

Original Article

Clinical and psychosocial variables influencing preoperative anxiety in patients undergoing sinus surgery

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Abstract: Objective: To explore the association between preoperative anxiety and nasal-specific symptoms in patients undergoing sinus surgery. Methods: A retrospective review was conducted on 150 patients who underwent routine sinus surgery between January 2022 and June 2025. All participants completed the Self-Rating Anxiety Scale (SAS), the 22-Item Sino-Nasal Outcome Test (SNOT-22), and the Family Adaptation, Partnership, Growth, Affection, and Resolve (APGAR) Index. Feature selection was performed using LASSO regression, followed by multivariate logistic regression to identify independent predictors of preoperative anxiety. A predictive nomogram was constructed and internally validated using the Bootstrap method. The model's performance was evaluated using ROC curves, calibration curves, and decision curve analysis (DCA). Results: Patients in the anxiety group had significantly higher mean ages, Lund-Mackay scores, and SNOT-22 total scores, but lower monthly household income per capita and APGAR scores compared to the non-anxiety group. LASSO regression identified age, endotracheal intubation, Lund-Mackay score, monthly household income, SNOT-22, and APGAR as candidate predictors. Multivariate logistic regression confirmed that age, Lund-Mackay score, monthly household income, SNOT-22 and APGAR were independent predictors of preoperative anxiety. The nomogram showed good discrimination, calibration, and clinical utility. Correlation analysis revealed that the SAS score was positively correlated with the SNOT-22 score and negatively correlated with the APGAR score. Conclusions: More severe nasal-specific symptoms and lower family support were associated with a higher risk of preoperative anxiety in patients undergoing sinus surgery. Age, Lund-Mackay score, monthly household income, SNOT-22, and APGAR were independent predictors, providing a reference for individualized anxiety intervention in clinical practice.

Keywords: Sinusitis, endoscopic sinus surgery, anxiety, nasal-specific symptoms

Introduction

Rhinosinusitis is a global health concern with complex and heterogeneous epidemiologic patterns and shows significant variation across regions and populations [1]. Studies have shown that the prevalence of chronic rhinosinusitis (CRS) varies significantly: the global average prevalence is 8.7%, while the overall prevalence in China is approximately 10%. The prevalence in urban areas is 4.8%, while it is as high as 7.0% in rural areas [2, 3]. From a pathophysiologic perspective, acute rhinosinusitis is caused by catarrhal or purulent inflammation of the sinus mucosa. In contrast, CRS is a heterogeneous condition defined as persistent inflam-

mation of the nasal cavity and sinus mucosa for more than 12 weeks. Common symptoms of both types include nasal obstruction, purulent nasal discharge, headache, and decreased sense of smell [4, 5]. In addition to local symptoms, rhinosinusitis can lead to distant non-suppurative or purulent lesions, affecting adjacent tissues and organs, and thus inducing serious complications. This disease not only harms the physical and mental health of patients, but also imposes a heavy socioeconomic burden on them [6]. Consequently, while drug treatment can alleviate symptoms to some extent, the long-term management of the disease still faces many challenges due to side effects and long-term drug efficacy decay [7].

