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Assessment of Factors Influencing Heightened Patient Anxiety Levels in the Operating Theatre: A Single-Centre Cross-Sectional Study

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Declaration:

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A. S.: Conceptualization, Methodology, Investigation, Data Curation, Writing – Original Draft. B. W. A.: Supervision, Methodology Review, Formal Analysis, Writing - Review & Editing. Both authors reviewed and approved the final manuscript.

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ABSTRACT

Background: Perioperative anxiety is a common phenomenon that heightens once in the operating theatre and can significantly influence patient surgical outcome and overall surgical experience. Anxiety can be influenced by communication, demographic, and operating theatre environment.

Objective of the study: The aim of this study is to assess the factors that influence heightened patient anxiety levels in the operating theatre and to investigate the association between patient anxiety levels and communication, demographic and the operating theatre environment.

Methodology: This study employed a quantitative descriptive cross-sectional research design. The study was conducted at the Choitram Memorial Hospital utilizing patients from 18 years and above that are undergoing surgical procedures at the major operating theatre. The study was conducted with 130 participants. Non-probabilistic convenience sampling technique was used for data collection from 2nd May to 5th June 2026. Data was collected using structured questionnaire and SPSS version 28 software was used for data analysis using descriptive and inferential statistics.

Findings: A major finding was the progressive increase in anxiety as surgery approached. Mean anxiety increased from 3.86 on the evening before surgery to 5.32 while patients were in the ward on the day of surgery and reached 7.46 in the operating room immediately before anaesthesia. The Friedman analysis confirmed that this change was statistically significant, while Kendall's W of 0.667 indicated substantial within participant variation across the three measurement points. More than half of participants recorded operating room anxiety scores between 8 and 10, and approximately one quarter selected the maximum score of 10.

Conclusion: This study demonstrates that patient anxiety increased substantially as surgery became more immediate, reaching its highest level in the operating room before anaesthesia. Demographic characteristics, including age, gender, education, and previous surgical experience, were not significantly associated with operating room anxiety. In contrast, operating theatre environmental factors showed consistent positive associations with anxiety.

Keywords: Anxiety, Operating Theatre, Perioperative, Anaesthesia.

INTRODUCTION

Surgery remains a critical component of patient care saving millions of lives around the world (1). However, it often comes with significant psychological consequences such as anxiety on the patient. For many, surgery is still viewed as a battle between life and death. Preoperative anxiety, characterized by feelings of tension, apprehension, nervousness, and worry in the period leading up to surgery, is a common phenomenon affecting an estimated 60–80% of surgical patients(2) and can significantly impact patient psychological wellbeing and surgical outcome through distress, fear, distorted cognition and increased pain, higher anaesthetic requirement, prolonged recovery time and longer hospital stay(3). Despite advancements in surgical techniques and anaesthetic management such as minimal invasive surgeries like laparoscopic, robotic surgeries (4,5), it remains a challenge for healthcare workers.

Patient anxiety in the operating theatre is a significant concern that can negatively impact surgical outcomes, recovery, and overall patient experience (3). Anxiety levels often heightened once in the operating room due to various factors, including fear of the unknown, perceived lack of control, and concerns about pain or complications(4,6). These psychological experiences often trigger physiological responses on patient vital signs including increase in pulse rate, blood pressure, and autonomic response.

Several factors have been found to contribute to heightened anxiety in the operating theatre. including demographic variables (age, gender, educational level), psychosocial factors (fear of death, fear of unknown, loss of control, previous surgical experiences, intraoperative emergence, fear of complications, postoperative pain), and environmental influences (noise, lighting, medical equipment, and staff communication styles) (7–11). However, the relative impact of these factors may vary across different cultural, institutional, and individual contexts, thus, making it essential to assess and understand them within specific healthcare settings such as the operating theatre.

