$ ), and the observation group exceeded the control group prominently ( $P<0.05$ , **Table 3**).

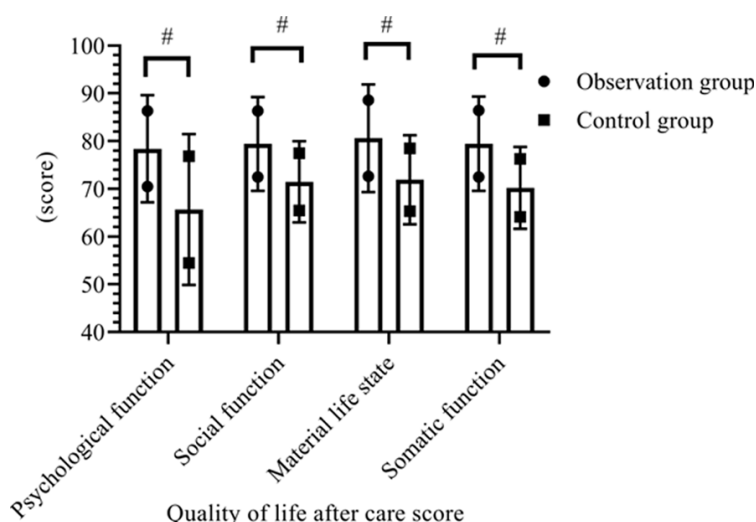
### *Comparison of the observation and control groups in their length of stay and medical expenses*

Compared with the control group, the observation group reported a shorter length of stay and lower medical expenses ( $P<0.05$ , **Table 4**).

### *Comparison of the observation and control groups in quality of life*

The scores for psychological function, social function, material life state, and body function were (56.38 $\pm$ 5.49), (52.89 $\pm$ 5.75), (55.78 $\pm$ 6.29) and (53.45 $\pm$ 4.86) in the observation group, (55.72 $\pm$ 5.18), (53.16 $\pm$ 6.23), (56.37 $\pm$ 5.89) and





**Figure 3.** Comparison of the observation and control groups in quality of life scores after nursing. The observation group yielded lower scores in psychological function, social function, material life state, and body function ( $P<0.05$ ) compared with the control group after nursing. # indicates  $P<0.05$  as compared between the two groups for the same index.

(54.02±6.02) in the control group before nursing, (78.49±8.68), (79.58±7.69), (80.64±8.23) and (79.38±7.86) in the observation group, and (70.42±6.83), (71.24±6.32), (71.46±7.28) and (70.54±6.32) in the control group at the end of 3 months of follow-up after nursing. The 3-month follow-up was successfully completed in both groups of patients, and no one was lost to follow up. The two groups have no statistical differences in the scores of their quality of life indicators before nursing ( $P>0.05$ ). At the end of 3 months of follow-up after the nursing, both groups experienced an elevation in their quality of life indicators as compared with the indicators before the nursing ( $P<0.05$ ), and the indicators in the observation group were significantly higher than they were in the control group ( $P<0.05$ , **Figures 2, 3**).

#### Comparison of the observation and control groups in nursing satisfaction

In the observation group, 15 patients were fully satisfied, 21 partially satisfied, and 4 dissatisfied with the nursing, with a total number of satisfactory patients up to 36 and a satisfaction degree of 90.00%, while in the control group, the corresponding data were 10, 17, 13, 27 and 67.50% ( $\chi^2=6.050$ ,  $P=0.034$ , **Figure 4**).

#### Discussion

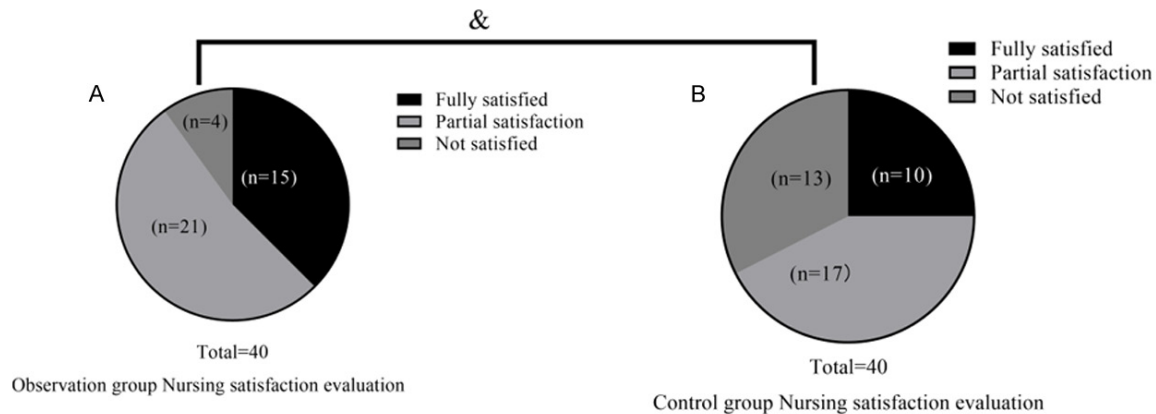
Most of the sinusitis patients have protruding masses in their nasal cavities and sinus muco-

