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Factors predicting preoperative anxiety among adult patients undergoing cardiac surgery in China: A cross-sectional study

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Abstract

Background: Preoperative anxiety is a significant concern for patients undergoing surgery, as it can lead to adverse effects such as increased postoperative pain, delayed wound healing, prolonged hospital stays, higher incidences of postoperative complications, and even mortality. Preoperative anxiety is particularly common in patients undergoing cardiac surgery, but it is often overlooked and warrants further investigation.

Objective: This study aimed to explore preoperative anxiety and its predictors, including fear of surgery, preoperative sleep quality, perception of illness severity, and perceived social support among adult patients undergoing elective cardiac surgery.

Methods: A cross-sectional study was conducted with 142 adult patients undergoing elective cardiac surgery using simple random sampling. Data were collected from patients in the Class III Grade A general hospital in Wenzhou, China, between October 2023 and March 2024. Questionnaires were used to gather information about patients' demographic characteristics, fear of surgery, preoperative sleep quality, perception of illness severity, perceived social support, and preoperative anxiety. Descriptive statistics, Pearson correlation analysis, and multiple linear regression were employed for data analysis.

Results: The total score for preoperative anxiety was 15.98 ± 4.95. Fear of surgery, preoperative sleep quality, perception of illness severity, and perceived social support explained 37.3% of the variance in preoperative anxiety (*Adjusted* R^2 = 0.373, $F_{(4,142)}$ = 26.77, p <0.05). Fear of surgery was the strongest predictor (β = 0.539, p <0.001), followed by preoperative sleep quality (β = -0.166, p <0.05) and perceived social support (β = -0.138, p <0.05). Perception of illness severity was not a significant predictor of preoperative anxiety.

Conclusion: Preoperative anxiety in adult patients undergoing elective cardiac surgery is significantly influenced by factors such as fear of surgery, preoperative sleep quality, and perceived social support. Nurses can implement targeted interventions to reduce preoperative anxiety. These interventions may include addressing the fear of surgery through health education and psychological counseling. Furthermore, improving the hospital environment to promote a calm and quiet atmosphere can enhance sleep quality. Encouraging social support to help patients build confidence in the success of their surgery and their ability to recover is also recommended.

Keywords

China; adult; sleep quality; anxiety; fear; pain, postoperative; cardiac surgery; social support; cross-sectional study

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Background

Cardiac surgery has recently been recognized as an essential component of national health systems, with over 1 million cardiac patients undergoing surgical interventions worldwide each year (Vervoort et al., 2024). A state-of-the-art review on cardiac surgery in low- and middle-income countries highlighted that the number of cardiac surgeries in China has continuously increased for over a decade (Vervoort et al., 2021). While advancements in surgical techniques have greatly improved medical treatment and patient outcomes, surgery inherently involves trauma, which imposes both psychological and physical burdens on patients. Previous studies indicate that anxiety is the most common psychological response among patients awaiting surgery, with 25%–80% experiencing preoperative anxiety (Zemla et al., 2019). Due to the pathological nature of the heart, the trauma associated with cardiac surgery, and its uncertain prognosis, patients often experience heightened worry and nervousness (Sarhadi et al., 2024). Niknejad et al. (2019) identified anxiety as one of the primary preoperative challenges faced by patients undergoing cardiac surgery.

Preoperative anxiety refers to feelings of worry, nervousness, or restlessness about an uncertain outcome. It

negatively affects patients' comfort and overall health (Getahun et al., 2020). Research has shown that preoperative anxiety is the most distressing aspect of the perioperative period. It is associated with increased postoperative complications, higher mortality rates, and severe postoperative pain (Qaddumi et al., 2024). Furthermore, elevated preoperative anxiety can result in adverse physiological effects such as increased serum cortisol levels, elevated blood pressure and heart rate, delayed wound healing, and extended hospital stays (Kaur et al., 2023). Anxiety also impacts patients' cognitive and emotional states, hindering their ability to comprehend surgery-related information, which may lead to delays or cancellations of surgery, compromised treatment outcomes, and even life-threatening consequences (Tulloch & Rubin, 2019).