Despite the well documented burden of perioperative anxiety on patient experience, there remains a clear gap in the evidence base regarding what specifically drives or heightens anxiety within the operating theatre environment. In particular, the literature is scanty in relation to contextually grounded list of the primary operating theatre related factors that intensify perioperative anxiety, especially when considering variations in facility culture, staff communication behaviours, environmental stressors (noise, cold temperature, unfamiliar equipment), and procedural routines. This gap limits the ability of perioperative teams to design targeted, evidence-based interventions that address the most influential theatre specific triggers of anxiety. Also, while most studies focused on the preoperative and postoperative impact of anxiety on patients, only a few studies have examined the patient experiences in the operating theatre environment and the factors that heighten patient anxiety in the operating theatre. Moreover, most of the existing studies have been conducted in high-income countries, with limited data from low- and middle-income settings, hence, results from those studies may not reflect a common consensus of all race and backgrounds due to influencing factors such as culture and beliefs, education, technology and economy. This research aims to provide valuable insights into the anxiety influencing factors in the operating theatre, paving the way for improved patient care and surgical outcomes.

Aim and Objectives

The aim of this study is to assess the factors that influence heightened patient anxiety levels in the operating theatre immediately prior to surgery and to investigate the association between patient anxiety levels and communication, demographic and the operating theatre environment.

The specific objective of this study is:

- To assess the factors that influence heightened patient anxiety levels in the operating theatre immediately prior to surgery
- To examine the association between patient anxiety levels and patient demographic characteristics.
- To assess the association between patient anxiety levels and communication factors, operating theatre environmental factors, and specific fears related to surgery and anaesthesia.

METHODOLOGY

Study Design and Setting

This study utilized a quantitative descriptive cross-sectional research design to collect data. This study design dictates that surveys of exposure and outcome statuses are performed at a single point in time. This study is conducted on post-operative patients with a focus on the operating theatre environment anxiety heightening factors. This study was conducted at the Choithram Memorial Hospital, Freetown Sierra Leone on patients undergoing surgical procedures at the major operating theatre complex. The study was conducted between the period from 2nd May to 5th of June 2026.

Study Population

This study was conducted on adult patients 18 years and above that are undergoing surgical procedures in the major operating theatres at Choithram Hospital.

Eligibility Criteria

The inclusion criteria for this study were all adult patients 18 years and above on elective surgeries who consented, can read English Language and Post-op surgery day1 and Day 2 patients. While the exclusion criteria include emergency surgeries, below 18 years, a history of mental illness or cognitive impairment, and incomplete responses to the study questionnaire.

Sampling and Sample Size

A non-probabilistic convenience sampling method was employed for this study. The study utilized a convenience sampling for the period of data collection from 2nd May to 5th of June 2026. The sample size for this study was estimated by using Yamane's sample size formula (12).

$$= \frac{N}{1 + N(e)^2}$$

Where:

n="sample size", N="population size" and e="margin of error"

Given: N=168, e=0.05

Therefore:

$$n = \frac{168}{1 + 168(0.05)^2} \approx 118$$

To account for a 10% non-response rate:

$$10\% \text{ of } 118 = \frac{10}{100} \times 118 \approx 12$$

Therefore, the final sample size for the study is 130 participants.

Data Collection / Study Procedures

Data collection process for this study commenced after ethical approval and final approval from my research supervisor and the hospital management. Data were collected using a structured, researcher developed questionnaire designed to assess the level of preoperative anxiety and factors associated with heightened anxiety among patients awaiting surgery. Preoperative anxiety was assessed using an 11-point Numerical Rating Scale (NRS), ranging from 0 (not anxious at all) to 10 (extremely anxious). The structured questionnaires were administered from the 2nd of May 2026 to the 5th of June 2026. The questionnaires were administered after a clear explanation of the research objectives and participant consent and were recollected after 24 hours. The participants were requested complete the questionnaires immediately after recovery from anesthesia. All the questions were filled by the same participants at the three different perioperative stages, mostly on the first day after surgery. They recalled their anxiety levels by comparing their levels of tension and unease at various stages of their perioperative periods. The data from the filled

questionnaires were then accurately inputted into Microsoft excel for storage and the file was encrypted with a password.

