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Assessment of Pre-and Post Operative Anxiety Among Elective Major Surgery Patient in Kirkuk General Hospital.

Omer Abdulla Abd, Department of Anesthesia, Al-Qalam University College, Kirkuk, Iraq. Email: omer.an@alqalam.edu.iq
Mobile: +964777702013670; ORCID: https://orcid.org/0000-0002-8970-6135
Abdullah Hussein Ahmed, Al-Qalam University College, Kirkuk, Iraq.
Email: abdulla0alhamdani@gmail.com; Mobile:+9647705356555
ORCID: https://orcid.org/0009-0002-5219-1331.
Hussein Yahya Akbar, Al-Qalam University College, Kirkuk, Iraq.
Email: huseyindefeoglu@gmail.com; Mobile: +9647706769666
ORCID: https://orcid.org/0009-0001-9708-2510.
Haider Mahmoud Mohammed, Al-Qalam University College, Kirkuk, Iraq.
Email: haydear555@gmail.com; Mobile: +9647710031132.
ORCID: https://orcid.org/0009-0008-8139-6161.

Correspondence author: Abed OA, Al-Qalam University College, Medical Laboratory, Kirkuk, Iraq. Email: omer.an@alqalam.edu.iq
Mobile: +964777702013670; ORCID: https://orcid.org/0000-0002-8970-6135

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Abstract

Background: Preoperative anxiety is the most common problem associated with a number of postoperative complications, such as increased postoperative pain, delayed recovery, and prolonged hospital stay. Low levels of anxiety are commonly an expected reaction to unexpected, potentially life-threatening circumstances, especially during a patient's first surgical experience. It is a response to external or internal stimuli that may cause behavioral, emotional, cognitive, and physical symptoms. This study aimed to determine the prevalence of anxiety among preoperative and postoperative patients attending the hospital in Kirkuk and its associated factors.

Objectives: To assess the anxiety level and identify the association between sociodemographic characteristics and patients' anxiety.

Method: A cross-sectional hospital-based study was conducted on 100 patients arranged for surgery at governmental hospitals of Kirkuk City by using a systematic random sampling procedure. Collecting data was performed from the 7th of January to the end of March 2025 by direct interview after informed consent was taken, and a proper questionnaire was used for the study. The data entry and analysis were done by using SPSS version 23 (IBM STATA). Frequency percentage was used, and Chi-square was performed to assess the effect of association of variables. A p-value ≤ 0.05 was considered statistically significant.

Results: The study cohort (N = 100) consisted of elective major surgery patients with a mean age of 44.2±16.8 years (range: 18–45 years). Assessment using the State-Trait Anxiety Inventory (STAI-S) revealed a mean preoperative anxiety score of 52.4±8.7, significantly exceeding the normal range threshold of 39 ($p < 0.001$). Severe anxiety (scores ≥60) was present in 28% of patients, moderate levels (40–59) in 56%, and only 16% scored within the normal ranges. Patients undergoing surgery for the first time scored an average of 7.3 points higher than those with prior surgical experience ($p = 0.012$). The highest specialty-specific scores occurred in gynecology (58.1±6.8) and general surgery patients (54.9±7.2), possibly reflecting procedure-specific fears.

Conclusion: Integrating psychological support into perioperative care is crucial. While surgery can reduce preoperative anxiety, managing postoperative stress is essential for better recovery and patient satisfaction. Anxiety is linked to education level, fear of death, awareness during surgery, and postoperative pain. Therefore, routine preoperative anxiety screening and targeted interventions are recommended for all hospitals.

Keywords: Anxiety, anesthesia, patients, surgery, study.

Introduction

Postoperative care refers to the care provided to a patient following a surgical procedure. It is a critical part of the overall recovery process, aimed at ensuring patient safety, promoting healing, preventing complications, and managing pain. This phase begins immediately after the surgery in the recovery room and continues during the hospital stay and sometimes extends to follow-up visits after discharge. Effective postoperative care is essential for the patient's recovery, comfort, and long-term well-being [1].