Since its advent, endoscopic sinus surgery (ESS) has become the core surgical management for refractory rhinosinusitis. This surgery significantly improves the quality of life of patients while preserving normal mucosa by precisely removing diseased tissue and restoring the anatomic structure and physiologic function of the nasal cavity and sinuses [8]. However, ESS is an invasive procedure that inevitably causes physiological stress in the body, often manifesting as significant preoperative anxiety [9]. Chen et al. [10] found that the prevalence of anxiety disorder in sinusitis patients was as high as 28.9%, significantly higher than that of the general population. Lamb et al. [11] believed that elevated preoperative anxiety levels can lead to excessive sympathetic nerve excitation, causing anesthesia induction and intraoperative hemodynamic instability, thereby increasing the difficulty of surgical operation, postoperative pain, and the risk of delirium, which is not conducive to postoperative recovery. Furthermore, the core symptoms that force patients to undergo surgery—chronic nasal obstruction, purulent nasal discharge, and facial swelling and pain—can form a vicious cycle. These symptoms can disrupt sleep structure and may also cause nocturnal hypoxemia, which in turn increases morning cortisol levels. This physiologic mechanism activates the hypothalamic-pituitary-adrenal (HPA) axis, exacerbating anxiety and keeping the body in a state of maladaptive physiological hyperarousal for a long time [12]. In recent years, clinical attention to the psychological state of patients during the perioperative period has increased significantly, but there remains a lack of integrated research that combines the objective severity of the disease, the patient's subjective symptom experience, and the family support system. At the same time, there is a lack of preoperative anxiety prediction tools that combine objective nasal cavity assessment scores with family functional status, making it difficult to screen high-risk groups accurately and implement targeted intervention. Given the heavy burden of preoperative anxiety in patients undergoing sinus surgery, this study aims to assess the current status of preoperative anxiety, clarify its key influencing factors, and focus on exploring the association between the severity of nasal symptoms and preoperative anxiety. The results can provide a basis for developing individualized perioperative intervention programs, reducing anxiety-related risks, thereby improv-

ing surgical efficacy, promoting postoperative recovery, and improving the quality of life of patients.

Materials and methods

Study population

This study was a retrospective study, analyzing the clinical data of 150 patients who underwent sinus surgery at the Fourth Affiliated Hospital of Anhui Medical University between January 2022 and June 2025. Inclusion criteria: diagnosis meeting the clinical diagnostic criteria for rhinosinusitis [13]; first surgical treatment; age ≥ 18 years; stable condition and normal cognitive function before surgery; able to communicate normally; and complete medical records. Exclusion criteria: comorbid mental illness or other psychological disorders; comorbid other nasal diseases; severe dysfunction of major organs; visual or auditory impairment; malignant tumors; and comorbid immune system diseases. This study was approved by the Ethics Committee of the Fourth Affiliated Hospital of Anhui Medical University (Approval No.: KYXM-202512-021).

Research tools and data collection

The collected research variables encompassed sex, age, body mass index (BMI), diagnosis type, presence of nasal polyps, pain status at admission, endotracheal intubation status, disease awareness, Lund-Mackay score, education level, sleep status, and average monthly household income per capita. The anxiety level of patients was assessed using the Self-Rating Anxiety Scale (SAS) [14]. The scale has 20 items covering symptoms such as sweating, facial flushing, numbness in the hands and feet, dyspnea, and palpitations. Each item is scored from 1 to 4. The scores of all items are added together to obtain the raw score. The raw score is multiplied by 1.25 and the integer part is taken as the standard score. The higher the standard score, the more severe the preoperative anxiety. The standard score < 50 indicates no anxiety, 50-59 indicates mild anxiety, 60-69 indicates moderate anxiety, and ≥ 70 indicates severe anxiety. The Cronbach's α coefficient of the Chinese version of the scale is 0.78 [15]. In this study, 50 points was used as the cutoff value to divide all patients into a non-anxiety group ($n=42$) and an anxiety group ($n=108$).

Table 1. Scores of SAS, SNOT-22, and APGAR scales in patients undergoing sinus surgery ($n=150$)

Scale	Score (Mean \pm SD)
SAS	51.30 \pm 14.08
SNOT-22	68.03 \pm 1.79
APGAR	5.68 \pm 1.33

Note: SD, Standard Deviation; SAS, Self-Rating Anxiety Scale; SNOT-22, the 22-Item Sino-Nasal Outcome Test; APGAR, Family APGAR Index.

The 22-Item Sino-Nasal Outcome Test (SNOT-22) was used to assess nasal-specific symptoms. The scale includes five dimensions: nasal symptoms, ear and facial symptoms, sleep, cough, and mood, with a total of 22 items [16]. It uses a 6-point rating system: 0 points for no distress, 1 point for mild distress, 2 points for mild distress, 3 points for moderate distress, 4 points for severe distress, and 5 points for very severe distress. The higher the score, the more severe the symptoms. The Cronbach's α coefficient of the Chinese version of the scale is 0.923 [17].