Cardiac surgery is one of the most frequently performed surgeries in developed countries and is considered a high-risk, potentially life-threatening procedure (Fiore et al., 2023). A study in the cardiac surgery department of a tertiary hospital in Valencia, Spain, found that over 80% of patients experienced moderate to high levels of anxiety (Prado-Olivares & Chover-Sierra, 2019). Additionally, a systematic review and meta-analysis revealed that preoperative anxiety is significantly associated with early postoperative mortality, with higher levels of preoperative anxiety linked to higher early mortality rates (Ji et al., 2022).

It is, therefore, crucial to study preoperative anxiety and its influencing factors in cardiac surgery patients. Research can identify which factors contribute to preoperative anxiety and support the development of effective intervention strategies to alleviate it. Systematic reviews have confirmed that numerous factors are associated with preoperative anxiety (Mudgalkar et al., 2022). For instance, studies have found that fear of surgery is a significant contributor to preoperative anxiety (Obuchowska & Konopinska, 2021). A multicenter survey conducted in China established a strong relationship between preoperative anxiety and preoperative sleep quality (Li et al., 2021). Additionally, a positive correlation has been observed between the perception of illness severity and preoperative anxiety (Jarmoszewicz et al., 2020). Kok et al. (2023) reported that social support plays a key role in preoperative anxiety among patients undergoing elective surgery in Ethiopia.

Despite the evidence linking various factors to preoperative anxiety, there is limited understanding of how these factors specifically affect patients undergoing cardiac surgery. Furthermore, previous research has shown that the factors influencing preoperative anxiety may vary across different countries and populations (Oh et al., 2024).

Traditional Chinese culture places significant value on balance and natural remedies. Chinese medicine often emphasizes treatments such as herbs, acupuncture, and massage, aiming to avoid surgery whenever possible. This cultural perspective may contribute to heightened caution and, consequently, increased anxiety regarding surgery.

Conceptual Framework

According to Meleis's Transition Theory (Yayla, 2019), surgery represents a health/disease-related transition for cardiac surgery patients. While some patients navigate this transition successfully, others experience physical and psychological challenges due to the imbalance created by the change. Nurses are critical in facilitating positive outcomes by identifying challenges during this transition and implementing appropriate interventions. Transition conditions in the theory include individual, social, and community factors. In this study, the patient's fear of surgery, perception of illness severity, and preoperative sleep quality represent individual factors, while perceived social support constitutes a social and community condition. These factors interact and influence one another. Patients awaiting cardiac surgery are in a transitional phase, facing changes in roles, support systems, health status, and abilities. This period is often marked by preoperative anxiety.

In this context, fear of surgery is a transitional condition that can either facilitate or hinder the patient's adaptation, ultimately influencing outcomes. Preoperative sleep quality, an individual factor during the waiting period, also affects the transition process. Perception of illness severity shapes patients' understanding of their disease and coping mechanisms. Additionally, perceived social support is vital in patients' responses to the transition.

Based on the Transition Theory model and literature review, this study investigated the preoperative anxiety of cardiac surgery patients at the First Affiliated Hospital of Wenzhou Medical University in China. It explored the relationship between preoperative anxiety and predictive factors, including fear of surgery, preoperative sleep quality, perception of illness severity, and perceived social support.

The study aimed to determine whether adult patients awaiting elective cardiac surgery experienced preoperative anxiety and whether fear of surgery, preoperative sleep quality, perception of illness severity, and perceived social support could collectively predict preoperative anxiety. The findings from this study will help nurses better understand factors related to preoperative anxiety in cardiac surgery patients and form a basis for developing effective nursing interventions to reduce anxiety. The conceptual framework of this study is presented in **Figure 1**.