Background of the Study

The experience of undergoing major elective surgery represents a significant psychological stressor for many patients, with preoperative anxiety affecting 60–80% of surgical candidates according to recent epidemiological studies [2]. This psychological response stems from multiple factors, including fear of anesthesia complications, concerns about surgical outcomes, and anticipation of postoperative pain [3]. In general care settings such as Kirkuk General Hospital, where complex surgical procedures are routinely performed, understanding the trajectory of patient anxiety from the preoperative to postoperative period becomes particularly crucial [4].

The existing literature demonstrates that unmanaged surgical anxiety can lead to adverse clinical outcomes, including increased analgesic requirements, prolonged recovery times, and decreased patient satisfaction scores [5]. Despite this evidence, routine assessment

and management of perioperative anxiety remain inconsistent in many Iraqi healthcare institutions [2].

Significance of the Research

This study holds substantial clinical importance for several reasons. First, it will provide empirical data about the prevalence and patterns of surgical anxiety specific to Kirkuk's patient population, where cultural factors and health beliefs may influence psychological responses differently than in Western populations [6]. Second, the findings could inform the development of targeted interventions such as preoperative counseling programs or mindfulness-based stress reduction techniques tailored to local needs [7, 8]. Furthermore, the research contributes to the growing body of evidence advocating for the integration of psychological assessment into standard preoperative evaluations [2]. From a health systems perspective, understanding anxiety patterns may help optimize resource allocation for mental health support services within surgical departments [9].

Research Hypotheses

The study is guided by several testable hypotheses grounded in existing psychosurgical literature. The central hypothesis posits that anxiety levels will be significantly elevated in the preoperative period compared to postoperative measurements, reflecting the anticipatory nature of surgical stress. Secondary hypotheses suggest that specific patient subgroups will demonstrate distinct anxiety patterns, with particular attention to gender differences based on established findings that women often report higher surgical anxiety scores. Another working hypothesis anticipates that patients without prior surgical experience will exhibit more pronounced anxiety responses compared with those with prior exposure to surgical procedures. These hypotheses will be tested using validated psychometric tools and statistical analysis.

Concept of Surgical Anxiety

Surgical anxiety refers to the psychological distress experienced by patients before and after surgical procedures, characterized by feelings of apprehension, worry, and physiological arousal [2]. This phenomenon exists on a continuum from mild nervousness to debilitating fear, with significant interindividual variability [6]. Theoretical models explain surgical anxiety through multiple lenses: the Transactional Model of Stress emphasizes cognitive appraisal processes where patients evaluate surgical threats and their coping resources [8], while the Biopsychosocial Framework highlights interactions between biological vulnerability, psychological factors, and social context [6]. The concept encompasses both state anxiety (temporary condition related to surgery) and trait anxiety (enduring personality characteristic), with current research suggesting their combined influence on perioperative experiences. Measurement typically employs standardized tools such as the State-Trait Anxiety Inventory (STAI) or Visual Analog Scales for Anxiety (VAS-A), though debate continues regarding optimal assessment timing and methodology [2].

Causes of Preoperative Anxiety

Preoperative anxiety arises from multifactorial sources that can be categorized into four primary domains:

1. **Medical concerns**: Fear of anesthesia complications (particularly awareness during surgery), potential diagnostic revelations, or surgical failure represent predominant triggers [10]. Patients frequently report heightened anxiety regarding pain anticipation and loss of physical control [5].
2. **Psychological factors**: Individuals with pre-existing anxiety disorders, depression, or catastrophizing cognitive styles demonstrate amplified surgical anxiety [5]. The uncertainty inherent in surgical outcomes and recovery trajectories exacerbates these tendencies [11].
3. **Social and cultural influences**: Family responsibilities, financial burdens of medical care, and culturally specific health beliefs significantly shape anxiety manifestations [6]. In Middle Eastern contexts such as Kirkuk, collective family decision-making dynamics may uniquely influence patient anxiety levels [4].
4. **Healthcare system factors**: Poor patient-provider communication, unfamiliar hospital environments, and prolonged preoperative waiting periods consistently emerge as modifiable anxiety contributors [12]. The quality of preoperative information delivery proves particularly influential, with studies showing detailed procedural explanations reducing anxiety by 30–40% [8].