The Family Adaptation, Partnership, Growth, Affection, and Resolve (APGAR) Index [18] was used. The scale has 5 items and evaluates the family from 5 dimensions: adaptability, cooperation, growth, emotionality, and intimacy. A 3-point Likert rating system was used (0 points = almost never, 1 point = sometimes, 2 points = often), with a maximum score of 10 points. The higher the score, the better the family functioning. The Cronbach's α coefficient of the scale is 0.78 [19].

All members of the research team possessed extensive experience in collecting questionnaire data and received specialized training before participating in this study to ensure that the survey operation was standardized. Data was entered by medical staff who had undergone rigorous training using electronic double entry to ensure the accuracy and completeness of data entry. To protect patient privacy, all data were anonymized, and personal information was strictly protected.

Statistical analysis

Statistical analyses were performed using SPSS version 28.0 (IBM Corp., Armonk, NY, USA). Counted data were expressed as n (%)

and chi-square tests were used for comparisons between groups; Fisher's exact test was used when the theoretical frequency of any cell was <5 . The Shapiro-Wilk test was used to analyze the normality of continuous variables; normally distributed measurement data were expressed as mean \pm standard deviation (SD) and independent samples t-tests or one-way ANOVA were used for comparisons between groups; non-normally distributed data were analyzed using nonparametric tests. Furthermore, LASSO regression was performed using R 4.4.0 software to screen for potential influencing factors of preoperative anxiety, and independent influencing factors were determined through multivariate logistic regression analysis. A nomogram predictive model was constructed based on risk factors and internally validated using the Bootstrap method (repeated sampling $B=1000$). The model's discriminative power was assessed using receiver operating characteristic (ROC) curves, its calibrability using calibration curves, and its clinical application value using decision curve analysis (DCA). A two-sided $P < 0.05$ was considered significant.

Results

Scores of SAS, SNOT-22, and APGAR scales in patients undergoing sinus surgery

As shown in **Table 1**, this study included 150 patients undergoing sinus surgery, with a mean SAS total score of 51.30 ± 14.08 . Based on the scoring results, 108 patients (72%) exhibited symptoms of anxiety. Regarding nasal-related quality of life, the SNOT-22 total score was 68.03 ± 1.79 points, while the patients' APGAR total score was 5.68 ± 1.33 points.

Comparison of baseline characteristics between the anxiety and non-anxiety groups

As shown in **Table 2**, intergroup comparisons revealed that patients in the anxiety group were significantly older than those in the non-anxiety group. The anxiety group also had a significantly lower proportion of patients requiring endotracheal intubation, a significantly higher proportion of patients with a poor understanding of their condition, a significantly higher Lund-Mackay score, and a significantly lower average monthly household income per capita (all $P < 0.05$). No significant differences were observed

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Table 2. Comparison of baseline characteristics between the non-anxiety and anxiety groups

Variable	Non-anxiety group (n=42)	Anxiety group (n=108)	χ^2/t	P
Sex, n (%)			0.021	0.884
Male	22 (52.38)	58 (53.70)		
Female	20 (47.62)	50 (46.30)		
Age (years)	45.50±15.40	51.31±15.69	2.047	0.043
BMI (kg/m ²)	23.70±3.38	24.23±3.64	0.816	0.416
Diagnosis, n (%)			0.074	0.941
Chronic rhinosinusitis	37 (88.10)	95 (87.96)		
Acute rhinosinusitis	3 (7.14)	5 (4.63)		
Fungal sinusitis	2 (4.76)	8 (7.41)		
Presence of nasal polyps, n (%)			0.303	0.484
Yes	0 (0.00)	4 (3.70)		
No	42 (100.00)	104 (96.30)		
Pain on admission, n (%)			3.764	0.052
No pain	29 (69.05)	90 (83.33)		
With pain	13 (30.95)	18 (16.67)		
Tracheal intubation, n (%)	35 (83.33)	57 (52.78)	11.905	0.001
Understanding of disease, n (%)			4.679	0.031
Good	37 (88.10)	77 (71.30)		
Poor	5 (11.90)	31 (28.70)		
Lund-Mackay score	6.40±2.16	8.55±2.51	4.889	<0.001
Education level, n (%)			0.038	0.845
High school or below	31 (73.81)	78 (72.22)		
College or above	11 (26.19)	30 (27.78)		
Sleep condition, n (%)			0.157	0.692
Normal	41 (97.62)	102 (94.44)		
Easily awakened/insomnia	1 (2.38)	6 (5.56)		
Average monthly household income (CNY)	3847.10±369.36	3561.57±250.32	5.447	<0.001

