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ARTICLE

The Application of Concept Map Thinking Combined with Kolcaba's Comfort Nursing in the Perioperative Care of Patients Undergoing Nasal Deformity Correction

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Abstract

Aims/Background By addressing patients' physical, psychological, social, cultural, and environmental comfort needs holistically, Kolcaba's Comfort Theory raises the standard of care and increases patient satisfaction. This study explored the combined application of these nursing models during the perioperative period for patients undergoing nasal deformity correction surgery.

Methods 92 patients undergoing nasal deformity correction at the Seventh Affiliated Hospital of Sun Yat-sen University were randomly divided into two groups: the conventional group (46 patients), which received standard perioperative nursing care, and the experimental group (46 patients), which received concept map thinking nursing combined with Kolcaba's comfort nursing intervention during the perioperative period. Clinical indicators, including the Self-Rating Anxiety Scale (SAS), Self-Rating Depression Scale (SDS), Pittsburgh Sleep Quality Index (PSQI), Rhinoplasty Outcome Evaluation (ROE) and General Comfort Questionnaire (GCQ), were compared between the two groups at multiple time points.

Results The experimental group demonstrated significantly shorter operation times ($p < 0.001$), faster recovery of nasal breathing ($p = 0.002$), and shorter hospital stays ($p < 0.001$) compared to the conventional group. Additionally, the experimental group experienced less intraoperative blood loss ($p < 0.001$) and a lower incidence of complications ($p = 0.013$). At 2 days, 1 month, and 3 months postsurgery, both groups showed decreases in SAS, SDS, and PSQI scores, with the experimental group demonstrating significantly lower scores ($p < 0.05$). At these same time points, the ROE and GCQ scores increased in both groups, with the experimental group achieving significantly higher scores than the conventional group ($p < 0.05$).

Conclusion The integration of concept map thinking with Kolcaba's comfort nursing significantly improves the postoperative recovery of patients undergoing nasal deformity correction. Reduced surgical trauma, enhanced psychological health, better sleep, increased comfort, and quicker nasal function recovery are all results of this method.

Clinical Trial Registration China Clinical Trial Registration Center (ChiCTR2300069829).

Key words: nasal deformity correction; concept map thinking; Kolcaba's comfort care; nasal cavity function; physiological state; sleep quality

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Introduction

Nasal deformity refers to structural abnormalities or nose dysfunction caused by congenital factors, acquired trauma, disease, or surgery (Bi et al, 2023; Cho et al, 2022). This condition affects the appearance of the patient and has a significant negative impact on mental health and social life. Nasal deformity correction is a specialized plastic surgery procedure aimed at restoring the external shape of the nose and improving ventilation through precise surgical techniques and advanced medical equipment. The procedure is preferred by patients and clinicians managing nasal deformities (Na'ara et al, 2021; Wei et al, 2022). However, according to clinical data (DeVictor and Tollefson, 2023; Lee et al, 2021), nasal deformity surgery, being invasive, often results in postoperative complications such as pain, facial edema, and nasal mucosal adhesions. Therefore, the overall therapeutic outcome is not solely determined by surgical procedures but also by the quality of comprehensive postoperative care. Although traditional nursing can serve as an effective adjuvant therapy, the standardized nursing model lacks personalization, resulting in inconsistent overall care quality and potentially compromising therapeutic outcomes.

Loghmani et al (2023) demonstrated that high-quality postoperative nursing care plays a pivotal role in the recovery of patients undergoing nasal deformity correction. Effective nursing care supports the surgical process, optimizes outcomes, prevents complications, promotes recovery, and ensures treatment effectiveness. In modern medical practice (Cardoso et al, 2021; Taghinezhad et al, 2022), nursing care has evolved from an auxiliary role to a specialized, comprehensive intervention that addresses physical and mental health needs. With advancements in medical technology and evolving patient expectations, nursing continues to explore new methods and theories to improve care quality and patient satisfaction.