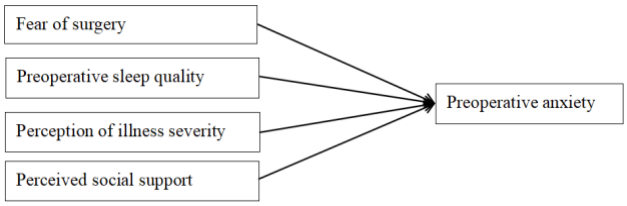

Figure 1 Research conceptual framework

Methods

Study Design

This study employed a predictive correlation design, with data collection carried out at a tertiary teaching hospital in China. The hospital is a Class III Grade A general hospital with 3,380 beds, including a cardiac surgery department that can accommodate up to 49 patients daily. The department routinely performs procedures such as coronary artery bypass grafting, valvuloplasty, valve replacement, congenital heart defect surgery, and large vessel replacement. Surgeries are scheduled to begin at 7:30 a.m., Monday through Saturday, with an average of 3 to 4 operations performed daily. Over the past five years, the department has maintained an annual average of 618 surgeries.

Samples/Participants

The target population for this study consisted of adult patients undergoing elective cardiac surgery in the cardiac surgery department of the hospital. The study sample was selected based on the following inclusion criteria: 1) Adult patients with heart disease undergoing cardiac surgery for the first time, 2) Patients aged 18–60 years, and 3) Patients able to understand, read, and write in the Chinese language. The exclusion criteria were as follows: 1) Patients with significant organ dysfunction or severe chronic illnesses, such as malignant tumors, severe liver or renal insufficiency; 2) Patients with serious audio-visual impairments that hinder cooperation in the study; 3) Patients diagnosed by a psychiatrist with anxiety, depression, or other mental illnesses; 4) Patients diagnosed with obstructive sleep apnea by a physician, 5) Patients undergoing heart transplant surgery.

This study recruited adult patients from the cardiac surgery department awaiting elective cardiac surgery. The sample size was calculated using G*Power 3.1.9.2 software, assuming four predictors: a power of 0.95, an alpha level of 0.05, and an effect size of 0.15. A power of 0.95 ensured a robust test, providing a 95% probability of detecting a true effect, thus increasing the reliability of the results and reducing the likelihood of them being due to chance. The effect size of 0.15 was classified as moderate in nursing research (Rodgers & Pustejovsky, 2021). Based on these parameters, the required sample size was 129 participants. To account for potential missing data and enhance the generalizability of the findings, an additional 10% was added, resulting in a total sample size of 142 participants.

Instruments

The study utilized a combination of demographic data collection and five validated instruments. Except for the demographic questionnaire developed by the researchers, all other instruments were used with authorization from the original and Chinese version authors. The instruments are detailed as follows:

Patients' Demographic Data: A demographic questionnaire was developed by the researchers to collect information on participants' age, gender, place of residence, living status, education level, marital status, number of children, occupation, monthly household income, medical insurance, type of heart disease (as diagnosed by a physician), type of operation, and comorbidities other than heart disease.

The short Chinese version of the State-Trait Anxiety Inventory (STAI): Preoperative anxiety, defined as the psychological reaction experienced by patients while awaiting cardiac surgery, was assessed using the short Chinese version of the STAI. Originally developed by Spielberger et al. (1971), this inventory is widely recognized for assessing anxiety across cultures. However, due to the length of the full version, the short Chinese version developed Du et al. (2022) was employed in this study. It includes six items per subscale, with response options ranging from 1 ("Almost never") to 4 ("Almost always"), where higher scores indicate greater anxiety severity. The Cronbach's α for this study was 0.778.

