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Preoperative Anxiety and Its Associated Factors among Surgical Patients in Pakistan: A Cross-sectional Study

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Abstract

Background. Preoperative anxiety is a frequent but unrecognized condition which has a negative impact on intraoperative anesthetic use, postoperative pain, wound healing and hospital stay. There are limited and fragmented evidence from low and middle income countries, especially Pakistan.

Objective. The purpose of this study was to find out the prevalence and severity of preoperative anxiety and socio-demographic, clinical and psychological parameters associated with it among adult surgical patients in tertiary care hospitals in Pakistan.

Methods. A cross-sectional study was performed in a hospital setting in 300 adult patients undergoing elective surgery. Four tertiary care hospitals were selected from four divisions of the Punjab, Sindh, Khyber Pakhtunkhwa and Islamabad Capital Territory, and consecutive sampling was performed. The Amsterdam Preoperative Anxiety and Information Scale (APAIS) and a 7-item Fear-and-Concern inventory were completed the night before the surgery. The data were analysed using descriptive statistics, independent-samples t-tests, one-way ANOVA, Pearson correlation and multiple linear regression under the .05 level of significance ($\alpha = .05$) in SPSS v.26.

Findings. The overall mean APAIS anxiety score was 14.65 (SD = 3.97; range 4–20). Of the 252 respondents (84.0%), 45.3% had scores greater than the clinical cut-off score (>10); these were considered to be severely anxious. Anxiety was significantly higher among patients undergoing major surgery ($M = 16.51$ vs. 11.98, $p < .001$), first-time surgical patients ($M = 15.61$ vs. 12.68, $p < .001$), and those with comorbidities ($p < .001$). Educational attainment ($F = 13.90$, $p < .001$) and income ($F = 7.08$, $p = .001$) were inversely associated with anxiety. Multiple regression retained major surgery ($\beta = 3.28$), no previous surgery ($\beta = 2.13$), female gender ($\beta = 1.25$), low education ($\beta = 1.17$), low income ($\beta = 1.17$), comorbidity ($\beta = 1.24$), and fear-related cognitions as independent predictors (adjusted $R^2 = .616$).

Conclusion. Preoperative anxiety is a very common phenomenon in surgical patients and is a combination of socioeconomic disadvantage, clinical vulnerability and cognitive-affective fear responses. The provision of regular APAIS screening and multi-component psychoeducational services is highly recommended.

Keywords: Preoperative Anxiety; APAIS; Associated Factors; Surgical Patients; Pakistan; Fear of Surgery; Cross-Sectional Study.

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1. Introduction

Surgery is one of the most frightening experiences a patient can experience, with many physical, cognitive and emotional responses that can occur before the operating room and last long after the surgery (Moerman, van Dam, Muller, & Oosting, 1996; Pritchard, 2009). Preoperative anxiety, defined as an unpleasant state of tension arising from the anticipation of an impending surgical procedure and its perceived threats, has been consistently linked to adverse perioperative outcomes including elevated blood pressure and heart rate, greater anaesthetic and analgesic requirements, prolonged recovery, and diminished patient satisfaction (Mitchell, 2010; Stamenkovic et al., 2018). In the literature, the prevalence of clinically significant preoperative anxiety has been estimated to be 60% to 80% in surgical patients in various parts of the world, depending on the setting, instrument, and cultural contexts (Bedaso & Ayalew, 2019; Celik & Edipoglu, 2018).

There are several factors that contribute to the development of preoperative anxiety. Gender, younger age, low education, and unfavourable economic status are known to be risk factors (Caumo et al., 2001; Erkilic et al., 2017). Anxiety also increases as a result of clinical variables such as the invasiveness of the intended procedure, lack of previous surgical experience, and the presence of comorbid illness (Karanci & Dirik, 2003; Nigussie, Belachew, & Wolancho, 2014). Fear of pain, fear of anaesthetia, fear of the unknown, fear of death are proximal cognitive drivers which take contextual vulnerability and turn it into subjective distress (Ramsay, 1972; Boker, Brownell, & Donen, 2002).

The context of Pakistan is an important context in which such enquiries should be undertaken, but has received little scholarly attention. Its healthcare system has limited resources, high patient-to-provider ratios, and limited routine screening for mental health during the peri-operative period, and high socio-economic and linguistic heterogeneities (Ali et al., 2014; Jawaid, Mushtaq, Mukhtar, & Khan, 2007). The previous research conducted on anxiety in Pakistan has been conducted on a single institution basis, and has used non-standardised instruments which has limited the comparison with the international literature (Matthias & Samarasekera, 2012). More detailed, multi-location research using a well validated scale is needed.

Preoperative anxiety also has a number of important clinical implications regarding surgical safety and equity. Anxious patients will experience greater pain intensity during the immediate postoperative period, be more prone to chronic post-surgical pain and require greater nursing and anaesthetic demands (Kagan & Bar-Tal, 2008; Ali et al., 2014). These effects in resource-limited systems manifest as tangible reductions in efficiency and patient health. However, brief structured interventions such as psychoeducation, provision of information (tailored to patients' needs) and preoperative counselling have been found to reduce anxiety and improve outcomes, but it requires evidence-based mapping of patient-level risk factors (Wongkietkachorn, Wongkietkachorn, & Rhunsiri, 2018; Mulugeta, Ayana, Sintayehu, Dessie, & Zewdu, 2018).

The present study thus fills an under-studied and clinically relevant gap. It is based on Spielberger's (1983) state–trait anxiety model and operationalised using the well-validated APAIS (Moerman et al., 1996; Boker et al., 2002) and it aims to look into the prevalence, severity and factors associated with preoperative anxiety among adult surgical patients in Pakistan. It aims to contribute to screening pathways, clinical prioritisation of psychosocial care, and designing context-sensitive interventions for a population that has received little empirical attention to date.