Note: BMI, body mass index; CNY, Chinese Yuan.

Table 3. Comparison of SNOT-22 and APGAR scores between the non-anxiety and anxiety groups

Variable	Non-anxiety group (n=42)	Anxiety group (n=108)	t	P
SNOT-22	66.90±1.10	68.47±1.82	5.225	<0.001
APGAR	6.29±1.64	5.44±1.11	2.655	0.001

Note: SNOT-22, the 22-Item Sino-Nasal Outcome Test; APGAR, Family APGAR Index.

between the two groups in terms of gender, BMI, disease diagnosis type, presence of nasal polyps, pain status upon admission, educational attainment, or sleep status.

Comparison of SNOT-22 and APGAR scores between the anxiety and non-anxiety groups

Intergroup comparisons revealed that patients in the anxiety group exhibited significantly higher SNOT-22 scores than those of the non-anxiety group (P<0.05). In contrast, their APGAR

total scores were significantly lower (P<0.05). Detailed data are presented in **Table 3**.

Univariate logistic regression analysis of factors associated with preoperative anxiety

Univariate logistic regression identified seven factors significantly associated with preoperative anxiety. Older age, poor understanding of the disease, higher Lund-Mackay score, and higher SNOT-22 total score were associated with an increased risk of preoperative anxiety.

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Table 4. Univariate logistic regression analysis of factors influencing preoperative anxiety in patients undergoing sinus surgery

Variable	β	SE	Wald χ^2	P	OR (95% CI)
Sex	0.053	0.364	0.146	0.884	1.055 (0.516-2.153)
Age	0.024	0.012	2.023	0.043	1.024 (1.001-1.048)
BMI	0.043	0.052	0.816	0.414	1.044 (0.942-1.157)
Diagnosis	-0.432	0.756	-0.572	0.567	0.649 (0.148-2.854)
Presence of nasal polyps	5.659	1.772	0.013	0.990	1.858 (0.154-4.521)
Pain on admission	-0.807	0.422	-1.919	0.056	0.446 (0.195-1.020)
Tracheal intubation	-1.681	0.481	-3.492	<0.001	0.186 (0.073-0.478)
Understanding of disease	1.092	0.522	2.092	0.036	2.979 (1.071-8.248)
Lund-Mackay score	0.395	0.094	4.248	<0.001	1.488 (1.239-1.788)
Education level	0.327	0.425	0.771	0.441	1.387 (0.604-3.188)
Sleep condition	0.880	1.096	0.803	0.422	2.412 (0.282-20.659)
Average monthly household income	-0.003	0.001	-4.466	<0.001	0.997 (0.995-0.998)
SNOT-22	0.558	0.125	4.451	<0.001	1.747 (1.367-2.234)
APGAR	-0.541	0.162	-3.333	<0.001	0.582 (0.424-0.800)

Note: OR, Odds Ratio; CI, Confidence Interval; BMI, body mass index; SNOT-22, the 22-Item Sino-Nasal Outcome Test; APGAR, Family APGAR Index.