The Surgical Fear Questionnaire (SFQ): Fear of surgery, a fundamental and intense emotional response associated with undergoing cardiac surgery, was measured using the Surgical Fear Questionnaire (SFQ). Fear of surgery differs from anxiety, as it is a short-term response to an immediate threat, whereas anxiety is long-term and future-oriented. The SFQ, developed by Theunissen et al. (2014) and translated into Chinese by Yang et al. (2022), consists of eight items scored on an 11-point numeric rating scale ranging from 0 ("Not at all afraid") to 10 ("Very afraid"). Higher scores reflect higher levels of fear. The Cronbach's α for this study was 0.795.

The Richards-Campbell Sleep Questionnaire (RCSQ): Sleep quality, defined as an individual's satisfaction with various aspects of sleep, was assessed using the Chinese version of the RCSQ. The original RCSQ was developed by Richards et al. (2000) and later translated and validated in Chinese by Liu and Chen (2019). This five-item scale evaluates dimensions such as sleep depth, sleep latency, awakenings, returning to sleep, and overall sleep quality. Responses are scored on a 100 mm visual analog scale, where higher scores indicate better sleep quality. The Cronbach's α for this study was 0.757.

The Brief Illness Perception Questionnaire (BIPQ): Perception of illness severity, defined as patients' perceived negative consequences of their heart disease, was evaluated using the BIPQ. Developed by Broadbent et al. (2006) and translated into Chinese by Lin et al. (2011), the BIPQ includes nine items that assess dimensions such as consequences, timelines, personal control, therapeutic control, identification, caring, understanding, and emotional response. Scores on the BIPQ are interpreted linearly, with higher scores reflecting more negative perceptions of illness. The Cronbach's α for this study was 0.797.

The Multidimensional Scale of Perceived Social Support (MSPSS): Perceived social support, a patient's perception of receiving support (e.g., emotional, informational, or tangible support), was assessed using the Chinese version of the MSPSS (C-MSPSS). Originally developed by Zimet et al. (1988) and adapted into Chinese by Chou (2000), this scale includes 12 items across three dimensions: support from family, friends, and significant others. Higher scores indicate higher levels of perceived social support. The Cronbach's α for this study was 0.969.

Data Collection

Data collection was conducted between October 2023 and March 2024. Following approval from the Institutional Review Board (IRB), investigators recruited 142 adult patients undergoing elective cardiac surgery using a random sampling method. Recruitment occurred within the cardiac surgery department of a comprehensive hospital in Wenzhou, Zhejiang Province, China. Patients meeting the inclusion criteria were assessed the day before their scheduled surgery and invited to participate. Upon providing written informed consent, participants completed all study questionnaires, which typically required approximately 30 minutes.

Data Analysis

Statistical analysis was performed using SPSS software. Descriptive statistics, including frequency distributions, percentages, means, and standard deviations, were calculated to summarize demographic and other study variables. Multiple regression analysis (enter method) was applied to assess the impact of the independent variables on

preoperative anxiety. The assumptions for multiple regression were tested and met as follows: 1) Linearity: Scatterplots of the dependent variable against each independent variable confirmed linear relationships; 2) Autocorrelation: The Durbin-Watson statistic was 1.530, within the acceptable range of 1.5 to 2.5; 3) Normality: Residuals were normally distributed, as confirmed by histograms and Q-Q plots; 4) Homoscedasticity: Residuals plotted against predicted values demonstrated consistent variance; 5) Multicollinearity: Variance Inflation Factor (VIF) values ranged from 1.031 to 1.105, well below the threshold of 10; 6) Influential Outliers: Cook's Distance and standardized residuals indicated no influential outliers. No missing data were encountered in this study. Statistical significance was set at p <0.05.