2. Problem Statement

Despite mounting international evidence linking preoperative anxiety to adverse surgical outcomes, robust multi-centre data from Pakistan remain scarce, standardised screening is not routinely embedded in perioperative pathways, and the interplay between socio-demographic disadvantage, clinical vulnerability, and psychological fear cognitions is poorly characterised. This means that there is a lack of empirical evidence to guide clinicians in identifying patients who are at risk and to prioritize brief and evidence-based interventions in the context of resource-limited surgical services.

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3. Literature Review

3.1. Conceptual Foundations of Preoperative Anxiety

In the Spielberger (1983) state–trait theory, preoperative anxiety is described as a temporary state of anxiety that involves an increase in autonomic activation and threat appraisal. It is situational, unlike trait anxiety, and thus is amenable to timely psychosocial intervention. These three cognitions — fear of the unknown, fear of pain and fear of anaesthesia — form a consistent triad of anxiety-provoking cognitions among surgical patients, as described by Ramsay (1972) in his original survey and echoed by Boker et al. (2002) and Bedaso & Ayalew (2019) in their contemporary conceptual models.

3.2. Measurement: The APAIS Instrument

The Amsterdam Preoperative Anxiety and Information Scale (APAIS) has proven to be the gold standard for short bedside evaluation of anxiety before surgery (Moerman et al., 1996). The APAIS is composed of six items that form two subscores: anxiety (4 items, range 4–20) and information need (2 items, range 2–10), and has been shown to have high convergent validity with the State-Trait Anxiety Inventory, and high feasibility for routine clinical use (Boker et al., 2002). It has been validated across European, Latin American, African and South Asian populations (Caumo et al., 2001; Celik & Edipoglu, 2018; Erkilic et al., 2017).

3.3. Prevalence in International and Regional Contexts

Preoperative anxiety prevalence varies by setting and instrument from 40% to greater than 80% across the world. Prevalence of clinically significant anxiety in surgical patients was reported as 56.6% in a study conducted in tertiary care in Turkey (Erkilic et al., 2017) and 59–70% in Ethiopia (Nigussie et al., 2014; Bedaso & Ayalew, 2019; Mulugeta et al., 2018). Within the region, however, there is even more limited data which suggest even higher prevalence rates: Matthias and Samarasekera (2012) reported 76% of Sri Lankan surgical patients to be clinically anxious and Jawaid et al. (2007) reported rates of nearly 70% in a tertiary hospital in Karachi. The variability highlights the need for country-specific evidence.

3.4 Socio-demographic Correlates

Being female is one of the most consistently reported correlates of higher levels of preoperative anxiety, likely due to both a biological reactivity and gendered role expectations related to illness and dependency (Caumo et al., 2001; Ebirim & Tobin, 2011). Less education and lower income is also a risk factor, likely through the effects of decreased health literacy, less access to procedural information, and increased financial concern (Karanci & Dirik, 2003; Nigussie et al., 2014). The results from the studies on age are conflicting: some indicate a curvilinear trend with the highest scores at the younger and older ends of the age spectrum (Mitchell, 2010); others suggest there is no age effect (Celik & Edipoglu, 2018).

3.5 Clinical and Surgical Correlates

The level of invasiveness of the proposed procedure is a significant and reliable predictor of preoperative anxiety levels, with major surgery consistently significantly higher in terms of anxiety than minor surgery (Karanci & Dirik, 2003; Mulugeta et al., 2018). Familiarity and cognition schema formation are protective benefit from prior surgical experience (Boker et al., 2002; Erkilic et al., 2017). Comorbid conditions and the length of illness are also independent, indicating higher perceived vulnerability and complexity of recovery (Ali et al., 2014).

3.6 Psychological and Contextual Correlates

Proximal factors which act as mediators between contextual vulnerabilities and subjective distress include cognitive-affective fears, which are fears affecting cognition and affect, such as fear of pain, fear of death, fear of anaesthesia and fear of unfavourable outcome (Ramsay, 1972; Kagan & Bar-Tal, 2008). Another significant aspect of

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provider communication and information adequacy is that patients who receive the information in a structured way from the surgical team tend to experience less anxiety than those who get it informally from other sources (Wongkietkachorn et al., 2018; Pritchard, 2009). Other contextual stressors are of greater importance in low and middle income countries, such as financial concerns, family responsibilities and waiting time (Jawaid et al., 2007; Mulugeta et al., 2018).

3.7 Research Gap

While the international literature has demonstrated the prevalence and correlates of preoperative anxiety, the studies done in Pakistan are limited to single institutional samples and very few studies have combined socio-demographic, clinical and psychological factors in the same framework for analysis. To meet this gap, the present study is a multi-site cross sectional study based on the APAIS instrument and a structured Fear and Concern inventory that provides empirically grounded and contextually anchored data, which can help guide screening and intervention pathways for Pakistan.

4. Research Objectives and Questions

4.1. Objectives

The study pursued four inter-related objectives:

- To estimate the prevalence and severity of preoperative anxiety among adult patients scheduled for elective surgery in Pakistani tertiary care hospitals;
- To examine the association between preoperative anxiety and selected socio-demographic characteristics;
- To evaluate the influence of clinical and surgical variables on the level of preoperative anxiety; and
- To identify the independent predictors of preoperative anxiety through multivariable regression modelling.

4.2 Research Questions

- **Q1.** What is the prevalence and severity of preoperative anxiety among adult surgical patients in Pakistani tertiary care hospitals?
- **Q2.** Which socio-demographic characteristics are significantly associated with preoperative anxiety?
- **Q3.** Which clinical and surgical variables are significantly associated with preoperative anxiety?
- **Q4.** Which combination of factors independently predicts APAIS anxiety scores in this population?

5. Research Methodology

5.1. Study Design

The study employed a descriptive, cross-sectional study with quantitative approach conducted in the hospital setting. The design was selected since it can provide an efficient snapshot of anxiety prevalence and correlates in multiple patient sub-groups at a single time point in the perioperative pathway (Bedaso & Ayalew, 2019).