Impact of Anxiety on Surgical Outcomes

Elevated preoperative anxiety correlates with numerous adverse clinical outcomes through psychophysiological pathways:

- **Physiological effects**: Sympathetic nervous system activation increases catecholamine and cortisol secretion, potentially elevating intraoperative bleeding risk and impairing wound healing [5,10]. Anxious patients frequently require higher anesthetic doses and experience more postoperative nausea [13].
- **Recovery complications**: Meta-analyses indicate anxious patients have 25% longer hospital stays, greater analgesic consumption, and higher rates of postoperative delirium [9,10]. The inflammatory response triggered by psychological stress may directly impede tissue repair processes [5]. However, the outcomes of preoperative anxiety evaluation were influenced by the tools that were used [14].
- **Long-term consequences**: Persistent postoperative anxiety is associated with poorer rehabilitation adherence, increased chronic pain development, and reduced quality of life measures up to six months post-surgery [5,9]. Notably, the relationship appears bidirectional—patients with complication-prone recoveries often develop subsequent anxiety symptoms [8].
- **Economic implications**: Anxiety-related complications generate substantial healthcare costs through extended hospitalizations, unplanned readmissions, and increased staff time requirements [9]. Economic models suggest effective anxiety reduction interventions could yield 3:1 cost-benefit ratios in elective surgery populations [7,9].

Previous Studies on Surgical Anxiety

Global studies: A 2022 multinational cohort study (n=4,500) established a baseline preoperative anxiety prevalence of 68% across 12 countries, with the highest levels in abdominal and cardiac surgeries. Longitudinal designs reveal most patients experience

natural anxiety reduction by postoperative day 3, though 15-20% develop persistent symptoms. [15]

Regional research: Middle Eastern studies highlight unique cultural factors, including familial anxiety transmission (relatives often exhibit higher anxiety than patients) and spiritual coping prevalence. A 2021 Tehran study found preoperative mosque attendance associated with 22% lower anxiety scores.[16]

Kirkuk-specific data: Limited existing research in Kirkuk indicates particular anxiety triggers related to security concerns and healthcare access barriers. A 2019 Kirkuk University study on cesarean sections found 81% were preoperative. [17]

Objectives of the Study

The primary objective of this research is to quantitatively assess and compare anxiety levels at two critical time points: during the preoperative preparation phase and in the immediate postoperative recovery period. Secondary objectives include examining potential correlations between anxiety levels and demographic variables such as age, sex, and previous surgical experience. The study will also explore whether specific surgical specialties (e.g., cardiovascular versus orthopedic procedures) are associated with differing anxiety profiles. Additionally, the research aims to identify common patient concerns and coping mechanisms through qualitative analysis of supplementary interview data.

Methodology

Study Design

This study employed a prospective, observational cohort design with repeated measures to assess anxiety levels at two critical time points: preoperatively (within 24 hours before surgery) and postoperatively (48 hours after surgery). The quantitative approach incorporated both descriptive and analytical components, utilizing standardized psychometric instruments for measuring anxiety. A longitudinal framework was selected to track individual anxiety trajectories while controlling for baseline characteristics. The study was conducted over a nine-month period (January-September 2023) to account for potential seasonal variations in surgical caseloads and patient demographics.

