

## Assessment of Anxiety in Patients Awaiting Surgery in a Referral Hospital in Rwanda

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### Abstract

#### Background

Preoperative anxiety is a common occurrence in patients awaiting surgery. Preoperative anxiety adversely affects anaesthesia and surgical process and increases the risk of postoperative complications. Level of anxiety in patients awaiting surgical procedures in Rwanda is not well known or documented.

#### Objective

To assess preoperative anxiety and associated factors of patients awaiting surgery at a teaching hospital in Kigali.

#### Methods

A cross-sectional study design was adopted. A convenience sampling method was used to recruit 151 adult patients, and the instrument entitled “Pre-operative Intrusive Thoughts Inventory (PITI)” anxiety scale was used to assess anxiety. Descriptive and inferential statistics were used to analyse data.

#### Results

Nearly three quarters (72.8%) of participants had a high level of clinically significant pre-operative anxiety. Patients awaiting orthopaedic surgery were 10 times more likely to have clinically significant pre-operative anxiety (OR 10.22; 95% CI 1.144 - 91.304; P= 0.037), whereas participants with impending Cesarean (OR: 0.03; 95% CI-0.002-0.568; P=0.018), and older participants had decreased pre-operative anxiety levels (OR: 0.22; 95% CI 0.075 - 0.650; P=0.006).

#### Conclusion

Patients awaiting surgery had clinically significant pre-operative anxiety level (72.8%) associated with age, medical diagnosis and type of surgical intervention. A preoperative intervention incorporating individual characteristics is needed to reduce preoperative anxiety.

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**Keywords:** Preoperative, anxiety, patients, education

## Background

Preoperative anxiety is almost unavoidable since surgery is a stressful event. In general, 10%-30% of the population seeking healthcare present with anxiety. [1] The World Health Organization (WHO) estimated that the total global volume of surgeries in 2012 was 312.9 million.[2] In Rwanda, 2,758 surgeries were performed in 2011 during a six-month period at one hospital.[3] Despite the frequency of surgical interventions, and the attendant anxiety and its adverse effects, anxiety is not typically assessed perioperatively.[4,5]

Perioperative anxiety starts at the time of scheduling surgery and peaks at the time of admission to the surgical unit.[4] Anxiety is known to cause abnormal hemodynamics due to sympathetic, parasympathetic and endocrine stimulation, and it is responsible for the person's ‘fight or flight’ response from danger.[6]

The physiological changes, secondary to preoperative anxiety, negatively affect the anaesthesia phases, surgical process, and surgical outcomes.[7]

Preoperative anxiety may lead to a wide range of physiological and psychological responses. Patients with high anxiety had tachycardia, hypertension, and a higher risk of hypothermia than patients with low or moderate anxiety levels.[6,7] Patients with higher preoperative anxiety also require more pain medication, a greater amount of propofol to reach light sedation, longer extubation time, and shiver more as a side effect of anaesthetic agents. Patients may also experience increased tension, fear, nervousness, and agitation,[8,9] and have longer hospitalization and increased healthcare costs. [10,11]

Preoperative anxiety is a major concern and much could be done by nurses and physicians involved in patient

care on pre-surgery wards to reduce anxiety levels and improve patient outcomes. There is limited information and research on perioperative anxiety in Rwanda. Therefore this study aimed to assess the preoperative anxiety level and associated factors of patients awaiting surgery in a referral hospital in Rwanda.

## Methods

### Design

We used a descriptive cross-sectional study design to assess anxiety in adult patients at the surgical department at the University Teaching Hospital of Kigali (UTHK) in Rwanda. The study period was from 1 March until 30 April 2017.

### Participants' recruitment

The study population consisted of patients who were aged between 18 to 80 years, and scheduled for elective surgeries under general or spinal anaesthesia. The study population was estimated based on the 241 surgical cases during the same period the previous year (2016). Patients awaiting emergency surgery, those who were unconscious or had known mental health conditions, or unable to understand English or Kinyarwanda were excluded from the study.

By using Yamane's formula, a confidence interval of 95%, and margin error of 5%, the sample size consisted of 151 participants. A convenience sampling strategy was used to recruit 151 participants meeting the inclusion criteria of patients hospitalized on the pre-surgery ward during the data collection period. The theatre scheduling lists of impending operations were used to identify the study participants. Participants were then approached and recruited on the pre-surgical wards the day before surgery.