Concept map thinking in nursing involves integrating complex information through visual representations, illustrating relationships between various health issues. This approach helps nurses clarify care priorities, develop effective nursing plans, and monitor patient progress throughout treatment (Eisenmann, 2021; Maryam et al, 2021). Kolcaba's Comfort Theory adopts a patient-centered approach, focusing on multiple dimensions of comfort, including physical, psychological, social, and spiritual aspects. It emphasizes comprehensive evaluation and personalized interventions to enhance the overall comfort and quality of life for patients (Lin et al, 2023). Based on these theories, our study applied concept map thinking and Kolcaba's comfort nursing to patients undergoing nasal deformity correction. The study aimed to evaluate the clinical value of this integrated nursing approach by observing and analyzing various clinical indicators, including psychological state and sleep quality, during the perioperative period. The findings from this research provide a theoretical foundation and practical guidance for enhancing clinical nursing practice in nasal deformity correction.

Methods

Research Subjects

The sample size was calculated using PASS software (version V23.02, NCSS LLC, situated in Logan, UT, USA) with a test power of 0.8 and a significance level of 0.05. The sample size for this study was determined using the following estimation method: $n = \frac{U^2_{1-\alpha/2} p0(1-p0)}{d^2}$. Using the estimation method, the required sample size (n) is determined based on the U statistic at a 95% confidence level, the significance level (α) set at 0.05, the relative error (d), and the expected proportion of the target population ($p0$). The sample size was estimated as 130 patients, and based on practical considerations, 92 cases were included in the study.

Between June 2022 and April 2023, 92 patients scheduled for nasal deformity correction surgery at the Seventh Affiliated Hospital of Sun Yat-sen University (Shenzhen) were selected as study participants. Using the random number table method, the patients were divided into: a conventional group and an experimental group, with 46 patients in each group. The study followed the principles outlined in the Declaration of Helsinki and was approved by the Ethics Committee of the Seventh Affiliated Hospital of Sun Yat-sen University (Shenzhen) under reference number KY-2022-104-01. Informed consent was obtained from all patients and their families. The trial was registered at the China Clinical Trial Registration Center with the registration number ChiCTR2300069829 (https://www.chictr.org.cn/showproj.html?proj=191278).

Inclusion and Exclusion Criteria

The inclusion criteria were: (1) Confirmation of abnormal nasal structure based on clinical symptoms, endoscopic findings, CT examination, and a significant impact on external nasal morphology and ventilation function, with patients opting for nasal deformity correction surgery. (2) Patients aging 18 years or older. (3) Patients with first-time recipients of nasal surgery. (4) Patients with a complete clinical history. The exclusion criteria included: (1) Patients with prior nasal deformity correction history. (2) Patients with presence of facial palsy or abnormal facial expression. (3) Patients with incomplete medical history. (4) Patients with neurological diseases associated with cognitive impairment, such as Parkinson's disease, vascular dementia, progressive supranuclear palsy, etc.

Research Methods

This study was a prospective, double-blind, randomized controlled trial designed to evaluate the clinical effects of nursing interventions on patients undergoing nasal deformity correction during the perioperative period. To ensure objectivity and accuracy, clinical data, including baseline information such as age and gender, and surgical and nursing-related variables, were collected by a designated individual who had no involvement in implementing the nursing interventions. The specific nursing procedures for both groups were as follows:

(1) In the conventional group, patients and their families were educated about the theoretical aspects of the disease, surgical procedures, preoperative precau-

tions, and key points to consider during surgery. Correct breathing techniques were taught, along with routine psychological counseling, to assist physicians in completing surgery-related tasks. Postoperatively, family members were advised to strictly adhere to the doctor's recommendations and maintain regular communication.

(2) In addition to the routine care, patients in the experimental group received an intervention combining concept map-based nursing with Kolcaba's comfort nursing. Prior to the intervention, the ward head nurse organized the establishment of a specialized intervention team. Team members used online resources to research relevant theoretical knowledge related to nasal deformity correction, concept map thinking, and Kolcaba's comfort nursing model. A concept map was developed through literature review, discussion, and analysis (Vendlinski and Kolcaba, 1997). Detailed information on the intervention is provided in Fig. 1 and Table 1.