Ethical Considerations

Ethical approval for the study was obtained from two institutions: 1) The Ethics Committee of the IRB, Faculty of Nursing, Burapha University (Approval code: G-HS047/2566 on 4 June 2023), 2) The First Affiliated Hospital of Wenzhou Medical University (Approval code: KY2023-181 on 14 August 2023). Before data collection, researchers provided detailed information about the study's purpose, potential benefits, duration, and confidentiality measures to all participants. Written informed consent was obtained through signed consent forms. On the day of data collection, the study's objectives were reiterated, emphasizing confidentiality and the participants' right to voluntary participation. Participants were explicitly informed that they could refuse to participate or withdraw from the study at any time before data collection without any adverse consequences. Those who agreed to participate signed the consent form before proceeding.

Results

Characteristics of the Participants

Table 1 presents the demographic characteristics of participants. Most were aged 51–60 years (59.9%, mean = 50.39, SD = 9.94) and predominantly male (57.7%). The majority lived in urban areas (65.5%) and had primary (34.5%) or junior high school education (33.8%). Most were married (87.3%) and reported having one (35.9%) or two children (40.8%). Nearly half (47.2%) had a monthly household income of 10,001–30,000 RMB (1 RMB = 0.1408 USD). Regarding medical insurance, 62.7% had urban/rural resident coverage, 34.5% had employee insurance, and 2.8% were self-paying. Most participants underwent traditional thoracotomy (75.4%), with others undergoing thoracoscopic surgery (14.1%) or interventional procedures (10.5%). The primary diagnosis was valvular heart disease (62.7%), with 46.5% reporting no comorbidities. The remaining participants had conditions like hypertension or diabetes.

Table 1 Characteristics of the participants (N = 142)

Characteristics	*n*	%
Age		
18-30 years	11	7.7
31-50 years	46	32.4
51-60 years	85	59.9
(Mean = 50.39, SD = 9.94, Min = 23, Max = 60)		
Gender		
Male	82	57.7
Female	60	42.3
Place of residence		
Countryside	49	34.5
Cities and towns	93	65.5
Living with people		
Spouse	68	47.9
Parents	13	9.2
Children	15	10.6
Living alone	10	7.0
Spouse and children	27	19.0
Others	9	6.3
Education		
Illiteracy	18	12.7
Primary	49	34.5
Junior high school	48	33.8
High school or technical secondary school	11	7.7
College degree or above	16	11.3
Marital status		
Married	124	87.3
Single	7	4.9
Divorced	9	6.4
Widowed	2	1.4
Number of children		
One	51	35.9
Two	58	40.8
Three	19	13.5
Four or more	4	2.8
None	10	7

Table 1 *(Cont.)*

Monthly household income		
5000-10000 RMB	53	37.3
10001-30000 RMB	67	47.2
30001-60000 RMB	22	15.5
(Median = 1000, Min = 5000, Max = 60000)		
Occupation		
Administrative staff	10	7
Professional and technical staff	17	12
Worker	45	31.7
Farmer	20	14.1
Housework	50	35.2
Medical insurance		
Employee medical insurance	49	34.5
Medical insurance for urban and rural residents	89	62.7
Own expense	4	2.8
Type of operation		
Traditional thoracotomy	107	75.4
Thoracoscopic surgery	20	14.1
Interventional operation	15	10.5
Type of heart disease as diagnosed by the physician		
Valvular heart disease	89	62.7
Cardiac tumor	8	5.7
Aneurysm of aorta	2	1.4
Coronary heart disease	9	6.3
Aortic dissection	7	4.9
Myocardiopathy	2	1.4
Congenital heart disease	25	17.6
Comorbidity diseases		
No	66	46.5
Yes	76	53.5
Hypertension	25	17.6
Diabetes	6	4.2
Hypertension+ diabetes	10	7.0
Others	35	24.7

Descriptive Characteristics of The Study Variables

The short Chinese version of STAI-S-6 is a transient emotional response characterized by tension and apprehension in specific situations, such as awaiting cardiac surgery. A score >15.5 indicates state anxiety. **Table 2** shows that preoperative anxiety had a mean of 15.98 (SD = 4.95), fear of surgery was 46.56 (SD = 19.34), preoperative sleep quality was 331.46 (SD = 98.99), perception of illness severity was 48.20 (SD = 11.26), and perceived social support was 63.89 (SD = 13.69).