Statistical / Qualitative Analysis

Raw data from the questionnaires were first inputted into Microsoft excel for storage and to organize it into readable format that makes it easier to extract actionable insights. The data was later exported into Statistical Package for Social Sciences or SPSS (version 28 IBM CORP) which was the software used to analyze the data. Quantitative data was analyzed using descriptive statistics (mean, median, standard deviations and interquartile ranges) to identify trends of anxiety. Nonparametric statistical tests were used for group comparisons and associations.

Ethical Considerations

This study was conducted in accordance with the Declaration of Helsinki. Ethical Approval was done by the Institutional Review Board (IRB) of FOCOS Orthopaedic Hospital with reference number FOCOS/IRB/26/002. Formal written informed consent was obtained from the participants. Also, a formal written request was sorted from Hospital Management for the conduct of the research in the hospital. Ethical consideration of confidentiality and anonymity of participants was strictly adhered to throughout the research.

RESULTS

Participant characteristics and operating room anxiety

As indicated in Table 1, the mean age of participants was 42.6 years, SD 15.1, with a range of 19 to 79 years. The sample consisted of 67 males (51.5%) and 63 females (48.5%). 59 participants (45.4%) had university education, while 50 participants (38.5%) had secondary education. 14 (10.8%) of the participants had primary education and 7 (5.4%) had no formal education. 79 (60.8%) of participants had no previous surgical experience.

There was no statistically significant correlation between age and operating room anxiety (Spearman $\rho = -0.042$, $p = 0.633$). The median operating room anxiety was 8.0 for males and females, and there was no significant difference between males and females ($U = 1988.0$, $p = 0.564$). The median anxiety score for the participants with no formal education was 10.0, while the median anxiety score for the other education groups was 8.0. Overall, there was no statistically significant difference ($H = 4.153$, $p = 0.245$). Prior surgical experience was not related to operating room anxiety either ($U = 1846.5$, $p = .418$).

Table 1: Participant characteristics and their association with operating room anxiety

Characteristic	n (%) or descriptive statistic	Operating room anxiety, median (IQR)	Test statistic	p value
Age, years	42.6 (15.1), mean (SD)		$\rho = -0.042$	0.633
Gender			$U = 1988.0$	0.564
Female	63 (48.5)	8.0 (6.0 to 9.0)		
Male	67 (51.5)	8.0 (6.0 to 10.0)		
Educational level			$H = 4.153$	0.245
No formal education	7 (5.4)	10.0 (9.0 to 10.0)		
Primary	14 (10.8)	8.0 (6.0 to 9.0)		
Secondary	50 (38.5)	8.0 (6.0 to 9.0)		
University	59 (45.4)	8.0 (6.0 to 9.0)		
Previous surgery			$U = 1846.5$	0.418
Yes	51 (39.2)	8.0 (6.0 to 9.0)		
No	79 (60.8)	8.0 (6.0 to 10.0)		

IQR, interquartile range; SD, standard deviation; ρ , Spearman correlation coefficient; U, Mann Whitney U statistic; H, Kruskal Wallis statistic.

Pattern of perioperative anxiety

The results (Table 2) indicate that, as participants neared the operating room, the anxiety level increased significantly. Mean anxiety regarding the forthcoming surgery was 4.11, SD 2.14, while anxiety regarding anesthesia was 3.52, SD 2.31. The average anxiety level the night before surgery was 3.86 (SD = 2.52). This increased to 5.32 (SD 2.57) while patients were in the ward on the day of surgery and reached 7.46 (SD 2.40) in the operating room immediately before anesthesia.