5.2 Study Setting and Population

All data was collected from surgical wards of four tertiary care hospitals from Punjab, Sindh, Khyber Pakhtunkhwa and Islamabad Capital Territory over 5 months period (from March to July 2025). The target population consisted of adult patients (age ≥ 18) admitted for elective surgery. To maintain the homogeneity of the analytic sample, the following groups were excluded: emergency surgery, obstetric caesarean sections, day-case cataract lists and patients with pre-existing psychiatric diagnosis.

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5.3 Sample Size and Sampling Procedure

The minimum required sample size was calculated using the Cochran's formula for a single proportion, Z = 1.96, expected prevalence p = 0.62 (Matthias & Samarasekera, 2012), absolute precision d = 0.06. After stratification within 4 hospitals, 300 patients were sampled in consecutive sampling the evening before surgery to get a 15% non-response rate.

5.4 Instrumentation

There were three sections in the measurement package. Socio-demographic and clinical information (gender, age, education, marital status, income, residence, province, surgery type and specialty, previous surgical experience, comorbidities, information source, and waiting time) were gathered in section A. For section B, the following six-item Amsterdam Preoperative Anxiety and Information Scale — APAIS (Moerman et al., 1996) was administered with the results of the items being summed to form the anxiety subscale (range 4–20; clinical cut-off > 10) and the information-need subscale (range 2–10). Each of the following Fear-and-Concern items was scored on a 5-point Likert scale and administered in section C: fear of pain, fear of anaesthetic, fear of death, fear of unfavourable outcome, fear of unknown, fear of family separation, and fear of financial burden.

5.5 Validity and Reliability

Three subject matter experts (anaesthesiologist, general surgeon and clinical psychologist) reviewed the instrument for content and face validity, and all the recommendations were followed. To ensure cross-cultural comprehensibility, the translations in Urdu were done independently, in forward direction, and then back translated to English, followed by cognitive pre-testing with 15 patients who were not included in the final analysis. The current sample showed high internal consistency with Cronbach's α = .920 for the APAIS anxiety subscale, .692 for the information-need subscale, .915 for the 6-item APAIS total, and .902 for the 7-item Fear-and-Concern scale.

5.6 Data Collection Procedure

Eligible patients were approached by trained research nurses the evening before the surgery, and informed written consent was obtained. The instrument was given in either self-report or, for those unlettered, in a structured, face-to-face Urdu reading format. It took about 12–15 minutes to administer for each participant. On leaving the village from the bed, the response completeness was checked, and if it was not complete, they were clarified on site.

5.7 Data Analysis

The data were double entered and cleaned in IBM SPSS v.26 (IBM Corp., 2019). Continuous data are presented as means and standard deviations, categorical data as frequencies and percentages. Group comparisons were done using independent-samples t-tests (for factors with two levels) and one-way ANOVA (for factors with more than two levels); Levene's test was consulted to determine which version of the t-test or one-way ANOVA to use (equal or unequal variance). The Pearson product-moment correlation measured linear relationships between quantitative data. The independent contribution of the ten most theoretically relevant predictors was tested in a multiple linear regression that used the APAIS anxiety subscale as the criterion. The criterion for statistical significance was a two-tailed α = .05

5.8 Ethical Considerations

The study was approved by the IRB of the coordinating hospital (Ref. IRB/2025/037). Informed consent was obtained from all participants, anonymity was ensured by coded data, no incentive was offered for participation, and all data were kept on the secure electronic devices of the research team, which were protected by a password.

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6. Findings

6.1 Socio-demographic and Clinical Profile

Adult surgical patients, 300 in total, were involved in the study. They were socio-demographically and clinically characterised as summarised in Table 1. The majority of females (55.0%) were slightly more numerous than males, the modal age band was 31-45 years (32.3%) and most of the respondents had completed secondary education or above (59.7%). The majority of the sample lived in urban areas (58.3%) and more than half of them were low-income (54.0%). The proportion of major surgery was 59.0%, first-time surgical patients accounted for 67.3% and 41.0% of those surgical patients had at least one comorbid condition.

Table 1. Socio-demographic and Clinical Profile of Participants (N = 300)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	165	55.00
	Male	135	45.00
Age group (years)	18–30	82	27.33
	31–45	97	32.33
	46–60	80	26.67
	> 60	41	13.67
Education	Illiterate	56	18.67
	Primary	65	21.67
	Secondary	98	32.67
	Higher	81	27.00
Marital status	Married	217	72.33
	Single	69	23.00
	Divorced / Widowed	14	4.67
Monthly income	Low	162	54.00
	Middle	111	37.00
	High	27	9.00
Residence	Urban	175	58.33
	Rural	125	41.67
Province	Punjab	129	43.00
	Sindh	60	20.00
	Khyber Pakhtunkhwa	54	18.00
	Balochistan	28	9.33
	Islamabad Capital Territory	29	9.67
Type of surgery	Major	177	59.00

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Variable	Category	Frequency (n)	Percentage (%)
	Minor	123	41.00
Surgical specialty	General Surgery	105	35.00
	Gynaecological	67	22.33
	Orthopaedic	52	17.33
	Cardiothoracic	23	7.67
	Urological	19	6.33
	Neurosurgery	18	6.00
	ENT	16	5.33
Previous surgery	No	202	67.33
	Yes	98	32.67
Comorbidity	Yes	123	41.00
	No	177	59.00
Information source	Surgeon	178	59.33
	Family / Friends	44	14.67
	Nurse	41	13.67
	Internet	33	11.00
	None	4	1.33

6.2 Reliability of the Measurement Instrument

The internal consistency of the study instrument was very good in general. All of the Cronbach's alpha coefficients for each subscale were at or above the generally accepted psychometric criteria for research use ($\alpha \geq .70$), as reported in Table 2.

