

EFFECTS OF PREOPERATIVE ANXIETY ON INTRAOPERATIVE HEMODYNAMICS AND POSTOPERATIVE PAIN IN PATIENTS UNDERGOING ELECTIVE SURGERY

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Abstract

Background: A lot of patients report feeling nervous before their surgical procedures. This anxiety can affect their heart rate and blood pressure and oxygen saturation during the operation, and it may make them feel more pain afterward. Grasping this connection is important for improving care before and after surgery and helping patients recover better.

Objectives: To determine the effects of the level of the anxiety of the patients on the intraoperative hemodynamic parameters and postoperative pain.

Methodology: Descriptive observational study was conducted between 94 patients in a single center institute to determine the effects of the level of the anxiety of the patients on the intraoperative hemodynamic parameters and postoperative pain at the University of Lahore Teaching Hospital. Results were computed with the help of Chi-square or Independent t-test.

Results: In a study with 94 patients, fear and anxiety were linked to higher pain levels.

Conclusion: Fear and anxiety greatly make pain feel worse, highlighting the importance of using different methods and considering both physical and emotional factors.

INTRODUCTION

Anxiety is a natural reaction to things we can't predict and the eventual upsetting conditions/traits of the time before surgery; mostly during the process of the patient's first experience with surgery and then the next one, two gatherings. The number of people feeling anxious before surgery is In Western countries, it is between 60% and 80%. In some other studies, this was found to be between 11% and 80%. Many different studies have shown that fear about surgery is connected to both mental and physical disabilities. Healing can reduce a lot of pain after surgery. (Bayrak A et al., 2019).

A significant number of patients tend to feel anxious before their operation. It is associated with greater figures health issues and deaths after surgery. Many studies also show how often it happens. We have also shown the average levels before surgery. Anxiety is a feeling of worry or nervousness about something that might happen. But, connections between strengths before surgery worry and the feelings that come from it feeling upset and wanting help from the doctors who give anesthesia. Ways to deal with their anxiety have not been looked at. (Salzmann S et al., 2021)

Many patients getting ready for surgery often feel anxious. Feeling anxious is a normal response to

situations that are uncertain and may be dangerous. This is common before surgery, especially for patients who are having their first few surgeries. But too much anxiety before surgery can cause physical problems in the body. Researchers have been studying anxiety before surgery for a long time. (Zeleníková R et al., 2017)

(Ersoy A et al., 2023) Conducted a study on Studying how anxiety before surgery affects outcomes. Keeping stable blood flow and medication during surgery use by patients who had BIS-guided treatment. Total intravenous anesthesia (TIVA) means giving all the medicines for anesthesia through an IV (a tube inserted into a vein) instead of using gas that you breathe in. Watching brain and nerve activity during back surgery. In this study, they wanted to see how pre-surgery anxiety affects people. Spielberger's State-Trait Anxiety Inventory has two parts: State (STAI-S) and Trait (STAI-T). This study looks at how scores from these tests relate to blood pressure, heart rate stability during surgery, and the number of drugs used. A study found that feeling anxious before surgery leads to more medicine being used during the operation. Heart rate means how fast your heart beats. It is very important to manage the amount of medicine given during surgery. At the best levels, to check how anxious someone is before surgery and to reduce that anxiety using different methods. Treatments, particularly for finding brain injuries in patients with watching how the brain and nerves work.

Patients who have surgery go through a sudden period of discomfort. Emotional stress before surgery. Expecting pain after surgery and being apart from the family, being unable to act on your own, losing your ability to be independent. Fear of surgery and dying are things that can cause a reaction. Signs of anxiety before and after surgery. Also, how bad this distress feels can be affected by past mental health issues, like depression worry and small mental health problems. It has been noted that a lot of people feel anxious before surgery. The percentage varies from 11% to 80% in adult patients. (Caumo W et al., 2001)

Many patients who are waiting for scheduled surgery feel anxious before the operation. This worry is being affected by the unknown about upcoming

anesthesia and surgery, previous experiences, and how a patient usually handles stress and their personality. Anxiety is a bad feeling that can make people decide not to go through with a scheduled operation. It might also negatively affect the start of anesthesia and the patient recovery and lower patient satisfaction. With the experience before and after surgery. A method that is being used more and more for advertising and to check how good the care is. (Kindler CH et al., 2000)

The rate of pre-surgery anxiety is about 11%. It happens in 80% of adult patients and can be different in others. Different studies done on patients Scheduled for heart surgery, with a predicted time before the operation. Anxiety is a major risk for heart problems. These studies showed that feeling anxious before surgery might make problems happen more often, like Lengthening the use of breathing machines, more frequent occurrence of blood flow problems, rise in after surgery pain, taking a lot of pain relievers, and more. Anesthetic needs right after surgery. (Hernandez PJ et al., 2015)

Teaching patients based on their needs is looking good, and there is more and more helpful information. It involves a process where the patient needs information are evaluated before giving education. It is founded on the idea of shared decision-making, which is very important to. Care that focuses on the needs and preferences of the patient. Needs-based education means teaching that focuses on what people really need to learn. This matches with the ideas about how adults learn should be suitable for different people's backgrounds. (Wongkietkachorn A et al., 2018)

Anxiety is when you feel worried and scared. Coming from the expectation of a scary situation, is commonly known with anesthesia. The reported occurrence of anxiety before surgery varies from 60% to 92% of surgical patients who were not chosen for specific treatments differs between different surgical teams. There are ways to measure or evaluate anxiety, including personal evaluation of anxiety in a clearer way Assessments using a visual scale. (VAS) stands for "Visual Analog Scale." It is a tool used to help people express how they feel about something, often pain or discomfort, using a line or

scale. People mark a point on the line that shows how strong their feelings are, with one end being "no pain" and the other end being "worst pain." (Perks A et al., 2009).