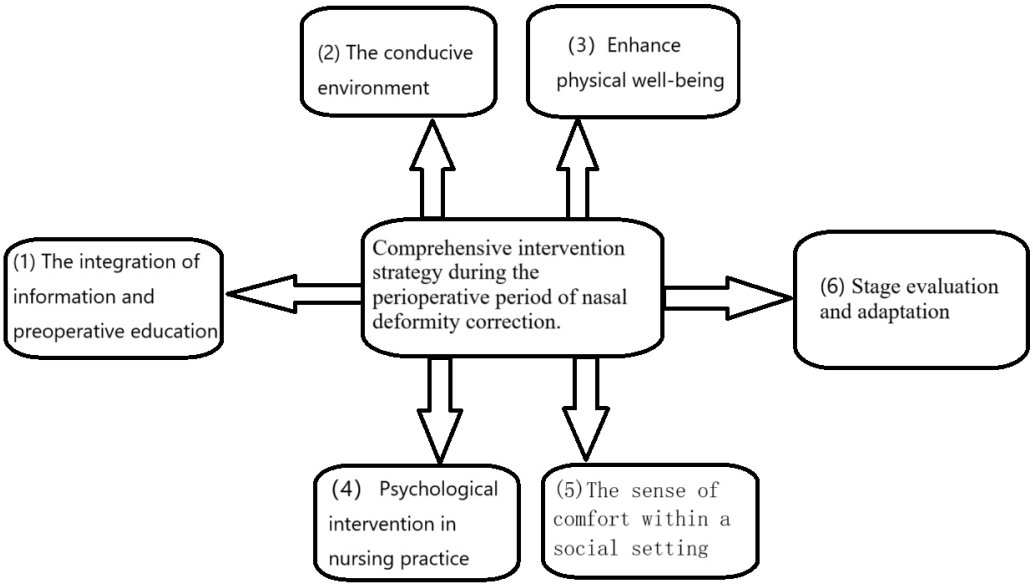

Fig. 1. Concept map analysis of the Kolcaba's comfort nursing model during the perioperative period for nasal deformity correction.

Data Collection

Comparison of Clinical Indicators

The duration of surgery, intraoperative blood loss, time to nasal breathing recovery, incidence of complications, and length of hospital stay were recorded for both groups.

Comparison of Psychological Well-Being

The psychological status of patients was assessed using the Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS) at admission, at 2 days, 1 month, and 3 months post-surgery. ① SAS (Dunstan and Scott, 2020): This 4-point ranges from 25 to 100 points, with scores below 50 indicating normal anxiety levels. Scores of 50–60 indicate mild anxiety, 61–70 moderate anxiety, and scores above 70 severe anxiety. Higher scores indicate more severe anxiety. The Cronbach's al-

Table 1. A Framework of Kolcaba's comfort care model.

Procedure	Specific content
(1) Integration of information and preoperative education	Upon hospital admission, the assigned nurse conducted patient examination, which included inquiry, assessment, and documentation. They comprehensively assessed the clinical condition of the patients, personality traits, educational background, and psychological state while recording disease awareness levels and specific needs of the patients. Tailored preoperative education was provided using multimedia (PPT presentations, animations) based on individual factors such as educational level and knowledge acquisition methods. Patients and their families were informed about the surgical procedure, anesthesia, perioperative precautions, and potential risks or outcomes. Additionally, patients were instructed on mouth-breathing techniques to facilitate post-surgical adaptations.
(2) Optimizing the environment	After admission, the nurses organized the wards to create a comfortable environment. The room temperature was maintained at 22 °C to 26 °C, and humidity at 45% and 65%. Soft lighting, warm-colored curtains, and decorative plants created an inviting ambiance. Regular cleaning ensured a tidy, hygienic environment. Soothing background music was played during the day to promote further calm, serene ambience conducive to patient relaxation.
(3) Enhancing physical well-being	Circuit nurses preoperatively visited patients and their families 24 hours before surgery to confirm details of the procedure, anesthesia, and patient preparation (e.g., fasting). Postoperative analgesia was provided based on individual needs, while physiological indicators were closely monitored. The bed head was elevated 15–30° to reduce discomfort, and cold compresses were applied to the nasal area. Nurses monitored bleeding and provided instructions on holding vitamin C lozenges to minimize bleeding-related complications. Individualized work-rest and dietary plans were tailored to patient preferences and nutritional needs, with family support encouraged to enhance recovery.
(4) Psychological interventions in nursing practice	Upon enrollment, nurses conducted psychological assessments to evaluate the mental status of each patient. Based on the results, personalized interventions were implemented to alleviate anxiety, panic, or tension. Family members were encouraged to engage with patients in a supportive manner. For individuals experiencing severe psychological distress, professional guidance was provided to address concerns and foster self-awareness, enabling patients to express their emotions and develop positive psychological states.
(5) Socia comfort	The head nurse employed a reverse teaching method (question-answer-question) to assess patients' comprehension of disease-related knowledge. Social support resources, such as emotional and information support, were discussed. Patients were encouraged to express their recovery needs and share experiences during patient meetings, fostering positive interpersonal relationships. Prior to discharge, family consultations were conducted to ensure effective reintegration into social life and to strengthen social support networks.
(6) Stage evaluation and adaptation	At each stage of recovery, a concept map was used to identify key factors impacting nasal function rehabilitation, allowing for targeted nursing interventions. Adjustments were made based on prior nursing assessments. Patients were advised to avoid excessive mouth movement and refrain from nose picking or blowing to prevent incision complications. Preventing measures for respiratory tract infections and maintaining warmth were emphasized to support optimal recovery and ensure high-quality nursing care.