Table 2. Internal Consistency (Cronbach's α) of the Measurement Instrument

Scale / Subscale	Items	N	Cronbach's α	Interpretation
APAIS Anxiety subscale (Q1, Q2, Q4, Q5)	4	300	0.920	Excellent
APAIS Information-need subscale (Q3, Q6)	2	300	0.692	Acceptable
APAIS Total scale (6 items)	6	300	0.915	Excellent
Fear-and-Concern inventory (7 items)	7	300	0.902	Excellent

6.3 Prevalence and Severity of Preoperative Anxiety

The mean score for the anxiety subscale of the APAIS was 14.65 (SD = 3.97; range 4–20) and the scores were significantly above the clinical threshold of 10. Two hundred and fifty-two of the respondents (84.0%) were above this score, among which 45.3% were severely anxious (score > 15), 38.7% were high, 11.3% were moderate and only 4.7% were mild. The complementary information-need subscale (M = 8.74, SD = 1.24) showed that 99.0% intends to have more information about the procedure (above score-5). Summary of the prevalence and severity distribution is shown in

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Figure 1.

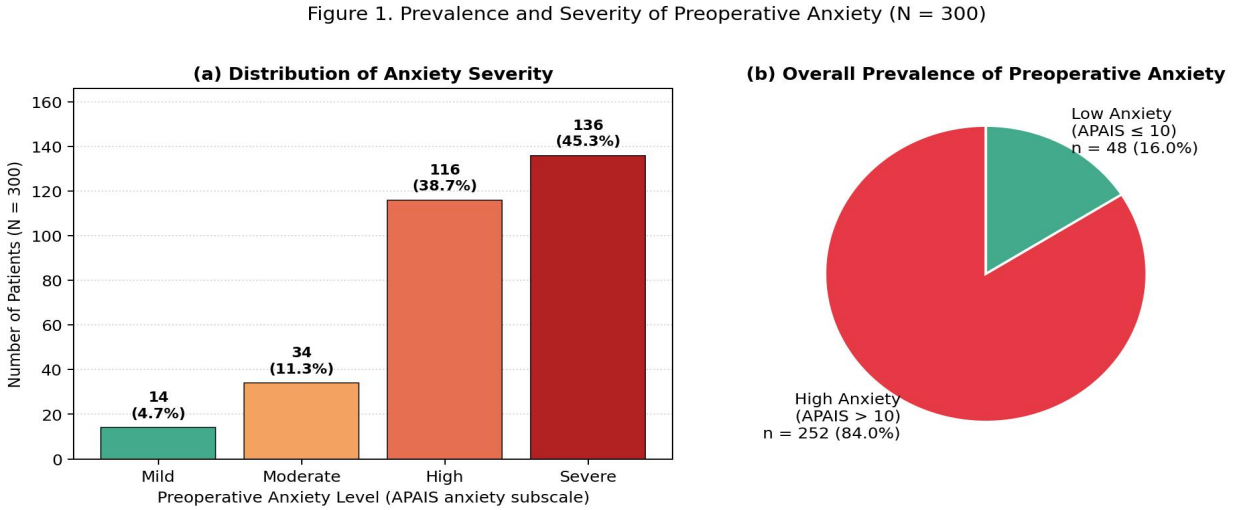


Figure 1. Prevalence and severity of preoperative anxiety among surgical patients (N = 300).

Table 3. Descriptive Statistics of APAIS Subscales and Fear-and-Concern Items (N = 300)

Scale / Item	Range	Mean	SD	Min	Max
APAIS Anxiety subscale	4–20	14.65	3.97	4	20
APAIS Information-need subscale	2–10	8.74	1.24	4	10
APAIS Total (six items)	6–30	23.39	4.98	8	30
Fear of Pain	1–5	3.93	0.97	1	5
Fear of Anaesthesia	1–5	3.87	0.98	1	5
Fear of Death	1–5	3.53	1.07	1	5
Fear of Outcome	1–5	3.75	1.05	1	5
Fear of the Unknown	1–5	3.81	0.96	1	5
Family Concerns	1–5	3.63	1.02	1	5
Financial Concerns	1–5	3.98	0.94	1	5

6.4 Associated Factors: Bivariate Analyses

A series of independent-samples t-tests and one-way ANOVA were used to determine socio-demographic and clinical variables that were significantly associated with the APAIS anxiety subscale. Women reported more anxiety than men (M = 15.02 vs. 14.21), though this difference did not reach conventional levels of significance ($t = 1.77$, $p = .078$). The mean levels of anxiety were significantly different among the educational strata ($F = 13.90$, $p < .001$) with the illiterate patients showing the highest mean (M = 16.18) and those with higher education showing the lowest mean (M = 12.44). Income also exerted a significant effect ($F = 7.08$, $p = .001$). The strongest single effect was the type of surgery: those patients who were to undergo a major surgery scored significantly higher than those undergoing minor surgery (M = 16.51 vs. 11.98, $t = 11.28$, $p < .001$) among clinical variables. First-time surgical patients (M = 15.61) reported higher anxiety than those with prior surgical experience (M = 12.68, $t = 6.30$, $p < .001$), and comorbid patients scored higher than non-comorbid patients (M = 15.60 vs. 13.99, $t = 3.56$, $p < .001$). There was no difference between

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the residences (p = .233) or surgical specialty (F = 0.59, p = .737). The mean anxiety scores at each of six key factors are shown in Figure 2.