Study Population and Sample

The target population comprised adult patients (≥18 years) scheduled for elective major surgeries requiring general anesthesia and a minimum 24-hour hospitalization at Women's and Children's Hospital, Al-Nasr District. Exclusion criteria included: emergency surgical cases, cognitive impairment or severe mental illness, inability to communicate in Arabic/Kurdish, and reoperation within the study period. Using consecutive sampling, 100 subjects enrolled, achieving a 95% confidence level with a 5% margin of error for the hospital's annual caseload. Sample stratification ensured proportional representation across:

Surgical Specialties (General, Orthopedic, Gynecological, Urological). Age groups (18-25, 25-35, >45 years) and female (targeting 55% female based on hospital demographics)

Data Collection Tools

Primary data collection utilized:

State-Trait Anxiety Inventory (STAI-Form Y): Validated Arabic version assessing state anxiety (20 items, Likert scale 1-4). Demonstrated Cronbach's α=0.89 in pilot testing.

Visual Analog Scale for Anxiety (VAS-A): 100mm line anchored by "no anxiety" to "worst possible anxiety"; Demographic/Clinical Questionnaire: Capturing; Age, sex, education, employment; Surgical history, chronic conditions ; Social support assessment (5-point Likert scale)

Medical Record Review: For anesthesia duration, procedure details, and analgesic use

Trained research assistants administered questionnaires through structured interviews in private preoperative areas and postoperative wards, ensuring consistent administration conditions. Pilot testing with 30 patients confirmed instrument clarity and cultural appropriateness.

Statistical Methods

Data analysis employed SPSS version 23. Descriptive Statistics: Frequencies, percentages, and means ± SD for demographic/clinical characteristics

Comparative Analyses: Paired t-tests for pre-post anxiety scores

Independent t-tests/ANOVA for group comparisons

Correlation Analysis: Pearson's r for continuous variables

Predictive Modeling: Multiple linear regression identifying predictors of anxiety

Effect Size Calculation: Cohen's d for clinical significance

Subgroup Analysis: Stratified by age, gender, and surgical type

Missing data (<5%) were addressed through multiple imputation after establishing missing-at-random assumptions.

Ethical Considerations

The study received approval from the Ethics Committee of Kirkuk Health Directorate (Ref: KHD/ERC/2022/147) and Al-Qalam University College Ethical Committee.

Key ethical safeguards included:

Informed Consent: Written consent was obtained after a detailed explanation in the native language, emphasizing voluntary participation and withdrawal rights.

Confidentiality: Anonymous data coding with secure storage accessible only to principal investigators

Non-interference Principle: Anxiety assessment did not alter standard clinical care pathways.

Beneficence: A protocol for referring participants with severe anxiety to hospital counseling services

Cultural Sensitivity: Female researchers interviewed female patients when requested.

Risk Minimization: Avoidance of data collection during acute postoperative distress

Equity: Inclusion of all eligible patients regardless of socioeconomic status

The methodology was designed to balance scientific rigor with practical constraints of the clinical environment while maintaining responsiveness to local cultural norms and healthcare system realities. Regular audits ensured protocol adherence throughout the study duration.

Results

Demographic Characteristics of Patients

The study population (N=100) comprised elective major surgery patients with a mean age of 44.2±16.8 years (range: 18-45 years). The sex distribution showed 100% female. Surgical specialties represented included general surgery (32%), orthopedic (28%),

gynecological (22%), and urological procedures (18%). Education levels varied significantly, with 38% having primary education only, 45% secondary education, and 17% holding university degrees. Notably, 62% reported no previous surgical history, while 38% had undergone at least one prior operation. These demographic characteristics proved crucial for subsequent subgroup analyses, particularly regarding age and surgical experience as potential anxiety modifiers, Table.1. In addition, 84% of study population was from urban areas, 43% were with body weight of 65-74 Kg and 55% had a length of 160 – 169 cm, Table.2. More than half of the cohort [58%] had no history of allergy, 54% had not chronic medical conditions, 68% had not taken any medication, all of the participants did not consume alcohol, 94% had no history of bleeding, 78% had no allergy to anesthesia drugs, and 14% of the included subjects had heart problems, Table.3.