The median operating room anxiety score was 8.0 (IQR 6.0 to 9.75). 76 participants (58.5%) reported scores of operating room anxiety between 8 and 10, including 33 participants (25.4%) with the maximum score of 10. Anxiety increased significantly when comparing the three time points: before surgery in the evening, on the day of surgery in the ward and in the operating room before anesthesia, Friedman $\chi^2 = 173.322$, $p < 0.001$. Kendall's W was .667 indicating substantial within participant change. Significant increases were also found with pairwise Wilcoxon tests between evening prior to surgery and the ward, evening prior to surgery and the operating room, and the ward and the operating room (all Bonferroni adjusted p values < 0.001).

The greatest numerical change occurred between the ward and the operating room with a mean increase in the anxiety score of 2.14 points. Mean score improved from 3.60 points from preoperative evening to operating room. The medians showed the same pattern, rising from 3.5 on the evening before surgery to 5.0 on the ward and 8.0 just before anesthesia. The findings thus indicate a continuous increase in anxiety throughout the perioperative pathway, rather than a single increase at one measurement point.

Table 2: Distribution and progression of perioperative anxiety

Anxiety measure	Mean (SD)	Median (IQR)
Upcoming surgery	4.11 (2.14)	4.0 (2.0 to 5.0)
Anaesthesia	3.52 (2.31)	3.0 (2.0 to 5.0)
Evening before surgery	3.86 (2.52)	3.5 (2.0 to 5.0)
Ward on day of surgery	5.32 (2.57)	5.0 (4.0 to 7.0)
Operating room before anaesthesia	7.46 (2.40)	8.0 (6.0 to 9.75)

For the three sequential measurements from the evening before surgery to the operating room, Friedman $\chi^2 = 173.322$, $p < 0.001$, Kendall's W = 0.667.

Specific fears and concerns associated with operating room anxiety

Several fears were significantly associated with higher operating room anxiety. Participants who feared not waking after anesthesia had a median anxiety score of 9.0 compared with 8.0 among those without this fear, U = 1088.5, $p = 0.004$. Fear of complications was also associated with greater anxiety, U = 1211.5, $p < 0.001$. Concern about family showed a particularly clear difference, with median scores of 8.0 among participants reporting this concern and 6.0 among those who did not, U = 646.0, $p < 0.001$.

Fear of death, U = 1213.0, $p = 0.024$, and fear of disability or dependency, U = 1047.0, $p = 0.001$, were also significantly associated with operating room anxiety. In contrast, fear of postoperative pain and fear concerning surgical results were not significantly associated with the operating room anxiety score. This has been summarized in Table 3

Table 3: Specific fears and their association with operating room anxiety

Fear or concern	Yes, n (%)	Median anxiety if Yes	Median anxiety if No	U statistic	p value
Not waking after anaesthesia	34 (26.4)	9.0	8.0	1088.5	0.004
Complications during surgery	74 (57.4)	9.0	7.0	1211.5	<0.001
Postoperative pain	100 (76.9)	8.0	8.0	1339.5	0.370
Surgical results	98 (75.4)	8.0	7.0	1310.5	0.159
Concern about family	104 (80.0)	8.0	6.0	646.0	<0.001
Death	34 (26.2)	9.0	8.0	1213.0	0.024
Disability or dependency	36 (27.7)	9.0	8.0	1047.0	0.001

Operating theatre environmental factors

All five measured environmental factors were significantly and positively correlated with operating room anxiety. Operating room atmosphere or sounds showed the strongest association, $\rho = 0.508$, $p < 0.001$, followed closely by seeing surgical instruments, $\rho = 0.497$, $p < 0.001$. The number of people in the operating room, seeing technical equipment, and waiting time before surgery were also positively associated with anxiety. All five environmental associations remained statistically significant at $p < 0.001$. This has been summarized in Table 4

Table 4: Association between operating theatre environmental factors and operating room anxiety