Figure 2. Mean APAIS Anxiety Scores by Socio-demographic and Clinical Factors (N = 300)
Grey dashed line = APAIS clinical cut-off (score > 10)

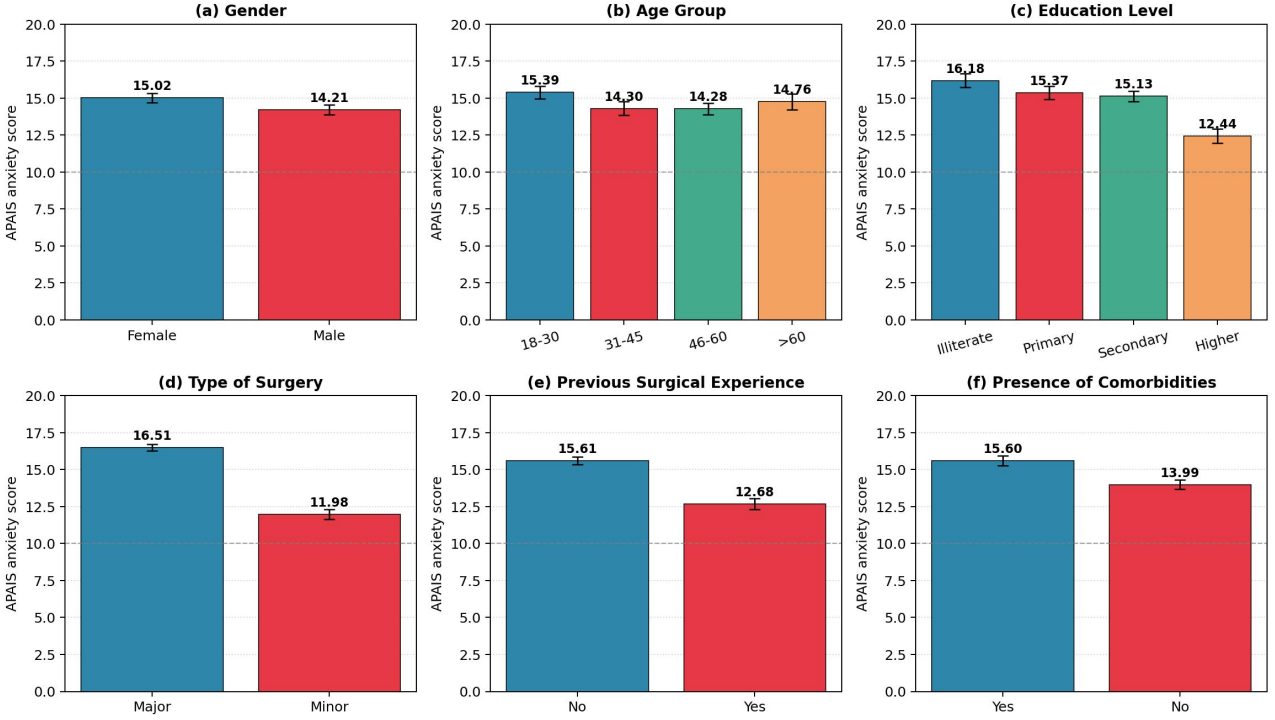


Figure 2. Mean APAIS anxiety scores across socio-demographic and clinical factors (N = 300).

Table 4. Bivariate Associations between Selected Factors and APAIS Anxiety Scores (N = 300)

Variable	Category	n	Mean	SD	Statistic	p
Gender	Female / Male	165 / 135	15.02 / 14.21	4.00 / 3.90	t = 1.77	.078
Age group	18–30 / 31–45 / 46–60 / > 60	82 / 97 / 80 / 41	15.39 / 14.30 / 14.28 / 14.76	3.83 / 4.51 / 3.58 / 3.49	F = 1.46	.226
Education	Illiterate / Primary / Secondary / Higher	56 / 65 / 98 / 81	16.18 / 15.37 / 15.13 / 12.44	3.45 / 3.61 / 3.46 / 4.30	F = 13.90	< .001
Income	Low / Middle / High	162 / 111 / 27	15.27 / 14.32 / 12.37	3.76 / 4.14 / 3.55	F = 7.08	.001
Residence	Urban / Rural	175 / 125	14.42 / 14.98	4.00 / 3.92	t = −1.20	.233
Type of surgery	Major / Minor	177 / 123	16.51 / 11.98	2.93 / 3.74	t = 11.28	< .001
Previous surgery	No / Yes	202 / 98	15.61 / 12.68	3.69 / 3.82	t = 6.30	< .001
Comorbidity	Yes / No	123 / 177	15.60 / 13.99	3.75 / 3.99	t = 3.56	< .001
Surgical specialty	7 categories	300	—	—	F = 0.59	.737
Information source	5 categories	300	—	—	F = 1.00	.410

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6.5 Fear Cognitions and Their Correlation with Anxiety

The patients had the highest mean scores on financial concerns (M = 3.98) and fear of pain (M = 3.93) and the lowest mean scores on fear of death (M = 3.53); all seven items were above a neutral value (Figure 3). Pearson correlations for each fear item with the APAIS anxiety subscale ranged from r = .48 (fear of the unknown) to r = .56 (fear of death), with all showing $p < .001$ (Figure 4). These magnitudes and directions of these correlations support the conclusions that cognitive-affective fear responses are proximal causal factors in the development of preoperative anxiety.