Table 2 Description of study variables (N = 142)

Variables	Mean	SD	Possible scores	Actual scores
Preoperative anxiety	15.98	4.95	6-24	6-24
Fear of surgery	46.56	19.34	0-80	3-80
Preoperative sleep quality	331.46	98.99	0-500	1-500
Perception of illness severity	48.20	11.26	0-80	18-76
Perceived social support	63.89	13.69	12-84	12-84

Correlation Results of All Studied Variables

Table 3 presents the Pearson correlation coefficients between the predictors and preoperative anxiety. A significant positive correlation was found between fear of surgery and preoperative anxiety (r = 0.565, p <0.01). Preoperative sleep quality showed a significant negative correlation with preoperative anxiety (r = -0.160, p <0.05). Perception of illness severity and perceived social support exhibited weak correlations with preoperative anxiety (r = 0.143 and r = -0.178, respectively).

Table 3 Pearson correlation coefficients between predictors and preoperative anxiety (N = 142)

Variables	1	2	3	4	5
1. Perception of illness severity	1				
2. Preoperative sleep quality	-0.148	1			
3. Fear of surgery	0.207*	0.037	1		
4. Perceived social support	0.136	0.009	-0.061	1	
5. Preoperative anxiety	0.143	-0.160*	0.565**	-0.178*	1

Note: * Correlation is significant at the .05 level (2-tailed) | ** Correlation is significant at the .01 level (2-tailed)

Predicting Factors of Preoperative Anxiety

The enter method was used for multiple regression analysis, with preoperative anxiety as the dependent variable. The overall fit of the model was statistically significant ($F_{(4,142)}$ = 26.77, p <0.05). The *adjusted* R^2 value of 0.373 indicated that the model explained approximately 37.3% of the variance in preoperative anxiety, highlighting the influence of the included predictors. The significant predictors, ordered from strongest to weakest, were: fear of surgery (β = 0.539, p <0.001), perceived social support (β = -0.138, p <0.05), and preoperative sleep quality (β = -0.166, p <0.05). Perception of illness severity (β = 0.009, p >0.05) had no significant effect on preoperative anxiety. A summary of the multiple linear regression analysis is presented in **Table 4**. VIF values indicated no multicollinearity issues.

Table 4 Summary of multiple regression analysis of factors influencing preoperative anxiety (N = 142)

Variables	*B*	*SE*	*β*	*t*	*p-value*	*VIF*
Perception of illness severity	0.004	0.031	0.009	0.132	0.895	1.105
Preoperative sleep quality	-0.008	0.003	-0.166	-2.448	0.016	1.034
Fear of surgery	0.138	0.018	0.539	7.793	<0.001	1.077
Perceived social support	-0.050	0.024	-0.138	-2.046	0.043	1.031
R = 0.629, R^2 = 0.396, *Adjust* R^2 = 0.373, F = 26.77						

Discussion

Firstly, preoperative anxiety was assessed in this study, with results revealing a mean score of 15.98, indicating that preoperative anxiety was prevalent among adult patients undergoing cardiac surgery. Of the participants, 75.4% underwent traditional thoracotomy, a complex and traumatic procedure. Additionally, most patients had low educational levels, with 81% having completed junior high school or less. This limited education often corresponds to weaker general medical knowledge, restricted access to information, and insufficient understanding of surgery, all of which can heighten preoperative anxiety. Moreover, 53.5% of patients had comorbidities such as hypertension and diabetes, which may have exacerbated their concerns about the surgery's outcomes, contributing to their anxiety. The waiting period of 3-7 days before surgery further intensified anxiety (Kefelegn et al., 2023). These findings align with Zeng and Guan (2021), who noted that preoperative anxiety is common among cardiac surgery patients, particularly among those under 60. Since the study participants were aged between 18 and 60, age was a key factor influencing anxiety levels. Thus, it is evident that preoperative anxiety is prevalent among adult patients undergoing elective cardiac surgery, highlighting the need to explore contributing factors and implement targeted nursing interventions to reduce anxiety.