pha coefficient for the SAS was 0.80, indicating high internal consistency reliability. Correlation coefficients between total and individual item scores ranged from 0.41 to 0.70. ② SDS (Dunstan and Scott, 2019): This 20-item scale uses a 4-point rating system, ranging from 25 to 100 points. Scores below 50 indicate no depression, 50–59 mild depression, 60–69 moderate depression, and scores above 70 severe depression. Higher scores indicate more severe levels of depression. The Cronbach's alpha coefficient for the SDS was 0.81, indicating high internal consistency reliability, with item-total correlations ranging from 0.43 to 0.72.

Comparison of Sleep Quality

The Pittsburgh Sleep Quality Index (PSQI) was utilized to assess sleep quality at admission, 2 days, 1 month, and 3 months post-surgery. The PSQI measures seven components: overall sleep quality, sleep onset latency, total sleep time, sleep efficiency, sleep disturbances, use of hypnotic drugs, and daytime dysfunction. Each component is scored from 0 to 3, with a total possible score of 21 (Buysse et al, 1989). Higher scores indicate poorer sleep quality. The Cronbach's alpha coefficient was 0.85, demonstrating high internal consistency reliability. Additionally, the correlation coefficients between the total score and individual items ranged from 0.49 to 0.78, indicating moderate to strong item-total correlations.

Comparison of Nasal Function Recovery

The Rhinoplasty Outcome Evaluation (ROE) was used to assess satisfaction with nasal appearance, social confidence, self-esteem, and the desire for further improvement at admission, 2 days, 1 month, and 3 months post-surgery. The ROE consists of six items, each rated from 0 (extremely dissatisfied) to 4 (extremely satisfied). The total ROE score was calculated using the following formula: ROE score = (sum scores of six items)/24 $\times$ 100, with scores ranging from 0 to 100. A score of 0–30 indicates extremely poor satisfaction, 31–50 dissatisfaction, 51–70 average satisfaction, 71–90 good satisfaction, and 91–100 excellent satisfaction (Izu et al, 2012). Higher scores correspond to better surgical outcomes. The Cronbach's alpha coefficient for the ROE was 0.82, indicating high internal consistency reliability and item-total correlations ranged from 0.45 to 0.71.

Comparison of Comfort Levels

The General Comfort Questionnaire (GCQ) was utilized to assess comfort across psychological, physical, spiritual, socio-cultural, and environmental dimensions. The 28-item uses a Likert scale ranging from 1 to 4, with higher scores indicating greater comfort (Zhu et al, 2006). The GCQ had a Cronbach's alpha coefficient of 0.86, indicating high internal consistency reliability and item-total correlation ranged from 0.39 to 0.75.

Statistical Analysis

All statistical processing and analysis were conducted using SPSS version 26.0 (IBM Corporation, situated in Armonk, NY, USA). The Kolmogorov-Smirnov test was used to assess normality. For normally distributed data, descriptive statistics were reported as mean $\pm$ SD, and group comparisons were made using independent

sample *t*-tests. Categorical data were presented as [*n* (%)], with comparisons between groups made using chi-square (χ^2) tests. Repeated measures were analyzed using analysis of variance (ANOVA) with Greenhouse-Geisser correction for violations of the sphericity assumption ($p < 0.05$). A *p*-value < 0.05 was considered statistically.

Results

General Information

No significant differences were observed between the two groups in terms of gender distribution, average age, disease duration, or number of complications ($p > 0.05$) (Table 2).

Comparison of Clinical Indicators between Groups

The experimental group exhibited significantly shorter operation time ($p < 0.001$), nasal breathing recovery time ($p = 0.002$), and hospitalization stay duration ($p < 0.001$) compared to the conventional group. Additionally, intraoperative blood loss ($p < 0.001$) and complication rates ($p = 0.013$) were lower in the experimental group. Detailed results are provided in Table 3.