Table 5. Multivariate logistic regression analysis of factors influencing preoperative anxiety in patients undergoing sinus surgery

Variable	β	SE	Wald χ^2	P	OR (95% CI)
Age	0.036	0.017	4.588	0.032	1.037 (1.003-1.071)
Tracheal intubation	-1.292	0.672	3.695	0.055	0.275 (0.074-1.026)
Lund-Mackay score	0.321	0.120	7.179	0.007	1.379 (1.090-1.744)
Average monthly household income	-0.005	0.001	13.837	<0.001	0.995 (0.993-0.998)
SNOT-22	0.563	0.166	11.475	<0.001	1.755 (1.268-2.430)
APGAR	-0.594	0.212	7.850	0.005	0.552 (0.364-0.837)
Constant	13.522	4.661	8.417	0.004	-

Note: OR, Odds Ratio; CI, Confidence Interval; SNOT-22, the 22-Item Sino-Nasal Outcome Test, APGAR, Family APGAR Index.

In contrast, endotracheal intubation, higher household income, and higher APGAR score were associated with a reduced risk (all $P < 0.05$). Detailed results are presented in **Table 4**.

LASSO regression for variable selection

LASSO regression analysis was performed to screen and reduce the dimensionality of the relevant variables (**Table 5**). The optimal LASSO coefficient λ was selected using 10-fold cross-validation. The results identified age, endotracheal intubation, Lund-Mackay score, monthly household income per capita, SNOT-22, and APGAR total score as predictors of preoperative anxiety in patients undergoing sinus surgery. The standardized LASSO regression

model was expressed as follows: $y = 5.735 + 0.004 \times \text{age} - 0.430 \times \text{endotracheal intubation} + 0.165 \times \text{Lund-Mackay score} - 0.002 \times \text{monthly household income per capita} + 0.280 \times \text{SNOT-22 total score} - 0.224 \times \text{APGAR total score}$ (**Figure 1**).

Multivariate logistic regression analysis of factors influencing preoperative anxiety

To determine the independent predictors of preoperative anxiety, multivariate logistic regression analysis was performed. The outcome variable was preoperative anxiety status (0 = non-anxiety, 1 = anxiety), and the covariates were the predictors selected by LASSO regression. As shown in **Table 5**, age, Lund-Mackay score, monthly household income per capita,

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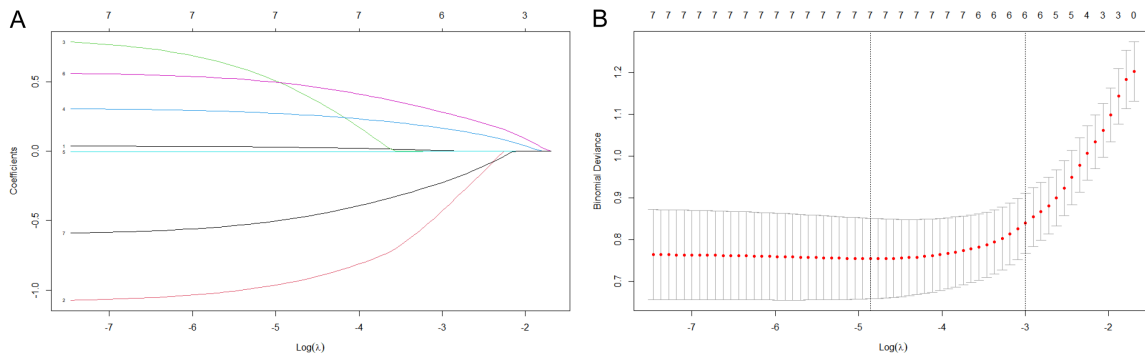


Figure 1. Least absolute shrinkage and selection operator (LASSO) for variable selection.

SNOT-22 total score, and APGAR total score were identified as independent predictors of preoperative anxiety (all $P < 0.05$).

Predictive model and performance for preoperative anxiety in patients undergoing sinus surgery

A nomogram prediction model was constructed based on the results of logistic regression analysis (**Figure 2A**) to quantify the risk factors for preoperative anxiety. The predictive performance of the model was assessed using an ROC curve. Internal validation was performed using the Bootstrap method ($B = 1000$). The model achieved an AUC of 0.892 in the training set and 0.820 in the validation set (**Figure 2B**).