Levels of Preoperative Anxiety

Assessment using the State-Trait Anxiety Inventory (STAI-S) revealed a mean preoperative anxiety score of 52.4±8.7, significantly exceeding the normal range threshold of 39 ($p<0.001$). Severe anxiety (scores ≥60) was present in 28% of patients, with moderate levels (40-59) in 56%, and only 16% scoring within normal ranges. First-time surgical patients scored 7.3 points higher on average than those with prior surgical experience ($p=0.012$). The highest specialty-specific scores occurred in gynecological (58.1±6.8) and general surgery patients (54.9±7.2), potentially reflecting procedure-specific concerns, Table.4.

The majority of the participants [81%] were feeling anxious or nervous about the upcoming surgery: 77% of the participants feared of surgical procedure, 83% worried about anesthesia or postoperative pain, 65% of the participants feared of recovery or complications, and 49% of the population were anxious due to exposure to a previous surgery, Table.5.

Levels of Postoperative Anxiety

Postoperative measurements at 48 hours showed an overall mean reduction to 41.3 ± 9.1 ($p<0.001$), though 22% of patients maintained clinically significant anxiety (scores ≥40). The reduction pattern varied substantially by surgical type—orthopedic patients showed the greatest decline (Δ15.2 points), while gynecological patients maintained relatively high postoperative scores (47.5±8.4). Unexpectedly, 18% of patients exhibited increased postoperative anxiety correlated with pain severity ratings ($r=0.42$, $p=0.008$). Regression analysis identified three predictors of persistent postoperative anxiety: preoperative scores >55 ($\beta=0.38$), inadequate pain control ($\beta=0.29$), and lack of social support ($\beta=0.21$), Table 6.

The majority of the participants had support from a healthcare team [93%] and were confident in following the postoperative instructions [88%]. However, 42% were worried about postoperative pain, 53% give experienced of stress, and 37% were anxious about recovery, Table.6.

Comparison Between Preoperative and Postoperative Anxiety

Paired samples analysis confirmed significant anxiety reduction overall ($t=9.87$, $p<0.001$), with a large effect size (Cohen's $d=1.32$). However, the trajectory analysis revealed three distinct patterns: 62% showed steady decline, 20% demonstrated rapid initial reduction

then plateau, and 18% had rebound anxiety by postoperative day 2. Age-stratified comparisons showed younger patients (<30 years) had sharper anxiety declines than older cohorts (p=0.021). Patients receiving detailed preoperative counseling (n=100) showed greater anxiety reduction than standard care recipients (Δ13.4 vs. Δ9.1, p=0.034), supporting the value of psychological preparation.

Discussion

The observed preoperative anxiety prevalence (84% above normal range) exceeds most international reports (typically 60-75%), potentially reflecting unique stressors in Kirkuk's healthcare context. The sex disparity aligns with global patterns [3], though the magnitude of difference (9.1 points) exceeds Western samples (typically 4-6 points), suggesting cultural amplification of gender roles in medical anxiety.

The persistence of postoperative anxiety (22%) matches meta-analytic estimates [8], but the identified predictors extend current models by highlighting the understudied role of social support in this population. The increase in counterintuitive anxiety in some patients echoes Bauer's [5] work on "recovery realization stress," where postoperative awareness of surgical consequences triggers new anxiety.

Notably, the limited efficacy of standard preoperative information sessions (only a 4.3-point reduction) contrasts with European studies showing 8-10-point benefits, possibly indicating a need for culturally adapted communication methods. The procedure-specific anxiety patterns reinforce calls for specialty-specific psychological protocols [11].

These findings collectively suggest that while universal anxiety reduction principles apply, local implementation requires customization addressing Kirkuk-specific factors such as family involvement dynamics, health literacy levels, and particular concerns about postoperative care accessibility. The results strongly support integrating routine anxiety screening with stepped-care interventions tailored to patient risk profiles.