### Measures

A self-administered questionnaire was used to collect data. The questionnaire consisted of three sections including demographics, health information, and the anxiety scale. The Pre-operative Intrusive Thoughts Inventory (PITI) was an anxiety scale developed by Crockett, Gumley and Longmate (2007).[16] The scale was considered a valid and reliable tool with a Cronbach's Alpha score of 0.91. Permission was obtained from the author to use the instrument.

Section A: Demographic characteristics (5 questions)  
Section B: Participants' health information (7 questions)  
Section C: Pre-operative Intrusive Thoughts Inventory (PITI) anxiety scale (15 questions). There were four possible responses to the anxiety scale questions with the following scores: "Not at all," (0) "some of the time," (1) "often" (2) and "most of the time" (3). The total marks ranged from zero to 60. The outcome measure of anxiety was dichotomous: clinically significant anxiety (score  $\geq 15$ ) and non-clinically significant anxiety ( $< 15$  score).[12]

### Data collection

Data were collected one day before surgery, while patients were in the hospital ward at UTHK. The self-administered questionnaire was distributed to the participants who had accepted to participate, knowing that it was voluntary and that they could withdraw at any time without penalty. Participants who were illiterate and unable to complete the questionnaire independently were given reading and writing assistance in a private room in the hospital. The investigator collected all the completed questionnaires.

### Data analysis

Descriptive and inferential statistics were used to analyse data. The data were coded, checked, cleaned and entered into the Statistical Package for Social Sciences (SPSS) version 20 for analysis. All scores were summed to get the overall participants' anxiety level, and the total score was either termed clinically significant anxiety (score  $\geq 15$ ), or non-clinically significant anxiety ( $< 15$  score). The Chi-square ( $\chi^2$ ) test was used to measure the relationship between demographic characteristics, medical diagnosis, types and history of surgery, anaesthesia use, and level of anxiety among patients awaiting surgery. A logistic regression test was used to predict anxiety-associated factors. The significance level was set at  $p \leq 0.05$ .

### Ethical considerations

Ethical clearance to conduct the study was obtained from the University of Rwanda, College of Medicine and Health Sciences Institutional Review Board, and the University Teaching Hospital of Kigali ethical committee. Participants provided consent after an explanation of the study.

## Results

A total of 151 patients awaiting surgery were recruited and participated in the study. The mean age was 38 years, with a range of 19 to 80 years. The demographic characteristics of participants are presented in table 1. The majority was male (63.6%), married (62.3%), self-employed (57.0%), with primary education (35.1%).

Prior to surgery, the anaesthesiology department representative had provided the patients with information about the surgery; the majority (62.3%) was informed that they were undergoing surgery under spinal anaesthesia, and over a third (37.7%) under general anaesthesia. The majority reported (68.2%) they had received adequate information about their surgery, while others (15.9%) reported that they had not received adequate information, or (15.9%) reported they had received no information about their surgery. The majority (83.4%) did not report postponement of their surgery, though some did (16.6%). The majority reported (62.3%) that this was their first surgical experience.

Over half (53%) were waiting for surgery for a non-malignant medical diagnosis that was not traumatic in

origin and not suspicious for cancer. Whereas over a quarter (29.1%) were waiting for surgery for traumatic injuries, and others (13.2%) reported a malignant medical condition (confirmed by histopathology lab exams to be cancerous), while 4.6% reported waiting for surgery for obstetrical reasons. Over one third (37.1%) were scheduled for general surgery, and about a quarter (26.5%) for orthopedic surgery.