According to Meleis's Transition Theory (Yayla, 2019), patients awaiting cardiac surgery are in a state of health-disease transition, moving from health to illness to recovery after surgery. This transition can cause changes in mood, health cognition, and behavior, with anxiety being a common response to the stress of surgery. The transition process consists of three stages: entry, passage, and outcome, each with varying durations and impacts.

The second aim of this study was to identify predictors of preoperative anxiety. Multiple regression analysis revealed that preoperative sleep quality, fear of surgery, and perceived social support significantly influenced preoperative anxiety. Contrary to expectations, perception of illness severity did not have a significant impact on anxiety. The regression model accounted for 37.3% of the variance in preoperative anxiety, with fear of surgery being the strongest predictor, followed by preoperative sleep quality and perceived social support. Despite these significant predictors, 62.7% of the variance remained unexplained, suggesting that other factors—such as economic, environmental, or medical variables—may also contribute. Future research should explore these additional factors to further understand their role in preoperative anxiety among cardiac surgery patients.

Fear of surgery was identified as one of the predictors of preoperative anxiety, directly linked to the situational transition patients experience when facing high-risk cardiac surgery. This fear often stems from concerns about the procedure itself, including potential unbearable pain and anesthesia-related adverse reactions such as nausea and vomiting. Patients undergoing heart surgery may also fear complications, incomplete recovery, or prolonged recovery times. Preoperative anxiety tends to be higher among adult cardiac surgery patients, which can impact their overall prognosis. These findings align with the results of Dogan and Arslan's study, which demonstrated that patients with a higher fear of surgery also reported higher levels of preoperative anxiety (Dogan et al., 2024). This highlights the importance of medical staff addressing patients' fears during treatment and educational sessions, teaching them how to manage their concerns, and fostering a calm acceptance of the surgery.

Preoperative sleep quality was the second predictor of preoperative anxiety. In this study, the average preoperative sleep quality score was 331.46 (±98.987), which was considered moderate. This score was higher than that reported in a similar study on cardiac surgery patients at another hospital in China (Yang et al., 2024), likely due to the "quiet ward" policy at the hospital in this study, which provided a more comfortable and peaceful environment. However, the sleep quality in this study population was lower compared to a group of urological surgery patients in a study by Wang et al. (2022), likely because of the shorter waiting time for urology surgery, whereas cardiac surgery required a waiting period of 3-7 days before the operation. Sleep quality influences patients' response patterns and health outcomes during their transition. Adequate sleep is negatively correlated with anxiety levels, as good sleep reduces stress, improves mood, and restores cognitive abilities. Conversely, poor sleep quality leads to increased stress, negative emotions, and heightened anxiety. Anxiety, in turn, can also disrupt sleep, creating a cycle of poor sleep and heightened anxiety. Therefore, identifying and addressing sleep disturbances in cardiac surgery patients through effective nursing interventions is essential to reduce preoperative anxiety.

Perceived social support was another significant predictor of preoperative anxiety. In this study, the mean score for perceived social support was 63.89 (±13.689), which was considered high. This score was higher than that reported for coronary heart disease patients (60.11 ± 13.97) in a study by Wang et al. (2024) but lower than the score for lung cancer patients, who had a perceived social support score of 66 (Tian et al., 2021). This discrepancy may be attributed to the heightened societal attention given to cancer patients in China, as cancer is often perceived as the most serious illness, leading to greater family and societal support for these patients compared to those with other diseases. This study found that social support played a role in reducing preoperative anxiety during the waiting period for surgery, aligning with the findings from Yang et al. (2019). During the health-disease transition, patients not only require financial support for medical treatment but also need confidence and willpower to overcome the disease. Economic status is a key factor influencing this transition, and access to abundant social resources can improve economic conditions and positively impact the transition outcomes. The more social support patients received, the lower their preoperative anxiety. Therefore, increasing social support for cardiac surgery patients is crucial in enhancing their well-being, reducing anxiety, and promoting better surgical outcomes. This, in turn, may help reduce postoperative complications and support recovery (Sharma & Gharti, 2019).