Environmental factor	Mean (SD)	Median (IQR)	Spearman ρ	p value
Seeing technical equipment	2.72 (2.26)	2.0 (1.0 to 3.75)	0.361	<0.001
Seeing surgical instruments	3.06 (2.62)	2.0 (1.0 to 5.0)	0.497	<0.001
Number of people in operating room	3.14 (2.42)	3.0 (1.0 to 4.0)	0.368	<0.001
Waiting time before surgery	3.43 (2.64)	3.0 (1.0 to 5.0)	0.351	<0.001
Operating room atmosphere or sounds	5.18 (2.94)	5.0 (3.0 to 8.0)	0.508	<0.001

Communication factors and operating room anxiety

Most participants reported receiving adequate surgical information, 92.3%, while 76.9% reported receiving adequate information about anesthesia. Almost all participants, 95.4%, felt comfortable asking questions, and 96.2% indicated that more detailed explanations could reduce their anxiety.

None of the communication variables showed a statistically significant association with operating room anxiety. Participants who reported inadequate information about anesthesia had a median anxiety score of 9.0 compared with 8.0 among those reporting adequate information, but the difference was not statistically significant, $U = 1220.0$, $p = 0.117$.

Table 5: Communication factors and operating room anxiety

Communication variable	Yes, n (%)	Median anxiety, Yes	Median anxiety, No	U statistic	p value
Adequate information about surgery	120 (92.3)	8.0	8.5	517.5	0.467
Adequate information about anaesthesia	100 (76.9)	8.0	9.0	1220.0	0.117
Comfortable asking questions	124 (95.4)	8.0	8.5	342.0	0.740
More detailed explanation would reduce anxiety	125 (96.2)	8.0	9.0	295.0	0.835

DISCUSSION

A major finding was the progressive increase in anxiety as surgery approached. Mean anxiety increased from 3.86 on the evening before surgery to 5.32 while patients were in the ward on the day of surgery and reached 7.46 in the operating room immediately before anesthesia. The Friedman analysis confirmed that this change was statistically significant, while Kendall's W of 0.667 indicated substantial within participant variation across the three measurement points. More than half of participants recorded operating room anxiety scores between 8 and 10, and approximately one quarter selected the maximum score of 10.

This pattern is important because it suggests that assessment performed only during routine preoperative preparation may underestimate the distress experienced immediately before anesthesia. The operating theatre represents a transition from anticipation to imminent exposure to surgical procedure. The unfamiliar setting, technical equipment, presence of multiple staff members, surgical instruments, sounds, and loss of personal control may become more salient once the patient enters the theatre. This interpretation is consistent with the literature reviewed in this study, which identifies fear of the unknown, perceived loss of control, environmental stimuli, pain, complications, and anesthesia related concerns as important components of perioperative anxiety (3,4,9,11).

Fear of surgical complications was significantly associated with operating theatre anxiety, with a median anxiety score of 9.0 among patients reporting this fear compared with 7.0 among those without it. This finding is consistent with Bedaso and Ayalew (13) a study which identified fear of surgical complications as an important correlate of preoperative anxiety. Similarly, fear of not waking up after anaesthesia, fear of death, and fear of disability or dependency were significantly associated with anxiety. These findings agree with previous studies in Ethiopia, where concerns about death, disability and dependency were associated with increased preoperative anxiety (14). Such fears may reflect patients' uncertainty about surgical safety, survival and their ability to regain independence after surgery. They may be particularly relevant immediately before anaesthesia, when patients anticipate losing conscious control over their circumstances.

In contrast, although fear of postoperative pain and concern about surgical outcomes were common, neither was significantly associated with operating theatre anxiety in the present study. This differs from findings reported by Mulugeta et al. (10), where fear of postoperative pain and unfavourable surgical outcomes were significantly associated with preoperative anxiety. The differences may be explained by variations in surgical procedures, patient characteristics, healthcare settings and the timing of anxiety assessment. Importantly, the absence of statistical significance does not necessarily imply that these concerns are clinically unimportant. Rather, the findings suggest that fears relating to immediate survival and potential loss of independence were more strongly associated with anxiety in this study. Nevertheless, given the observational design, these relationships should be interpreted as associations rather than evidence of causation.