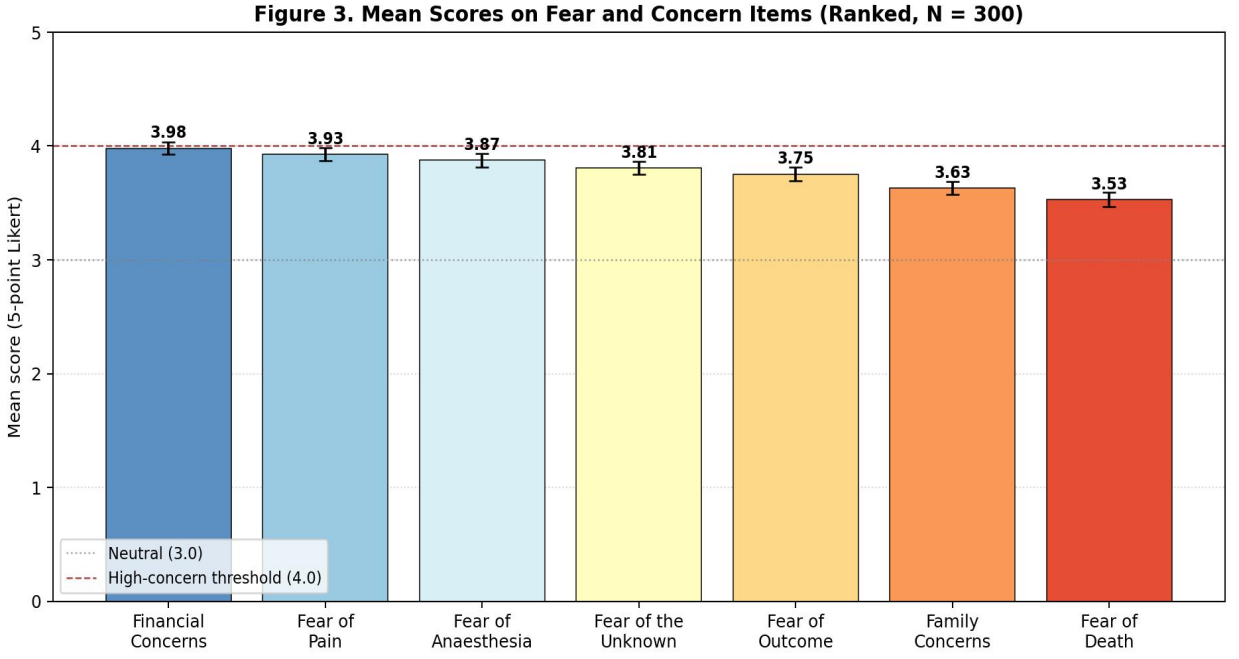


Figure 3. Mean scores on the Fear-and-Concern inventory (ranked, N = 300).

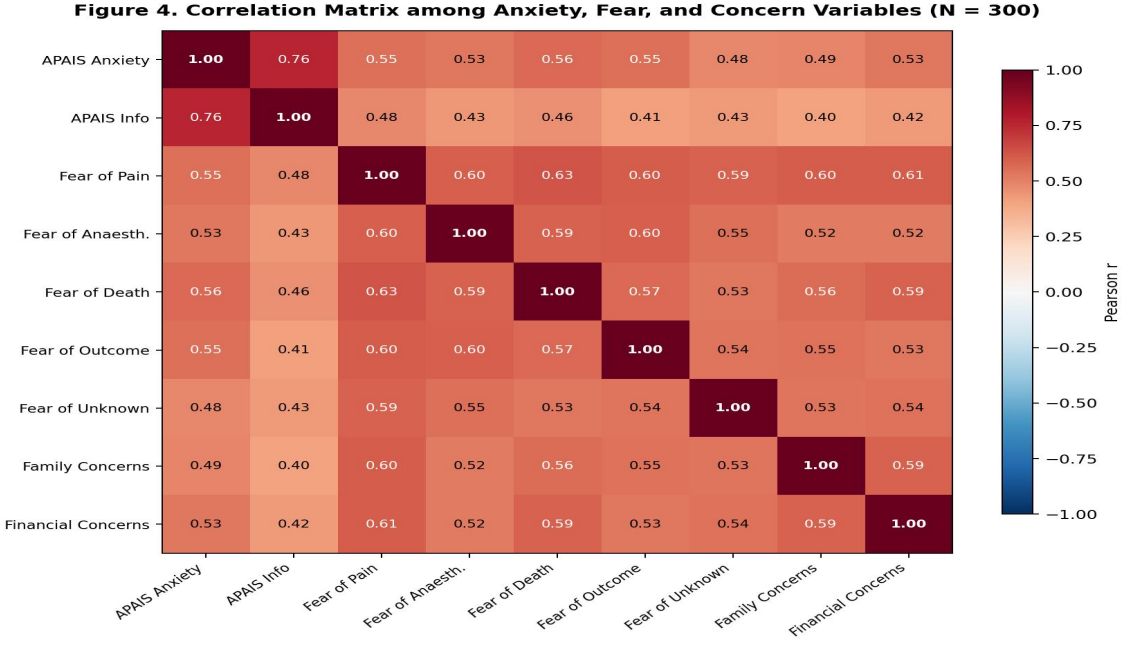


Figure 4. Pearson correlation matrix among anxiety, fear, and concern variables (N = 300).

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6.6 Prevalence of High Anxiety across Sub-groups

The proportion of patients exceeding APAIS cut-off was compared between sub-groups using Chi-square tests. Highest prevalence occurred in patients undergoing major surgery (96.6%) and those who had received no formal education or primary education (approx. 91%) and lowest in patients who had received a higher education (67.9%) and a high income (70.4%). Statistically significant differences were observed for surgery type ($\chi^2 = 48.82$, $p < .001$), education ($\chi^2 = 21.58$, $p < .001$), income ($\chi^2 = 9.23$, $p = .010$), and comorbidity ($\chi^2 = 3.92$, $p = .048$). The prevalence data for sub-groups is visually compared to the overall sample mean of 84.0% (see Figure 5).