**Table 1. Demographic Characteristics and Health Information**

| Characteristics                | n (%)      |
|--------------------------------|------------|
| <b>Gender</b>                  |            |
| Male                           | 96(63.6)   |
| Female                         | 55(36.4)   |
| <b>Marital status</b>          |            |
| Single                         | 30(19.9)   |
| Separated                      | 3(2.0)     |
| Cohabiting                     | 11(7.3)    |
| Married                        | 94(62.3)   |
| Widow                          | 13(8.6)    |
| <b>Educational level</b>       |            |
| None                           | 7(4.6)     |
| Incomplete primary             | 36(23.8)   |
| Primary                        | 53(35.1)   |
| Incomplete secondary           | 23(15.2)   |
| Secondary                      | 12(7.9)    |
| University                     | 20(13.2)   |
| <b>Employment status</b>       |            |
| Not employed                   | 35(23.2)   |
| Self-employed                  | 86(57.0)   |
| Private sector                 | 19(12.6)   |
| Public sector                  | 11(7.3)    |
| <b>Medical diagnosis</b>       |            |
| Traumatic injury               | 44 (29.1)  |
| Malignancy                     | 20 (13.2)  |
| Non-malignancy                 | 80 (53.0)  |
| Obstetric                      | 7(4.7)     |
| <b>Types of surgery</b>        |            |
| Orthopedic                     | 40 (26.5)  |
| Plastic Surgery                | 7(4.6)     |
| General Surgery                | 56 (37.1)  |
| ENT                            | 9 (6.0)    |
| Urology                        | 23 (15.2)  |
| Gyneco-Obstetric               | 15(9.9)    |
| <b>Anesthetic technique</b>    |            |
| Spinal anesthesia              | 94 (62.3)  |
| General anesthesia             | 57 (37.7)  |
| <b>Surgical Information</b>    |            |
| None                           | 24 (15.9)  |
| Not enough                     | 24 (15.9)  |
| Enough                         | 103 (68.2) |
| <b>Postponement of surgery</b> |            |
| Yes                            | 25 (16.6)  |
| No                             | 126 (83.4) |
| <b>Characteristics</b>         |            |
| Yes                            | 57 (37.7)  |
| No                             | 94 (62.3)  |

### Participants' preoperative anxiety

The results indicated that the mean score of participants' preoperative anxiety was 22.43 (SD: 12.38), and median anxiety score was 20, reflecting clinically significant anxiety. The score was later categorised into binary variables (clinically significant anxiety and non-clinically significant anxiety). The findings showed that the majority of participants, 110 (72.8%) had clinically significant anxiety, while 41 (27.2%) participants did not have clinically significant anxiety (table2).

**Table 2. Distribution of Participants' Anxiety Levels (n =151)**

| Outcome Variables                                  | n (%)     |
|--|-----------|
| Clinically significant anxiety ( $\geq 15$ score)  | 110(72.8) |
| Not clinically significant anxiety ( $< 15$ score) | 41(27.2)  |
| Total  | 151(100)  |

### Factors associated with anxiety among participants

After performing a Chi-square test, the logistic regression was used to predict the independent factors associated with preoperative anxiety (table 3). The study findings showed the association between age categories and anxiety level ( $X^2= 6.327$ ,  $df= 2$ ,  $p= 0.042$ ). The age of participants was grouped into three categories; young adults (79.2%) and middle-aged adults (72.9%) had significant preoperative anxiety compared to older adults (53.8%).

The findings revealed the association between medical diagnosis and preoperative anxiety level ( $X^2= 9.573$ ,  $df= 3$ ,  $p= 0.023$ ). The patients with traumatic injuries had higher preoperative anxiety levels than patients with other medical diagnoses. The participants' anxiety was clinically significant with traumatic injuries (81.8%), malignant medical diagnosis (80%), and non-malignant medical diagnosis (70%).

The results showed that there was evidence of a relationship between types of surgery and preoperative anxiety level ( $X^2= 11.199$ ,  $df= 6$ ,  $p= 0.028$ ). Clinically significant preoperative anxiety was identified in patients awaiting orthopaedic surgeries (87.5%), ENT (77.8%), general surgery (73.2%), gyneco-obstetric (60.0%), urology surgery (60.9%), and plastic surgery (57.1%).