Calibration of the regression model and decision curve analysis

The DCA for the training and validation cohorts demonstrated that the model curve lay above both the “all” and “none” curves, indicating high clinical utility across a broad range of risk thresholds (**Figure 2C**). The calibration curves for the training and validation sets showed that the model’s predicted probability closely aligned with the actual incidence of preoperative anxiety in patients undergoing sinus surgery, as the curves substantially coincided with the ideal calibration line, accurately reflecting the risk of preoperative anxiety (**Figure 2D**).

Correlation between SAS and SNOT-22/APGAR scores

Scatter plots and linear correlation analysis revealed significant correlations between preoperative anxiety levels and both sinonasal symptom severity (SNOT-22) and family support (APGAR) (all $P < 0.05$, **Figure 3**).

Discussion

In recent years, with the continuous advancement of modern medicine, clinical care has evolved from focusing merely on patients’ physical conditions to attaching greater importance to their psychological well-being [20]. Preoperative anxiety is the most common psychological disturbance among surgical candidates, and its intensity tends to rise as the operation approaches [21]. Epidemiologic data have shown that the global pooled prevalence of preoperative anxiety in surgical patients reaches 48% [22]. Consistently, the present study found that 72% of the 150 patients undergoing sinus surgery suffered from preoperative anxiety, indicating a considerably high prevalence in this population. Anxiety not only destabilizes patients’ emotional status but also adversely affects surgical performance and postoperative recovery, further undermining overall perioperative outcomes [23, 24]. Accordingly, identifying the level and influencing factors of preoperative anxiety and formulating targeted interventions is crucial for optimizing perioperative management, ensuring surgical safety, and improving patients’ quality of life.

The present study demonstrated that age was an independent influencing factor for preoperative anxiety in patients undergoing sinus surgery. Sinus surgery primarily involves nasal mucosal repair, and cellular regenerative capacity gradually declines with aging. As a result, elderly patients tend to exhibit slower postoperative healing and prolonged recovery courses, which trigger anxiety driven by concerns over uncertain prognostic outcomes [25, 26]. Furthermore, most participants in this study were diagnosed with chronic sinusitis, a disease characterized by a high recurrence rate that may fur-

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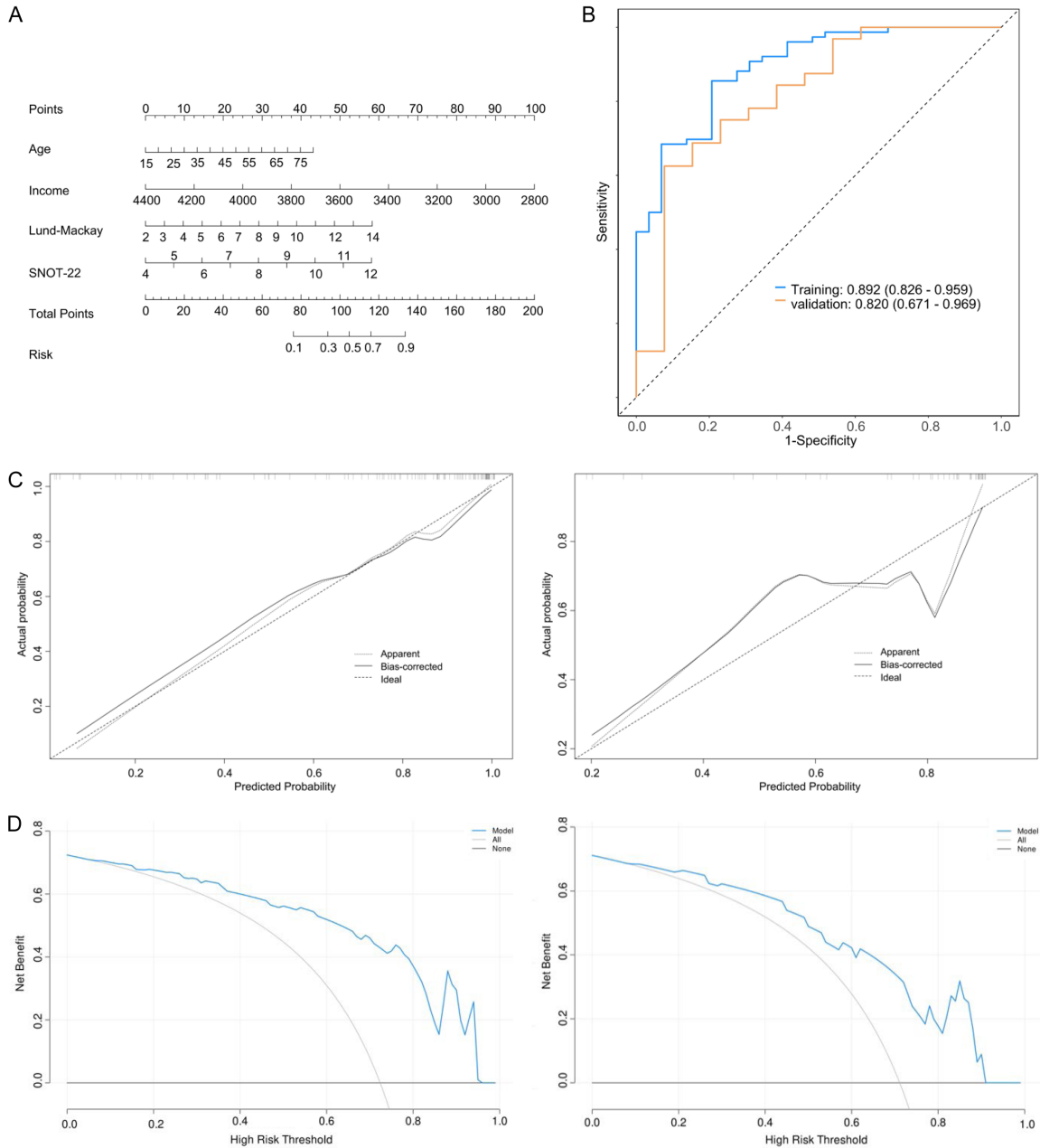