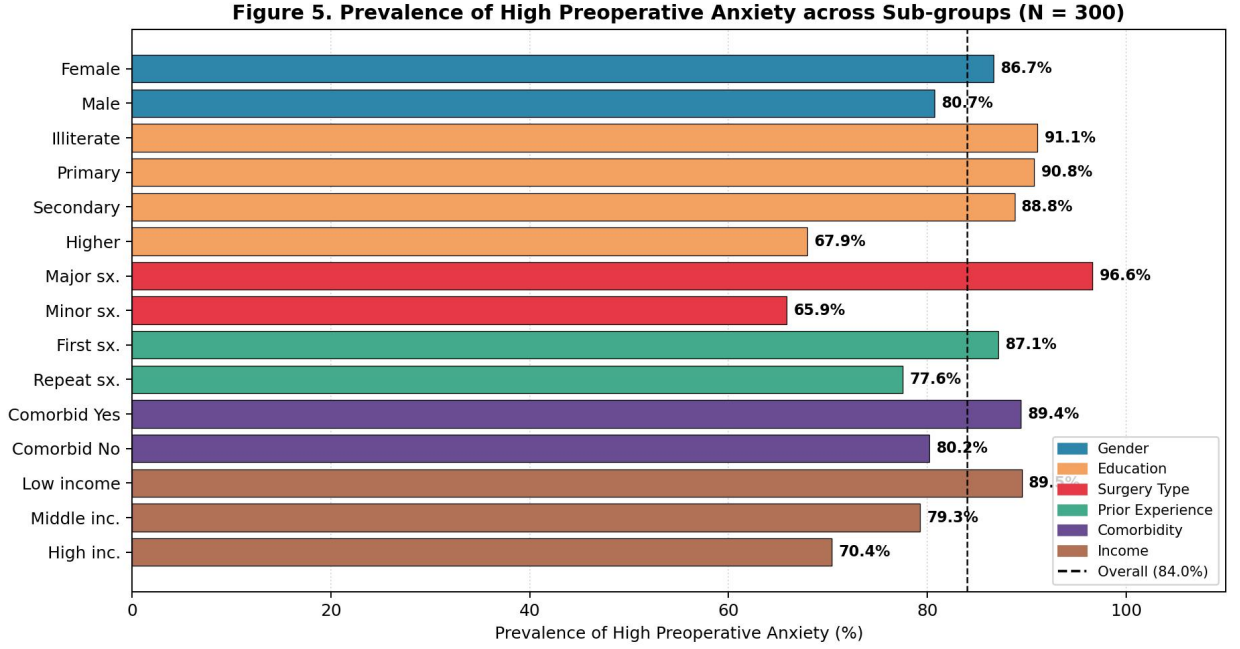


Figure 5. Prevalence of high preoperative anxiety across socio-demographic and clinical sub-groups (N = 300).

6.7 Independent Predictors: Multiple Regression

The multiple linear regression model with APAIS anxiety subscale scores as criterion and ten theoretically motivated predictors entered simultaneously yielded a well-fitting model, $F(10, 289) = 49.02$, $p < .001$, $R^2 = .629$, adjusted $R^2 = .616$. Seven predictors remained independently significant (Table 5): major surgery, no previous surgical experience, female gender, low education level, low income, presence of comorbidity, and fear of death all increased anxiety scores, while fear of pain and fear of anaesthesia each added significant, but modest, variance. When controlling for the other variables, age was not a significant predictor in the multivariable model.

Table 5. Multiple Linear Regression Predicting APAIS Anxiety Scores (N = 300)

Predictor	B	SE	t	p	Significance
Female (vs. male)	1.252	0.294	4.261	< .001	***
Age (years, continuous)	−0.003	0.009	−0.279	.781	ns
Low education	1.165	0.304	3.833	< .001	***
Major surgery	3.276	0.324	10.100	< .001	***
No previous surgery	2.133	0.320	6.670	< .001	***

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Predictor	B	SE	t	p	Significance
Comorbidity present	1.239	0.298	4.153	< .001	***
Low income	1.174	0.288	4.073	< .001	***
Fear of pain	0.487	0.208	2.344	.020	*
Fear of anaesthesia	0.464	0.197	2.356	.019	*
Fear of death	0.533	0.188	2.840	.005	**
(Constant)	3.500	0.788	4.441	< .001	—

Note. B = unstandardised regression coefficient; SE = standard error; R^2 = .629; Adjusted R^2 = .616; F(10, 289) = 49.02, p < .001. * p < .05; ** p < .01; *** p < .001; ns = not significant.

6.8 Conceptual Synthesis

The findings, when combined, are consistent with a socio-psycho-clinical model, whereby socio-demographic disadvantage, clinical vulnerability, cognitive-affective fear responses and contextual/institutional factors are all involved in the genesis of pre-operative anxiety, which in turn leads to a series of negative peri-operative outcomes. These relationships summarized in Figure 6 form a working conceptual framework that could be used for further screening, intervention, research or to inform next steps.

Figure 6. Conceptual Framework of Preoperative Anxiety and Its Associated Factors