The strongest and most consistent findings related to the operating theatre environment. All the environmental variables measured were positively correlated with operating room anxiety. The strongest association was with operating room atmosphere or sounds, followed by seeing surgical instruments. Significant associations were found between anxiety and the number of people in the operating room, technical equipment, and waiting time before surgery.

The results provide direct support for the assumption underlying the study that the theatre itself can increase anxiety. Existing literature has identified unfamiliar medical equipment, noise, lighting, staff activities and the wider operating theatre environment as possible sources of anxiety (9,11). The current findings provide evidence in context from Choithram Memorial Hospital and show that these environmental characteristics exist and are related to the level of anxiety reported by patients.

IMPLICATIONS / RECOMMENDATIONS

The findings have direct implications for perioperative nursing, anesthetic practice, and operating theatre management. The marked rise in anxiety after patients entered the operating room indicates that anxiety assessment should not end on the ward. A brief reassessment immediately before anesthesia may identify patients whose distress increases rapidly during transfer and theatre preparation.

The strong environmental associations suggest that relatively modifiable theatre practices deserve attention. Unnecessary exposure to surgical instruments may be minimized before induction. Preoperative assessment should also extend beyond conventional demographic risk profiling. The lack of significant associations with age, gender, education, and previous surgery indicates that anxiety screening should be offered broadly rather than restricted to demographic groups assumed to be at increased risk. Questions about fear of complications, anesthetic recovery, death, disability, and concerns about family may provide more clinically relevant information about individual distress.

LIMITATIONS

Several limitations should be considered. First, the study was conducted at a single private tertiary hospital, which limits the extent to which the findings can be generalized to other hospitals in Sierra Leone or other health systems. Second, convenience sampling may have introduced selection bias because participation depended on patient availability and willingness to participate.

Third, the study relied on patient reported anxiety and retrospective recollection of anxiety at different perioperative stages. Recall may therefore have influenced some responses. The 0 to 10 anxiety ratings provide a simple measure of perceived anxiety but do not constitute a complete diagnostic assessment of anxiety. The binary communication questions may also have been insufficiently sensitive to differences in communication quality.

Finally, observational design establishes associations rather than causal relationships. For example, a correlation between operating room sounds and anxiety does not establish that sounds alone caused the anxiety.

CONCLUSION

This study demonstrates that patient anxiety increased substantially as surgery became more immediate, reaching its highest level in the operating room before anesthesia. Demographic characteristics, including age, gender, education, and previous surgical experience, were not significantly associated with operating room anxiety.

In contrast, operating theatre environmental factors showed consistent positive associations with anxiety. Operating room atmosphere or sounds and seeing surgical instruments demonstrated the strongest relationships. Specific fears concerning complications, not waking after anesthesia, death, disability or dependency, and family were also associated with greater anxiety.

Communication variables were not statistically associated with operating room anxiety, although most participants indicated that more detailed explanations could reduce their anxiety. Collectively, the findings suggest that heightened operating room anxiety is influenced more strongly by immediate environmental exposure and specific patient concerns than by the demographic characteristics examined in this study.

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AUTHOR CONTRIBUTIONS (CRediT)

Abu Sesay: Conceptualization, Methodology, Investigation, Data Curation, Writing - Original Draft.
Bright Worlanyo Aklamanu: Supervision, Methodology Review, Formal Analysis, Writing - Review & Editing.

CONFLICT OF INTERESTS

The authors declare no conflicts of interest.

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This work received no external funding.

DATA AVAILABILITY

Anonymized data may be made available from the corresponding author upon reasonable request and subject to institutional approval.

ETHICAL APPROVAL

Ethical Approval was done by the Institutional Review Board (IRB) of FOCOS Orthopaedic Hospital with reference number FOCOS/IRB/26/04/002. The approval was issued on the 29th of April 2026.

ARTIFICIAL INTELLIGENCE USE DECLARATION

ChatGPT was the AI tool used for editing and organizing the research work.

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