Comparison of Psychological Well-Being between Groups

Repeated measures ANOVA revealed a significant group effect on SAS and SDS scores ($p < 0.001$). Additionally, there was a significant time-effect on both SAS and SDS scores ($p < 0.001$), with scores decreasing in both groups over time following surgery ($p < 0.05$). The experimental group exhibited significantly lower SAS and SDS scores at 2 days, 1 month, and 3 months post-surgery compared to the conventional group ($p < 0.05$) (Table 4).

Sleep Quality Comparison between Groups

Repeated measures ANOVA revealed a significant group effect on PSQI scores ($p < 0.001$), along with a significant time effect ($p < 0.001$). Sleep quality, as reflected by PSQI scores, improved over time in both groups after surgery ($p < 0.05$). Notably, the experimental group had significantly lower PSQI scores at 2 days, 1 month, and 3 months post-surgery compared to the conventional group ($p < 0.05$). For detailed information and visual representation, refer to Table 5.

Nasal Function Recovery Comparison between Groups

Repeated measures ANOVA revealed a significant group effect on ROE scores ($p < 0.001$), as well as a significant time effect ($p < 0.001$). Both groups exhibited improvements in ROE scores over time post-surgery ($p < 0.05$). However, the experimental group had significantly higher ROE scores at 2 days, 1 month, and 3 months post-surgery compared to the conventional group ($p < 0.05$) (Table 6).

Comparison of Kolcaba Comfort Scores between Groups

The repeated measures analysis of variance (ANOVA) revealed a significant group effect on GCQ scores ($p < 0.001$). Additionally, a significant time effect

Table 2. General information (mean ± SD), *n* (%).

Characteristic/Group	Sex		Age (years)	Course of disease (years)	Number of comorbidities	
	Male	Female			≤2	>2
Conventional group ($n = 46$)	37 (80.43)	9 (19.57)	32.22 ± 8.85	7.15 ± 1.22	18 (39.13)	28 (60.87)
Experimental group ($n = 46$)	33 (71.74)	13 (28.26)	33.78 ± 9.23	7.38 ± 1.31	14 (30.43)	32 (69.57)
t/χ^2 value	0.956		0.827	0.871	0.767	
p-value	0.328		0.410	0.386	0.381	

Table 3. Comparison of clinical indicators between the two groups.

Characteristic/Group	Duration of surgery (min)	Intraoperative blood loss (mL)	Nasal breathing recovery time (days)	Complication rate, n (%)	Hospitalization stay duration (days)
Conventional group ($n = 46$)	45.10 ± 6.65	7.63 ± 2.13	4.78 ± 0.65	10 (21.74)	4.96 ± 0.57
Experimental group ($n = 46$)	36.89 ± 5.44	6.37 ± 0.98	4.36 ± 0.58	2 (4.35)	4.48 ± 0.52
t/χ^2 value	6.481	3.645	3.270	6.133	4.219
p-value	<0.001	<0.001	0.002	0.013	<0.001

Table 4. Comparison of psychological well-being between the two groups (mean ± SD).

Characteristic/Group	Time of observation	Conventional group (n = 46)	Experimental group (n = 46)	F_{time}/p-value	$F_{interclass}$/p-value	$F_{interaction}$/p-value
SAS (score)	On admission	68.70 ± 6.52	68.85 ± 7.09	2103.362/<0.001	612.651/<0.001	364.525/<0.001
	2 days after surgery	56.33 ± 5.16^{b}	50.18 ± 5.25^{ab}			
	1 month after surgery	31.28 ± 4.80^{bc}	26.15 ± 5.59^{abc}			
	3 months after surgery	23.15 ± 4.21^{bcd}	17.17 ± 3.83^{abcd}			
SDS (score)	On admission	49.35 ± 6.61	47.61 ± 6.89	2635.362/<0.001	712.225/<0.001	415.347/<0.001
	2 days after surgery	40.37 ± 6.10^{b}	39.20 ± 5.22^{ab}			
	1 month after surgery	32.67 ± 4.42^{bc}	24.43 ± 5.02^{abc}			
	3 months after surgery	21.07 ± 3.19^{bcd}	16.24 ± 3.21^{abcd}			

Note: SAS, Self-Rating Anxiety Scale; SDS, Self-Rating Depression Scale; F_{time}, Effect of time; $F_{interclass}$, Inter-group effects; $F_{interaction}$, Interaction effects between groups and time; Compared with the conventional group, $^{a}p < 0.05$; Compared with admission, $^{b}p < 0.05$; Compared with 2 days after surgery, $^{c}p < 0.05$; Compared with 1 month after surgery, $^{d}p < 0.05$.