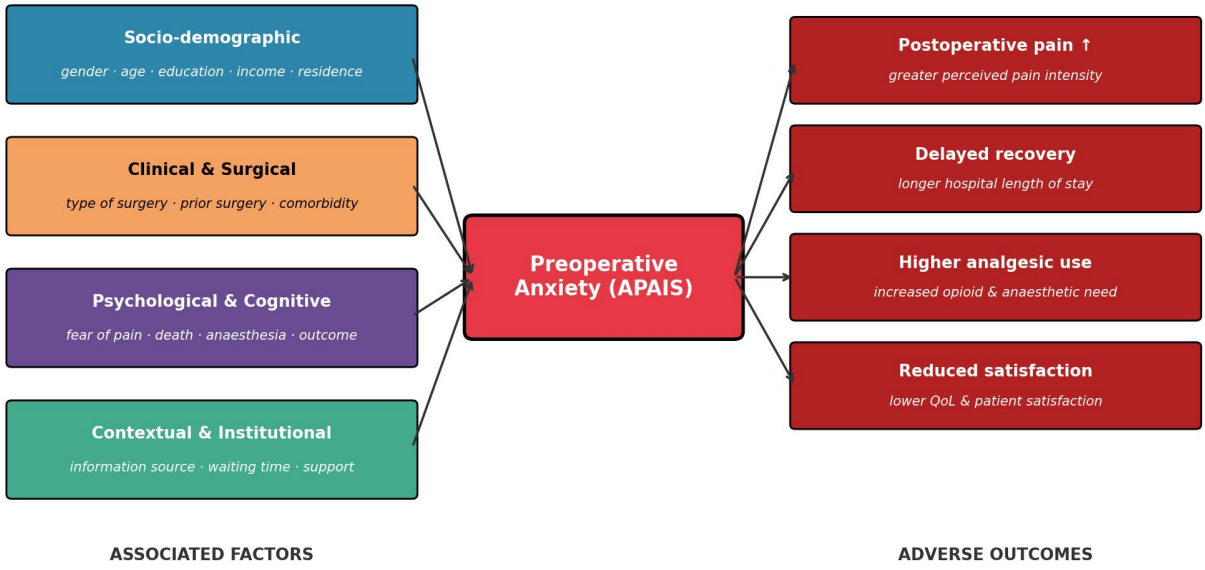


Figure 6. Conceptual framework of preoperative anxiety and its associated factors.

7. Discussion

This multi-site study confirms that the anxiety levels among adult surgical patients in Pakistan are very high, with 84.0% having scores above the APAIS clinical cut-off, and almost half being severely anxious. The pooled mean anxiety score (M = 14.65, SD = 3.97) is statistically higher than those reported in Turkey (Erkilic et al., 2017) and Ethiopia (Bedaso & Ayalew, 2019; Mulugeta et al., 2018) and similar to those reported by Matthias and Samarasekera (2012) and by Jawaid et al. (2007) in South Asia. This high national burden is probably due to the combined effect of

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resource limitations, high patient-to-provider ratios, and lack of routine screening of perioperative distress along the surgical pathway in Pakistan.

The pattern of associated factors found is similar to that found in the international literature and yet it has some locally relevant risks. The strong impact of major surgery, low education, low income, lack of previous surgical experience and comorbidity is consistent with the studies of Caumo et al. (2001), Karanci and Dirik (2003), and Nigussie et al. (2014). The independent contribution of fear-related cognitions supports the theoretical idea that anxiety is not only the result of objective clinical vulnerability, but is also influenced by cognitive appraisal (Ramsay, 1972; Boker et al., 2002; Kagan & Bar-Tal, 2008). The near universal desire for more procedural information (99.0% above the score-5 threshold) further confirms Wongkietkachorn et al. (2018) and highlights the need for communication that may be considered actionable within routine practice.

The gender effect was not significant at the bivariate level ($p = .078$), but remained significant in the regression model ($\beta = 1.25$; $p < .001$), indicating that the gender effect occurs, at least in part, indirectly through socioeconomic and clinical pathways that are not evident at the bivariate level and are captured in the multivariable adjustment (Ebirim & Tobin, 2011). The lack of age effect is in agreement with Celik and Edipoglu (2018) and refutes the intuitive notion that older patients will be more anxious. Taken together, these results support the integration of brief APAIS-based screening, pre-admission information, and psychoeducation into the surgical care provided in Pakistan (Mitchell, 2010; Stamenkovic et al., 2018).

8. Research Implications

The results are in favor of the regular use of brief APAIS screening in the Preoperative assessment of Pakistani patients. Structured provision of information by the nursing and anaesthesia teams should be targeted especially at sub-groups with a high risk of not understanding the information: women, low education or income, first surgical patient, and those with great or comorbid conditions. The policy of the health system should be to fund implementation research for scalable psychoeducational interventions which could lower anxiety related surgical morbidity.

9. Limitations

There were some restrictions to note. First, the cross-sectional design does not allow for causal statements to be made about the correlates and preoperative anxiety. Secondly, multi-site sampling improves external validity, but all sites were public tertiary centres, therefore, caution should be used when generalising to private sector, secondary level and rural level healthcare facilities. Third, self-report is always susceptible to social-desirability bias, especially in the fear-related items. Fourth, physiological measures such as heart rate, blood pressure and cortisol were not included in the study and would have triangulated with the psychometric results. Fifth, this was a limited outcome domain, specifically preoperatively anxiety was assessed but not postoperatively pain, recovery or satisfaction, and should be explored in future longitudinal studies.

10. Conclusion and Recommendations

The present multi-site cross sectional study confirms that preoperative anxiety is a global and clinically important phenomenon in adult surgical patients in the Pakistani tertiary care hospitals, as 84.0% of the patients were found above the clinical cut off of APAIS and almost half of them were severely anxious. The socio-demographic disadvantage factors (female gender, low education, low income), clinical vulnerability factors (major surgery, no previous surgical experience, comorbid conditions), and cognitive-affective fear responses (fear of death, fear of pain, fear of anaesthesia) were all linked to higher anxiety levels, and these factors accounted for about 63% of the variance in APAIS scores in the multivariable model. The results highlight the role of preoperative anxiety as a nonaccidental perioperative risk factor that should be taken into account. The following are some evidence-based recommendations. First, there is a need to incorporate brief screening based on the APAIS into the normal assessment of patients prior to any surgical procedure in public sector hospitals and record the score of the anxiety with the normal physiological parameters. Second, the provision of information should be structured, need-based, and institutionalized for both surgical and anaesthetic teams, particularly for first-time surgical patients and with limited health literacy. Third, a specific approach to preoperative counselling should be developed, using validated brief psychoeducational approaches that are targeted towards patients with major surgery or with significant fear of death, anaesthesia, or pain. Fourth, surgical nurse and

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anaesthesiologist professional training curricula should incorporate skills relating to psychosocial risk assessment and communication. Finally, future studies should employ longitudinal and interventional designs to establish causal pathways, to assess the efficacy of contextually adapted intervention, and to quantify the downstream effect of the intervention on postoperative pain, recovery and patient satisfaction. In total, these actions hold the promise of bringing about tangible improvements in surgical outcomes in Pakistan's resource-limited health system through better recognition of anxiety.

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