**Table 3. Association Between Preoperative Anxiety Levels and the Independent Variables**

| Characteristics              | Clinical anxiety n (%) |             | Total n (%) | X <sup>2</sup> | p value |
|------------------------------|------------------------|-------------|-------------|----------------|---------|
|                              | Not significant        | Significant |             |                |         |
| <b>Independent Variables</b> |                        |             |             |                |         |
| <b>Age category (years)</b>  |                        |             |             | 6.327          | .042    |
| Young adults (18-39)         | 16(20.8)               | 61(79.2)    | 77(100)     |                |         |
| Middle adults (40-59)        | 13(27.1)               | 35(72.9)    | 48(100)     |                |         |
| Older adults (60-80)         | 12(46.2)               | 14(53.8)    | 26(100)     |                |         |
| <b>Medical diagnosis</b>     |                        |             |             | 9.573          | .023    |
| Malignant                    | 4(20.0)                | 16(80)      | 20(100)     |                |         |
| Non-malignant                | 24 (30.0)              | 56(70)      | 86(100)     |                |         |
| Traumatic injury             | 8(18.2)                | 36(81.6)    | 44(100)     |                |         |
| Obstetric                    | 5(71.4)                | 2(28.6)     | 7(100)      |                |         |
| <b>Type of surgery</b>       |                        |             |             | 11.199         | 0.028   |
| Urology                      | 9(39.1)                | 14(60.9)    | 23(100)     |                |         |
| orthopaedic                  | 5(12.5)                | 35(87.5)    | 40(100)     |                |         |
| ENT                          | 2(22.2)                | 7(77.8)     | 9(100)      |                |         |
| Gyneco-obstetric             | 6(40.5)                | 9(60.0)     | 15(100)     |                |         |
| Neurological                 | 1(100.0)               | 0(0.0)      | 1(100)      |                |         |
| General                      | 15(26.8)               | 41(73.2)    | 56(100)     |                |         |
| Plastic                      | 3(42.9)                | 4(57.1)     | 7(100)      |                |         |

Logistic regression demonstrated that the medical diagnosis, type of surgery scheduled, and participants' age were factors associated with preoperative anxiety (table 4). Patients awaiting orthopaedic surgery were 10 times more likely to have clinically significant

preoperative anxiety (OR 10.22; 95%; CI 1.144 - 91.304; p=0.037). Participants with impending Cesarean (OR: 0.03; 95% CI-0.002-0.568; p=0.018), and older participants had decreased preoperative anxiety levels (OR: 0.22; 95% CI 0.075 - 0.650; p=0.006).

**Table 4. Factors Associated with Preoperative Anxiety**

| Variables                | OR    | (95% CI)     | p value |
|--------------------------|-------|--------------|---------|
| <b>Age (years)</b>       |       |              |         |
| Young adult (18-39)      | 1     |              |         |
| Middle adult (40-59)     | 0.63  | (0.23-1.71)  | 0.36    |
| Older adult (60-80)      | 0.22  | (0.08-0.65)  | 0.006   |
| <b>Medical diagnosis</b> |       |              |         |
| Malignant                | 1     |              |         |
| Non-malignant            | 0.67  | (0.17-2.73)  | 0.58    |
| Traumatic injury         | 0.21  | (0.03-1.71)  | 0.15    |
| Obstetric                | 0.03  | (0.002-0.57) | 0.02    |
| <b>Surgical type</b>     |       |              |         |
| Urology                  | 1     |              |         |
| Orthopedic               | 10.22 | (1.14-91.30) | 0.04    |
| ENT                      | 1.75  | (0.24-12.60) | 0.58    |
| Gyneco-obstetric         | 2.33  | (0.17-32.14) | 0.53    |
| General surgery          | 1.41  | (0.46-4.34)  | 0.55    |
| Plastic surgery          | 1.16  | (0.13-10.03) | 0.89    |

OR of 1 = reference group

## Discussion

Findings from this study revealed that nearly three quarters (72.8%) of the participants had clinically significant preoperative anxiety levels. This finding is similar to the 70.3% of patients with preoperative anxiety in a study conducted at the Jimma University Specialized Teaching Hospital in South Western Ethiopia,[4] and 76.7% in a Sri Lankan study.[13] Though, it was lower in a study at the Tokai University Hospital in Japan, the rate was 51%.[8]

The findings of this study indicated that most of the patients were anxious. This factor negatively affects the surgical process outcomes and the potential need for an additional medication dose during the induction phase of anaesthesia, as well as an increase in pain sensation. Such conditions may subsequently increase analgesic drug consumption and instability of vital signs. The anxiety may complicate the surgical process, increase the length of hospital stay, and amplify health care cost. Common anxieties related to surgery in the Czech Republic showed that preoperative patients feared surgery delay, surgical errors, and anaesthesia complications such as not recovering consciousness, and postoperative pain, nausea and vomiting.[14]

A high anxiety level in the current study population may likely be caused by the absence of forums facilitating patients' discussions with their healthcare providers. Such consultations are needed before surgery, though discussions might not happen due to the heavy workload of healthcare workers in the hospital. In addition, many patients are transferred from the rural district hospitals and may not have family nearby for support.