Table 5. Comparison of sleep quality changes between the two groups (mean ± SD).

Characteristic/Group	Time of observation	Conventional group (n = 46)	Experimental group (n = 46)	F_{time}/p-value	$F_{interclass}$/p-value	$F_{interaction}$/p-value
PSQI (score)	On admission	18.41 ± 1.51	18.83 ± 1.63	2363.475/<0.001	591.020/<0.001	237.195/<0.001
	2 days after surgery	17.37 ± 1.28^{b}	16.09±1.31^{ab}			
	1 month after surgery	13.20 ± 1.30^{bc}	11.43 ± 1.26^{abc}			
	3 months after surgery	10.85 ± 1.07^{bcd}	9.22 ± 1.07^{abcd}			

Note: PSQI, Pittsburgh Sleep Quality Index; F_{time}, Effect of time; $F_{interclass}$, Inter-group effects; $F_{interaction}$, Interaction effects between groups and time; Compared with the conventional group, $^{a}p < 0.05$; Compared with admission, $^{b}p < 0.05$, Compared with 2 days after surgery, $^{c}p < 0.05$; Compared with 1 month after surgery, $^{d}p < 0.05$.

Table 6. Comparison of nasal function recovery between the two groups (mean ± SD).

Characteristic/Group	Time of observation	Conventional group ($n = 46$)	Experimental group ($n = 46$)	F_{time}/p-value	$F_{interclass}/p$-value	$F_{interaction}/p$-value
ROE (score)	On admission	40.17 ± 3.32	40.04 ± 3.41	3125.769/<0.001	812.356/<0.001	716.395/<0.001
	2 days after surgery	46.50 ± 4.75^{b}	50.33 ± 4.47^{ab}			
	1 month after surgery	66.37 ± 6.18^{bc}	70.24 ± 6.22^{abc}			
	3 months after surgery	79.76 ± 8.13^{bcd}	85.11 ± 7.76^{abcd}			

Note: ROE, Rhinoplasty Outcome Evaluation; F_{time}, Effect of time; $F_{interclass}$, Inter-group effects; $F_{interaction}$, Interaction effects between groups and time; Compared with the conventional group, $^{a}p < 0.05$; Compared with admission, $^{b}p < 0.05$; Compared with 2 days after surgery, $^{c}p < 0.05$; Compared with 1 month after surgery, $^{d}p < 0.05$.

Table 7. Comparison of Kolcaba's comfort score between the two groups (mean ± SD).

Characteristic/Group	Time of observation	Conventional group ($n = 46$)	Experimental group ($n = 46$)	F_{time}/p-value	$F_{interclass}/p$-value	$F_{interaction}/p$-value
GCQ (score)	On admission	24.41 ± 4.12	24.15 ± 4.34	2859.661/<0.001	812.355/<0.001	337.491/<0.001
	2 days after surgery	34.15 ± 4.07^{b}	37.39 ± 4.15^{ab}			
	1 month after surgery	41.65 ± 4.50^{bc}	45.26 ± 4.68^{abc}			
	3 months after surgery	56.30 ± 5.53^{bcd}	60.37 ± 5.09^{abcd}			

Note: GCQ, General Comfort Questionnaire; F_{time}, Effects of time; $F_{interclass}$, Inter-group effects; $F_{interaction}$, Interaction effects between groups and time; Compared with the conventional group, $^{a}p < 0.05$; Compared with admission, $^{b}p < 0.05$; Compared with 2 days after surgery, $^{c}p < 0.05$; Compared with 1 month after surgery, $^{d}p < 0.05$.

was observed on GCQ scores ($p < 0.001$), indicating that comfort levels improved over time in both groups following surgery ($p < 0.05$). The experimental group consistently demonstrated higher GCQ scores compared to the conventional group at 2 days, 1 month, and 3 months post-surgery ($p < 0.05$) (Table 7).