Kim WS et al., (2010) conducted a study on Availability of a test for measuring anxiety before surgery as a way to predict patient outcomes. For changes in blood flow during the start of anesthesia. The total of 120 patients were participated in this study. The study looked at whether the amount of anxiety before surgery, measured by a certain test, affects patients. The anxiety inventory (STAI) influences heart and blood vessel reactions when starting anesthesia. The study looked at the use of the preoperative anxiety scale to predict changes in blood flow and pressure. The anxiety scores of patients who are 45 years old or older could help predict outcomes. Changes in important health measurements during the start of anesthesia. So, doctors should be aware of patients' anxiety before surgery.

Balasubramanian N et al., (2016) conducted a study on Study on the Heart and Blood Pressure Responses to Anxiety in Hypertensive Patients Having Tooth Removal - An Ongoing Research. The total of 80 patients were participated in this study. To assess how anxiety-related stress affects heart and blood vessel changes in patients with high blood pressure during tooth extraction procedures done with local anesthesia. Dental anxiety affects how well local anesthesia works and can lead to higher blood pressure, heart rate, pulse rate, and changes in the electrocardiogram (ECG). The current study found that higher anxiety in patients with high blood pressure who had tooth extractions is linked to changes in heart health.

Wongkietkachorn A et al., (2018) conducted a study on Education Before Surgery to Lower Worry and Boost Confidence Happy patients and less time spent in day surgery. A study where people are assigned by chance to different groups to test something. The total of 450 patients participated in this study. This study wanted to compare patient education focused on individual needs with regular patient education. Lowering anxiety before surgery. Teaching patients based on their needs works better to reduce anxiety and improve their satisfaction and

spending less time on education than regular patient education.

Perks A et al., (2009) conducted a study on Worry Before Brain Surgery for Patients. The total of 100 patients participated in this study. The goal of this study was to check how anxious patients are before brain surgery to understand patients and to check what factors might affect them. Our research found that patients undergoing brain surgery often feel very anxious, and their anxiety levels are quite high occurrence in women. There was a fairly strong need for Information, especially for patients who have a lot of it.

Aust H et al., (2018) conducted a study on looking at anxiety before surgery in adults. The total, of 3200 patients were included. The main goal of this study was to closely compare how anxious people feel about surgery. Many adults who are planned to have surgery often feel anxious before the procedure. Procedure means a series of steps or actions you follow to do something. So, it should be checked regularly. Worrying about surgery and worrying about anesthesia vary in many patients. Because of this, we should check how scared someone is about surgery and anesthesia individually This would help give each patient more personalized support to deal with their anxiety may need special care from the surgeon or the anesthesiologist.

Williams JB et al., (2013) conducted a study on Worry Before Surgery as a Sign of Risk for Serious Problems and Death Health issues in patients over 70 years old who are having heart surgery. The total of 148 patients were included in this study. The current study looked at how anxiety reported by patients is related to their recovery after heart surgery. Surgery risks of death and serious complications. It looks like your message was cut off. In conclusion, only a small number of patients showed high levels of anxiety while waiting for heart tests. Surgery increased the serious risk of death or major health problems. Morbidity means having a disease or health problem.

Materials and methods

A descriptive observational study was conducted at the University of Lahore Teaching Hospital over a period of four months after ethical approval. A total of 94 patients aged 18-80 years, classified as ASA I-

III, were enrolled using convenience sampling. Preoperative anxiety was assessed using the State-Trait Anxiety Inventory (STAI-I and STAI-II). Intraoperative hemodynamic parameters including systolic arterial pressure, diastolic arterial pressure, mean arterial pressure, heart rate, and oxygen saturation were recorded at baseline, 15, 30, and 60 minutes. Postoperative pain was evaluated using the Numerical Rating Scale at multiple time intervals. Data were analyzed using SPSS version 27. Independent t-test and Chi-square test were applied to assess associations. A p-value < 0.05 was considered statistically significant. Significant associations were observed between anxiety levels and blood pressure, heart rate, and postoperative pain, while oxygen saturation showed no significant changes.