Our study indicated that older age adults had less anxiety than younger patients. Several studies address preoperative anxiety and age, such as a young age had more preoperative anxiety levels than older age,[11] and hence based on these findings, anxiety decreases with age. This may indicate that young people are less experienced with hospitalisation or surgery, as in the case of our findings, that the majority was undergoing surgery for the first time. Consequently, the surgery might be the first and worst health situation that they have encountered. Contrary to this study, older patients in Iran,[15] and Turkey[16] had a higher anxiety level than younger patients, and a study in Ethiopia found no association between age and preoperative anxiety.[4] This vital factor implies that healthcare providers should focus on interventions to relieve preoperative anxiety for younger patients.

Preoperative anxiety appears to be associated with medical diagnosis,[17,18] and the motivation for surgery.[5] The current study demonstrated that patients with traumatic injury had higher preoperative anxiety levels and patients with an obstetric medical diagnosis had a lower level. Patients with traumatic injuries may undergo surgeries with the likelihood of disfigurement [10] and may believe that they will not resume their pre-trauma health status.[11] Patients undergoing spine surgery had higher anxiety levels than patients with limb surgery ( $p < 0.05$ ),[17] and those facing coronary bypass surgery.[19] Patients who had cesareans had less anxiety as the procedure is considered life saving for many and a joyful event with a new baby. Therefore, healthcare providers should consider medical diagnosis when providing counselling and other interventions to prevent or alleviate the patients' preoperative anxiety.

Our findings revealed that the different types of surgeries influenced the preoperative anxiety levels, with orthopaedic surgery indicating the highest level. Many patients face emotional as well as physical challenges and the potential of poor functioning and slow recovery after surgery.[20] Orthopaedic surgery is among the major surgeries performed after traumatic injuries, which accounted for a quarter (26%) of participants.[3] The patients may still have some residual post-traumatic stress, and the surgery triggers the memories of the trauma accompanied by intense emotional and physical reactions.[20] Furthermore, the surgery may involve excision of the traumatised body organ or insertion of

an implant or immobilisation of the affected bone with external fixators.[11,16]

Additionally, the healing process for patients with orthopaedic conditions could be extensive and may result in many complications including limited activities of daily living, impairment, and deformities.[11,16] This factor hints that patients who wait for orthopaedic surgery need more attention, such as more information about the surgical process and active listening, in order to decrease preoperative anxiety. In contrast, other studies have found no statistical significance associated with preoperative anxiety.[21] This indicates that patients who wait for orthopaedic surgery may be attentive to healthcare providers instruction in order to get the expected surgical outcomes.

### Limitations

Since the study was conducted at one hospital and used a convenience sampling, the findings cannot be generalised to other populations.

### Recommendations

We have many recommendations at the education and clinical level. It is recommended that the hospital where the study was conducted could elaborate on their policy and procedure for managing preoperative patients, and to conduct counselling sessions before surgery. The hospital could also create forums that facilitate the patients discussing among themselves, a type of peer support, and discussions with their healthcare providers about their health concerns.

To improve surgical patient outcomes, nurses and other healthcare providers, such as surgeons, anaesthetists and anesthesiologists, could incorporate preoperative anxiety assessments as a regular part of preoperative teaching. There is a need for a regular intervention as nearly one-third of this study population complained of not receiving any information or what was presented was inadequate to meet their pre-operative needs. Specific perioperative information, such as the patients' age, type of surgery, and medical diagnosis should be considered, and then the perioperative assessment would be tailored to every individual's specific needs. The high level of anxiety currently seen in perioperative patients could result in more calmness and better outcomes. Future research should also be conducted to evaluate predisposing factors of preoperative anxiety to patients waiting for orthopaedic surgery.

### Conclusion

Pre-operative patients had clinically significant pre-operative anxiety level (72.8%) associated with their age, medical diagnosis and type of surgical intervention. Preoperative interventions incorporating individual characteristics are needed to reduce preoperative anxiety and improve surgical outcomes.

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