Discussion

Nasal deformity correction is a plastic surgery procedure aimed at addressing abnormal nasal morphology and nasal cavity structure. This surgery repairs congenital defects and deformities and significantly improves nasal ventilation function, yielding significant clinical benefits (Cho et al, 2021; Ryu et al, 2022). However, due to the invasive nature of the surgery, it inevitably damages nasal microvessels and surrounding tissues, leading to postoperative complications such as facial pain, swelling, and discomfort. These effects, along with the unique anatomical position of the nose, can exacerbate physical and psychological discomfort, negatively impacting the sleep quality and recovery of patients. Anxiety, fear, and other psychological stressors are also common, potentially affecting compliance and overall treatment efficacy (Jafarov et al, 2023; Kimura et al, 2022).

Numerous studies emphasize the importance of perioperative nursing interventions, notably for patients undergoing nasal correction surgery, because many patients lack sufficient knowledge about their condition and possess poor self-management abilities, high-quality nursing care during the perioperative period to ensure optimal postoperative recovery is necessary (Caimi et al, 2024; García-Paz et al, 2022; Wang et al, 2024). In this study, we analyzed clinical data from 92 patients undergoing nasal deformity correction, significant improvements were observed in key indicators such as SAS scores, SDS scores, PSQI scores, ROE scores, and GCQ scores compared to admission. These improvements were more pronounced over time, further underscoring the essential role of comprehensive nursing interventions in the postoperative recovery of nasal deformity correction patients.

This study aimed to investigate the optimal perioperative nursing approach for patients undergoing nasal deformity correction. To achieve this, a combination of concept map thinking nursing and Kolcaba's comfort nursing model was implemented during the perioperative period. The results revealed that the experimental group had significantly shorter surgery times, faster nasal breathing recovery, and reduced hospitalization duration compared to the conventional group. Additionally, the experimental group experienced lower intraoperative bleeding and fewer complications. These findings suggest that integrating concept map thinking nursing with Kolcaba's comfort nursing reduces intraoperative trauma and promotes faster postoperative recovery.

In addition, at 2 days, 1 month, and 3 months post-surgery, the experimental group demonstrated significantly lower SAS, SDS, and PSQI scores and higher GCQ and ROE scores compared to the conventional group. These findings indicate that these two nursing approaches enhance psychological well-being, sleep quality, nasal function recovery, and overall comfort during recovery. The contributing factors to these outcomes are as follows: (1) Kolcaba's comfort nursing

is a comprehensive, personalized, and goal-oriented nursing model that integrates interventions addressing various domains of patient well-being, including physiological, psychological, social, spiritual, and environmental aspects. Preoperative patient assessments are conducted to gather a thorough understanding of the condition of the patient, enabling the implementation of individualized care plans. Effective communication strategies promote active patient participation and cooperation with the nursing plan (Chaica, 2024; Pazarcikci and Efe, 2023). Creating a calm and comfortable environment for patients significantly reduces anxiety, enhances pain tolerance, and improves sleep quality. Postoperative interventions, such as managing facial swelling and pain, help alleviate negative emotions and enhance physiological comfort. Psychological interventions focus on identifying and mitigating adverse psychological states, motivating patients to take an active role in their recovery. A comprehensive understanding of the social context surrounding each patient allows for tailored care approaches, including involving supportive individuals in the life of the patient, which fosters self-confidence and subjective well-being. At each stage of rehabilitation, continuous evaluations are carried out, and necessary adjustments are made to ensure high-quality nursing care throughout the recovery process. Egger-Rainer et al (2022) conducted a quantitative exploratory analysis on 267 epilepsy patients in Austria and southern Germany, demonstrating that specialized comfort nursing interventions significantly reduced patient uncertainty, anxiety, and discomfort while improving overall treatment outcomes. (2) The theory of concept map thinking is grounded in education and psychology, providing a structured and hierarchical representation of divergent thinking. Concept mapping visually organizes the relationships between various factors and theoretical knowledge related to disease management by centralizing key themes. This approach facilitates a comprehensive understanding of nursing interventions, enabling healthcare providers to anticipate potential challenges and maintain high-quality care (Cardwell et al, 2021; Yarmohammadi et al, 2023). van der Ven et al (2021) applied the concept map model to Coronavirus Disease 2019 (COVID-19) research and community-based interventions, concluding that "concept mapping is an effective tool for rapidly assessing community vulnerability while promoting community participation". This supports the notion that concept mapping is beneficial for improving intervention strategies in nursing practice. (3) The combined application of these models enhances the overall critical thinking and problem-solving abilities of nurses, allowing them to identify and address emerging issues in patient care promptly. This reduces the incidence of adverse events and facilitates patient recovery. The integration of these models empowers nurses to provide more effective and comprehensive care, promoting faster rehabilitation and improved patient outcomes.