sa, which further develops into nasal polyps and results in degraded olfactory sensation and memory, dizziness, headache, runny nose, and stuffy nose, affecting the patients' quality of life severely [12]. The clinical treatment of sinusitis focuses on endoscopic surgery, which guarantees the completion of all surgeries on the lesions in a visible manner using endoscopy until the sinus ostium is opened, through which, the small polyps close to the natural sinus ostium can be clearly observed to ensure that they are thoroughly removed to improve the local drainage and restore the normal sinus functions [13, 14]. But clinically it is found that the prognoses of sinusitis patients

who received endoscopic surgical treatment of the nose are closely associated with multiple factors, and their rehabilitation quality depends on the surgical quality and nursing quality in the perioperative period as well [15, 16]. Continuous improvement of the nursing quality in the perioperative period of sinusitis surgery and the reduction of surgery-related complications become the chief goals of clinical nursing in order to ensure the patients a successful recovery.

The history of seamless nursing goes back to the end of 1980s in a medical center in the United States. Its emergence aims to satisfy patients' demands and improve their satisfaction by determining all the gaps in the nursing service and dealing with all the causes through comprehensive management, so that the patients have access to meticulous and high-quality nursing services in the process of treatment and rehabilitation after treatment [17, 18]. Since then, seamless nursing has become a new nursing model, widely applied in clinical nursing, whose satisfactory effects have also been confirmed by Schramm et al. [19] and Donovan et al. [20].

Through seamless nursing in the perioperative period, the observation group achieved lower HAMA and HAMD scores and higher compliance with the doctor's instructions than the control group ( $P<0.05$ ), indicating that the application of seamless nursing can significant-



**Figure 4.** Comparison of the observation and control groups in the evaluation results of nursing satisfaction. While no statistical difference was found between the two groups in the number of patients fully satisfied and partially satisfied ( $P > 0.05$ ), the observation group had fewer patients who were dissatisfied compared with the control group. & indicates  $P < 0.05$  for number of dissatisfied patients between the two groups.

ly alleviate patients' unhealthy emotions, which ensures a higher acceptance of the knowledge delivered by the nurses regarding health, and a better understanding of the importance of cooperation in nursing, so as to achieve a higher compliance with the doctor's instructions. In this study, the observation group reported lower WHO pain scores at 1 d, 3 d, 7 d and 14 d after surgery, and higher psychological function, social function, material life, and state and body function scores than the control group ( $P < 0.05$ ), indicating that the application of seamless nursing can prominently reduce the pain intensity patients suffered from after surgery, leading to an elevated quality of life. Such an elevation is attributed to the decreased pain intensity after surgery, which removes their physiological discomforts so that patients can maintain a proper status to receive nursing services. In such a way, nursing quality is guaranteed and the patients' quality of life is improved to a large extent [21]. Meum [22] applied seamless nursing in the laparoscopic surgery under general anesthesia, and the results showed that patients were improved in terms of their unhealthy emotions and pain intensity, psychological coping capacity and the incidence of postoperative complications.

The patients in the observation group had shorter hospital stays and lower medical expenses compared with the control group ( $P < 0.05$ ). In addition, the observation group reported a nursing satisfaction of 90.00%, which was higher than the 67.50% in the con-

trol group ( $P < 0.05$ ). Due to a short length of stay and their lower medical expenses, the patients recovered more quickly and cheaply. Therefore, they were highly satisfied with the nursing. Radhakrishnan et al. [23] integrated seamless nursing into operating room nursing and observed a sharp increase in nursing quality and the patients' and doctors' satisfaction. During the implementation of seamless nursing, all the nurses had clearly defined roles and duties. They participated in the entire medical nursing process [24]. Furthermore, the personalized character was highlighted in the nursing, and the patients' differences and individualities were taken into full consideration for targeted nursing to ensure that they can obtain continuous high-quality nursing services during the entire perioperative period [25].

In conclusion, the application of seamless nursing in the perioperative nursing of sinusitis patients has the advantages of alleviating unhealthy emotions and postoperative pain intensity, increasing postoperative compliance with the doctor's instructions, shortening the length of stay and reducing the medical costs, and improving the patients' quality of life and satisfaction, which indicates the model should be applied more broadly. However, this was a retrospective study with a small cohort. The analysis of the study results is incomprehensive, and the obtained results are biased to some extent. Further studies shall be based on larger sample sizes and will be more in-depth and forward looking to obtain more scientific

and representative study conclusions, in order to provide more guidance in the surgical nursing of sinusitis patients.

## Disclosure of conflict of interest

None.

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