Figure 2. Predictive model and performance for anticipatory anxiety in patients undergoing sinus surgery. A. Nomogram prediction model for preoperative anxiety in patients undergoing sinus surgery. B. ROC curve for preoperative anxiety in patients undergoing sinus surgery. C. Clinical decision curve analysis for training and validation sets (The left side is the training set, and the right side is the validation set). D. Calibration curves for training and validation sets (The left side is the training set, and the right side is the validation set).

ther aggravate anxious emotions. Yang et al. [27] reported that age-related declines in organ function lead patients to overestimate surgical risks and generate greater uncertainty about the procedure. This phenomenon is particularly prominent in middle-aged and elderly individuals, who are more concerned about surgical success and the adverse effects of postopera-

tive complications on rehabilitation, ultimately presenting significantly higher anxiety levels.

Our results revealed that a high Lund-Mackay score was an independent risk factor for preoperative anxiety in patients undergoing sinus surgery. As a quantitative radiologic index for evaluating the severity of sinus lesions, an ele-

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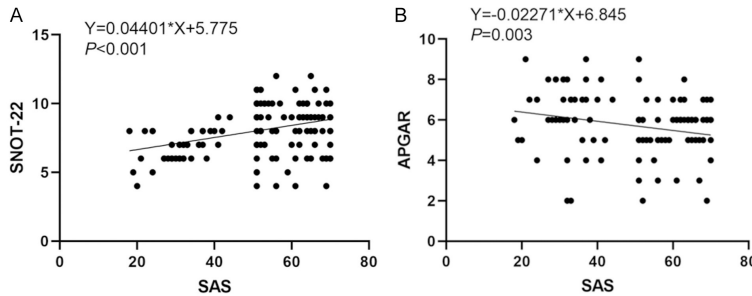


Figure 3. Correlation between preoperative anxiety and nasal symptoms in patients undergoing sinus surgery. Note: (A) SNOT-22, the 22-Item Sino-Nasal Outcome Test; (B) APGAR, Family APGAR + Index.

ated Lund-Mackay score indicates more extensive pathological involvement and higher surgical complexity. Such conditions may cause patients to worry excessively about disease prognosis and consequently exacerbate their anxiety [28, 29]. Bai et al. [30] confirmed that higher Lund-Mackay scores are closely correlated with nasal polyp recurrence in patients with sinusitis. Accordingly, patients with elevated scores often fear unsatisfactory surgical efficacy, deterioration of symptoms, and potential recurrence that may necessitate revision surgery. Ranford et al. [31] also validated that a higher Lund-Mackay score reflects more severe disease status, which is prone to inducing uncomfortable physical sensations and further elevating the risk of preoperative anxiety.