The decision to pursue this study stemmed from a deep understanding of the significance of postoperative care. The findings indicate that clinical nursing protocols should prioritize monitoring patient rest and activity levels during the perioperative period, managing postoperative facial swelling and pain, and maintaining cleanliness in the surgical area. These actions are crucial for ensuring a smooth postoperative recovery. Clinical practitioners should tailor interventions based on the

condition of individual patients, providing personalized and effective care throughout the recovery process. In addition, it is important to note that the advantage of this study lies in the utility of a concept map as an effective communication tool that addresses the full spectrum of physiological, psychological, social, and spiritual needs of patients. However, various limitations must be considered: (1) Nurses involved in this study require specialized training in concept map development and Kolcaba's comfort care, which demands additional time and resources. (2) Each patient has unique needs that may limit the standardization of concept maps and comfort care plans, potentially impacting the consistency of nursing care. (3) Evaluating the effectiveness of nursing interventions involves integrating various clinical indicators and patient feedback, making the evaluation process more complex. (4) Patients with lower educational levels may show less interest in participating in concept map production, potentially affecting the development and implementation of comprehensive nursing plans.

Conclusion

In summary, the integration of concept map thinking and Kolcaba's comfort nursing interventions for patients undergoing nasal deformity correction has demonstrated significant benefits. This combined approach effectively addresses psychological well-being, enhances sleep quality, promotes nasal function recovery, accelerates rehabilitation, and improves overall comfort during postoperative recovery. These findings suggest that the application of this combined nursing model has considerable value for clinical practice and holds great potential for broader implementation.

The strength of this study lies in the use of concept maps as an intuitive and efficient communication tool that enables a comprehensive assessment of the physiological, psychological, social, and spiritual needs of all patients. By providing targeted interventions based on these concept maps, nursing staff can improve overall patient comfort and enhance the quality of care. Through our clinical experience, we have observed that patients who undergo nasal deformity correction often experience stress and discomfort throughout the surgical process due to the complexity of the procedure. By utilizing concept maps, nurses can assist patients in better understanding the surgical process and expected outcomes, thereby reducing anxiety and fear. Additionally, the implementation of Kolcaba's comfort care allows for a more thorough evaluation and management of patient comfort needs during the perioperative period, including pain relief, emotional support, and educational guidance, ultimately improving patient satisfaction and quality of life.

Key Points

- Concept maps serve as an effective communication tool by encompassing the physiological, psychological, social, and spiritual needs of patients, helping nursing staff clearly define the direction and focus of nursing care. Kolcaba's Comfort Theory provides a comprehensive approach to addressing the physical, psychological, social, cultural, and environmental comfort needs of the patients.
- The integration of concept map and Kolcaba's comfort nursing model significantly improves the quality of nursing care compared to routine perioperative care for patients undergoing nasal deformity correction.
- The combined approach of concept mapping and comfort nursing reduces surgical trauma and facilitates faster postoperative recovery during the perioperative period.
- The integration also enhances psychological outcomes (reducing anxiety and depression), improves sleep quality, and increases comfort levels, contributing to better patient nasal function recovery.

Availability of Data and Materials

All data included in this study are available upon request by contact with the corresponding authors.

Author Contributions

YD: Writing- review & editing, Writing - original draft, Supervision, Project administration, Data curation, Conceptualization. YT: Participate in the development of intervention program. CG: Data analysis. YF: Quality assurance, project management. JG: Project guidance, data analysis. YW: Research planning, implementation of intervention measures, quality control, Supervision. All authors have been involved in revising the manuscript critically for important intellectual content. All authors have given final approval for the version to be published. All authors have agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethics Approval and Consent to Participate

The study followed the principles outlined in the Declaration of Helsinki and was approved by the Ethics Committee of the Seventh Affiliated Hospital of Sun Yat-sen University (Shenzhen) under reference number KY-2022-104-01. Informed consent was obtained from all patients and their families.

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Conflict of Interest

The authors declare that no conflicts of interest exist.

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