In this study, the perception of illness severity did not significantly impact preoperative anxiety ($\beta = 0.009$, $p = 0.895$), a finding consistent with the results of Jarmoszewicz et al. (2020). Perception of illness severity refers to a patient's ability to assess and interpret their condition based on past experiences with illness. Most participants in this study were adults awaiting elective cardiac surgery, many of whom had been diagnosed with heart disease for at least three years and had received prior medical treatment. As a result, they had a reasonable understanding of their condition. According to transition theory, during the waiting period before surgery, their perception of illness severity remained stable, which likely explains why it did not influence their preoperative anxiety or the transition process.

Strengths and Limitations

The findings of this study enhance nurses' understanding of preoperative anxiety and its influencing factors in cardiac surgery patients in China, contributing to the ongoing research and development of targeted nursing interventions. However, this study has some limitations: 1) It was conducted at a single hospital, which, although a Grade A provincial hospital in Wenzhou, China, may limit the generalizability of the findings. 2) Preoperative anxiety was measured based on patients' subjective reports; incorporating objective data could provide a more comprehensive understanding of their anxiety. 3) The study population consisted of Chinese patients, and the findings may be influenced by cultural and healthcare system factors specific to China, which may not be directly applicable to other populations.

Implications and Recommendations

With the improvement in living standards, there has been increasing attention to the medical experience and psychological well-being of patients. For those undergoing cardiac surgery, nurses should not only focus on perioperative treatment and care but also consider patients' psychological states, particularly their levels of anxiety and the factors influencing preoperative anxiety. This study found that fear of surgery, preoperative sleep quality, and perceived social support were significant predictors of preoperative anxiety. Nurses can use these findings to develop effective interventions aimed at reducing preoperative anxiety. By actively assessing patients' psychological states before surgery, nurses can provide targeted health education and psychological support to alleviate fear of surgery. Additionally, improving the hospital environment to enhance sleep quality, promoting a calm atmosphere, and helping patients access social support can increase their confidence in both the success of the surgery and their ability to overcome the illness. It is recommended that nurses conduct further research to evaluate the clinical applicability of these findings and explore the effects of surgery-related fear, sleep quality, and social support on preoperative anxiety in patients undergoing elective cardiac surgery.

It is also recommended that studies be conducted with experimental designs to assess the effectiveness of interventions in reducing preoperative anxiety in adult patients undergoing cardiac surgery. Using multiple data collection settings will help generalize the findings. Additionally, it would be valuable to explore objective data, such as physiological responses, to gain deeper insights into preoperative anxiety among patients.

Conclusion

This study, grounded in Transition Theory, examined the factors influencing preoperative anxiety in adult patients undergoing elective cardiac surgery. It found that fear of surgery, preoperative sleep quality, and perceived social support significantly impacted preoperative anxiety. The findings offer valuable insights and a research foundation for the development of nursing interventions aimed at reducing preoperative anxiety in adult cardiac surgery patients.

Declaration of Conflicting Interest

There is no conflict of interest to declare.

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Authors' Contributions

All authors contributed to the study's conception and design, data acquisition, and data analysis, wrote the first draft of the manuscript, revised the final draft, and gave final approval of the version to be published.

Authors' Biographies

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Data Availability

Supporting data for this study are available from the corresponding author upon reasonable request.

Declaration of Use of AI in Scientific Writing

There is nothing to declare.

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