Low per capita monthly household income was also identified as a risk factor for preoperative anxiety. Church et al. [32] proved that adequate financial support can effectively relieve psychological stress in patients. Chronic sinusitis is characterized by a prolonged disease course and high recurrence, requiring long-term standardized treatment and follow-up. Although medical insurance partially reduces the economic burden, patients with low household income often worry about unreimbursed medical expenses. Such financial concerns increase psychological pressure and further aggravate preoperative anxiety [33].

Correlation analysis showed that SAS scores were significantly correlated with SNOT-22 scores, and nasal-specific symptoms were closely associated with preoperative anxiety. Previous studies have indicated that nocturnal hypoxaemia caused by nasal congestion can lead to elevated cortisol levels upon waking [34]. Persistent hypercortisolemia induces hippocampal

neuronal damage, impairs emotional regulation ability, and facilitates the occurrence of anxiety. Furthermore, local pain and olfactory decline caused by purulent nasal secretion irritation enhance patients' perceived disease severity through somatization symptoms, thus forming a vicious psychological and physical cycle [35]. Conversely, anxiety can further aggravate nasal symptoms via autonomic nervous system dysfunction.

Zhan et al. [36] demonstrated that anxiety increases nasal mucosal vascular permeability and enhanced glandular hypersecretion, thereby worsening nasal congestion and rhinorrhea. Nasal obstruction also compromises nocturnal sleep quality, leading to daytime fatigue and inattention, which amplify patients' surgical worries and fears. Also, persistent purulent nasal discharge and headache cause persistent physical discomfort and interfere with daily life and work. Recurrent and fluctuating symptoms greatly impair quality of life and further intensify anxious mood. Phillips et al. [37] pointed out that the sleep and emotional domains of the SNOT-22 questionnaire were strongly correlated with anxiety and depression and can effectively predict affective symptoms. Feng et al. [38] found that preoperative negative emotions such as anxiety or depression hinder the postoperative improvement of nasal congestion, rhinorrhea and hyposmia in patients undergoing endoscopic sinus surgery, supporting the close association between nasal-specific symptoms and preoperative emotional status.

SAS scores were also significantly correlated with APGAR scores. Strong family support provides critical psychological encouragement and spiritual comfort for patients to cope with disease stress. Evidence has confirmed that adequate family support alleviates psychological distress through emotional comfort and practical life assistance during hospitalization and treatment [39, 40]. Ren et al. [41] also observed a close relationship between family care and anxiety levels, highlighting that sound family support helps maintain positive mental status and reduce anxiety vulnerability. Collectively, family support serves as an important psychosocial resource and is negatively correlated

with preoperative anxiety by providing emotional and practical support.

Several limitations of this study should be acknowledged. First, all participants were recruited from a single medical center, which may have resulted in selection bias and limit the generalizability of the findings. Second, this study only evaluated preoperative anxiety status without dynamically monitoring postoperative anxiety changes or exploring their long-term impacts on rehabilitation outcomes. Further long-term follow-up cohorts are required to conduct continuous postoperative observation and psychological evaluation.

Conclusion

This study found that 72% of patients undergoing sinus surgery experience preoperative anxiety. Age, Lund-Mackay score, monthly household income per capita, SNOT-22 total score, and APGAR total score were independent influencing factors of preoperative anxiety. In clinical practice, comprehensive preoperative psychological assessment and targeted personalized psychological interventions should be actively implemented to alleviate anxiety, optimize perioperative management, and improve outcomes.

Disclosure of conflict of interest

None.

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