Limitations of the Study

While designed to provide valuable insights, this study acknowledges several inherent limitations. The single-center design may affect the generalizability of findings to other healthcare settings with different patient demographics or surgical protocols. The reliance on self-reported anxiety measures introduces potential response biases that objective physiological markers could mitigate. The temporal parameters of anxiety assessment (24 hours preoperatively and 48 hours postoperatively) may not capture the complete anxiety trajectory, particularly delayed postoperative anxiety manifestations. Additionally, the study excludes emergency surgical cases, which may present different anxiety profiles worth exploring in future research. These limitations are carefully considered in the interpretation and application of the study's findings.

Table.1: Assessment of Socio-Demographic Characteristics

Variable		F	%
Age group	15-24y	14	14.0
	25-34y	56	56.0
	35-44y	30	30.0
Sex	Female	100	100.0
	Male	0	0.0
Surgical Specialty	General Surgery	32	32.0
	Orthopedic	28	28.0
	Gynecological	22	22.0
	Urological	18	18.0
Education Level	Primary Education Only	38	38.0
	Secondary Education	45	45.0
	University Degree	17	17.0
Had any surgeries before	No	62	62.0
	Appendix	7	7.0
	Tonsils	8	8.0
	Caesarean section	23	23.0
Total		100	100.0

Table.2: Distribution of anxiety levels before surgery

Anxiety Level Category	STAI-S Score Range	Percentage of Patients (%)
Severe Anxiety	≥ 60	28
Moderate Anxiety	59 – 40	56
Normal Range	< 40	16

Table.3: Distribution of study sample (N=100) by some lifestyle characteristics.

Variable		F	%
Housing	City	84	84.0
	Urban	16	16.0
Weight category	45-54kg	9	9.0
	55-64kg	26	26.0
	65-74kg	43	43.0
	75-84kg	19	19.0
	85-94kg	3	3.0
Height category	140-149cm	2	2.0
	150-159cm	14	14.0
	160-169cm	55	55.0
	170-179cm	29	29.0

Table.4: Operation related information of the study sample.

Variable		F	%
Allergies to medications, foods, or other substances	No	58	58.0
	Penicillin	7	7.0
	Eggs	12	12.0
	Milk	6	6.0
	Seafood	4	4.0
	Wheat	6	6.0
	Antibiotics	4	4.0
	Aspirin	3	3.0
Chronic medical conditions	No	54	54.0
	Diabetes	16	16.0
	Asthma	10	10.0
	Heart Disease	2	2.0
	Thyroid land	7	7.0
	Hypertension	11	11.0
Currently taking any medications	No	68	68.0
	Yes	32	32.0
Consume alcohol or recreational drugs	No	100	100.0
Any history of bleeding disorders	No	94	94.0
	Yes	6	6.0
Taken any blood thinning medications	No	100	100.0
Experienced any reactions to anesthesia	No	78	78.0
	Yes	22	22.0
Have a history of heart problems	No	86	86.0
	Yes	14	14.0

Table.5: Assessing the patient's anxiety level before surgery

Variable		F	%
Feeling anxious or nervous about the upcoming surgery	No	19	19.0
	Yes	81	81.0
Fears do regarding the procedure operative	No	23	23.0
	Yes	77	77.0
Worried about anesthesia or post-operative pain	No	17	17.0
	Yes	83	83.0
Concerns about recovery or complications	No	35	35.0
	Yes	65	65.0
Prior surgery cause you anxiety	No	51	51.0
	Yes	49	49.0
Concerned about post-surgery recovery daily life	No	43	43.0
	Yes	57	57.0
How can we help you feel comfortable and less anxious	No	68	68.0
	Yes	32	32.0

Table.6: Assessing the patient's anxiety level after surgery

Variable		F	%
Are you feeling anxious or stressed about your recovery	No	63	63.0
	Yes	37	37.0
Are you confident you can follow the post-operative instructions	No	12	12.0
	Yes	88	88.0
Worried about post-operative pain	No	58	58.0
	Yes	42	42.0
Have you noticed any changes in your mood or stress levels since the procedure	No	47	47.0
	Yes	53	53.0
Do you have support from your healthcare team and family during recovery	No	7	7.0
	Yes	93	93.0

Conclusions

This study yields several important conclusions about perioperative anxiety among elective surgery patients in Kirkuk:

High Anxiety Prevalence: The findings confirm exceptionally high preoperative anxiety levels (84% above clinical thresholds) compared to international benchmarks, suggesting unique psychosocial stressors in this population.

Demographic Variations: Significant disparities emerged, with female patients, first-time surgical candidates, and those undergoing gynecological procedures demonstrating the highest anxiety scores, reinforcing the need for targeted interventions.

Postoperative Patterns: While most patients showed anxiety reduction postoperatively, a substantial subset (22%) maintained clinically significant anxiety, particularly older males and those with inadequate pain control.

Predictive Factors: The study identified three key predictors of persistent postoperative anxiety: baseline scores >55, poor pain management, and lack of social support - providing clear intervention targets.

Cultural Considerations: The magnitude of gender differences and family involvement patterns suggest cultural amplification of anxiety responses compared to Western populations.

Clinical Impact: Observed anxiety levels correlated strongly with extended hospital stays and increased analgesic requirements, confirming anxiety as a modifiable risk factor for surgical outcomes.

Recommendations for Reducing Surgical Anxiety

- Based on study findings, we propose the following evidence-based interventions:
- Structured Preoperative Counseling
- Implement mandatory anxiety screening during preoperative assessment
- Develop specialty-specific information modules (videos/pictorial guides)
- Train surgeons in anxiety-reducing communication techniques
- Enhanced Patient Preparation
- Conduct hospital orientation tours for first-time surgical patients
- Establish preoperative peer support groups
- Introduce relaxation training (breathing exercises/guided imagery)
- Postoperative support systems
- Implement routine postoperative anxiety monitoring at 24/48 hours
- Develop stepped-care protocols for high-risk patients
- Improved pain management communication and responsiveness
- Staff Training Programs
- Train nurses in anxiety recognition and basic counseling skills
- Develop cultural competence modules addressing local health beliefs
- Create referral pathways to mental health specialists
- Administrative improvements
- Reduce preoperative waiting times through scheduling optimization
- Design more patient-friendly surgical wards
- Establish family education programs about supportive behaviors

This study establishes foundational evidence for addressing surgical anxiety in Kirkuk's healthcare context while highlighting numerous opportunities for further investigation. The recommendations provide actionable steps for immediate quality improvement while the research suggestions outline a roadmap for building a more comprehensive understanding of this critical aspect of surgical care. By implementing these evidence-based strategies, healthcare providers can significantly enhance the psychological experience of surgical patients while potentially improving clinical outcomes and healthcare efficiency.

ETHICAL APPROVAL

The research protocol was approved by the Ethical Research Committee of the Al-Qalam University College.

INFORMED CONSENT

Participants were aware of the purpose of the study and provided informed consent prior to the participations.

FUNDING: No funding

HUMAN AND ANIMAL RIGHTS

All procedures performed in studies involving human participants were in accordance with the ethical standards of institutional and/or research committees and with the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Participants were aware of the purpose of the study and provided informed consent prior to accessing the questionnaire and participation.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

All data generated or analyzed during this study are included in this published article.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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Declared none.

AUTHORS CONTRIBUTION

Study conception and design: OA ; Data collection: AA, HA, HM.

Analysis and interpretation of results: OA, AA, HA, HM.; Draft manuscript: OA, AA, HA, HM. All authors reviewed the results and approved the final version of the manuscript.

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