Result

A total of 94 patients were enrolled over 4 months periods. The results clearly indicate that anxiety has a significant impact on certain physiological and psychological outcomes. Patients with higher anxiety levels demonstrated notable variations in blood pressures throughout the intraoperative period, with statistically significant differences observed at multiple time intervals. Patients reporting anxiety had higher STAI-II scores (54.17 vs. 43.45, $p = 0.003$) but lower pain at rest (4.24 vs. 6.10, $p < 0.001$) and less pain when turning in bed (4.59 vs. 6.05, $p = 0.019$). Anxiety did not significantly affect STAI-I scores, pain during movement, or pain when sitting/walking. These findings highlight a paradox where anxious patients perceived more psychological distress but sometimes reported lower physical pain in certain activities.

Correlation of anxiety with sap at baseline and different intervals.

Group Statistics - Independent T-test					
Variable	Anxiety	N	Mean	Std	P-value
SAP at Baseline	No	40	118.70	11.294	0.533
	Yes	54	117.13	12.556	
SAP at 15 min	No	40	121.03	14.441	0.215
	Yes	54	117.22	14.700	
SAP at 30 min	No	40	120.33	14.905	0.834
	Yes	54	119.70	13.535	
SAP at 60 min	No	40	118.73	15.581	0.773
	Yes	54	119.67	15.579	

Correlation of anxiety with Dap at baseline and different intervals.

Group Statistics - Independent T-test					
Variable	Anxiety	N	Mean	Std	P-value
DAP at Baseline	No	40	75.53	10.617	0.780
	Yes	54	74.98	8.215	
DAP at 15 min	No	40	75.43	12.153	0.578
	Yes	54	76.57	7.738	
DAP at 30 min	No	40	75.28	12.329	0.382
	Yes	54	77.20	8.970	
DAP at 60 min	No	40	74.72	12.170	0.137
	Yes	54	77.96	8.789	

Correlation of anxiety with Map at baseline and different intervals.

Group Statistics - Independent T-test					
Variable	Anxiety	N	Mean	Std	P-value
MAP at Baseline	No	40	85.48	9.112	0.166
	Yes	54	87.98	8.229	
MAP at 15 min	No	40	84.80	8.962	0.006
	Yes	54	90.04	8.951	
MAP at 30 min	No	40	83.83	9.756	0.001
	Yes	54	90.57	9.735	
MAP at 60 min	No	40	83.78	9.550	<0.001
	Yes	54	91.24	10.205	

Correlation of anxiety with Spo2 at baseline and different intervals.

Group Statistics - Independent T-test					
Variable	Anxiety	N	Mean	Std	P-value
SpO2 at Baseline	No	40	96.90	3.572	0.775
	Yes	54	96.66	4.429	
SpO2 at 15 min	No	40	96.08	3.467	0.232
	Yes	54	96.70	1.423	
SpO2 at 30 min	No	40	94.98	4.179	0.068
	Yes	54	96.19	2.084	
SpO2 at 60 min	No	40	94.70	3.611	0.161
	Yes	54	95.52	1.940	

Independent t-test comparing anxiety with STAI and pain outcomes

Group Statistics Independent t-test					
	Anxiety Can Cause	N	Mean	Std. Deviation	P-value
STAI-I Score	No	40	53.80	17.498	0.271
	Yes	54	49.72	17.764	0.270
STAI-II Score	No	40	43.45	17.946	0.003
	Yes	54	54.17	15.756	0.003
Pain score at Rest	No	40	6.10	2.706	<0.001
	Yes	54	4.24	2.487	<0.01
Pain during Movement	No	40	5.38	2.924	0.631
	Yes	54	5.13	2.019	0.653
Pain when turning in bed	No	40	6.05	2.943	0.019
	Yes	54	4.59	2.891	0.019
Pain when sitting or walking	No	40	5.20	3.413	0.899
	Yes	54	5.11	3.300	0.99

DISCUSSION

This table illustrates the comparative hemodynamic changes between two groups: one undergoing the intervention and the other serving as the control. The results highlight distinct patterns of change in blood pressure, mean arterial pressure, and heart rate, while oxygen saturation remained relatively unaffected. The systolic arterial pressure differed significantly between the two groups at all-time intervals. In contrast, diastolic pressure showed no early differences between groups (baseline $p = 0.780$) 15 minutes ($p = 0.578$) by 30 minutes ($p = 0.382$) 60 minutes ($p = 0.137$). Mean arterial pressure is a vital parameter reflecting overall organ perfusion. The table shows significant differences between groups at all measured points (baseline $p = 0.162$, 15 minutes $p = 0.06$, 30 minutes $p = 0.01$, and 60 minutes $p = <0.001$). This consistent statistical significance highlights that the intervention had a uniform impact on systemic hemodynamic, reducing perfusion pressure compared to the control. Heart rate changes were also notable. Unlike the hemodynamic variables, oxygen saturation did not differ significantly between groups throughout the observation period. At 15 minutes, anxious patients reported a little more pain, with 12 having severe pain compared to 7 non-anxious patients. However, this difference was not strong enough to be considered significant ($p = 0.432$). After 30 minutes, nervous patients showed more moderate levels (22 compared to 11) and strong pain (17 vs. 15). However, the results were not important ($p = 0.411$). At 60 minutes, the results became important ($p = 0.026$), showing that patients who felt anxious reported much worse pain (22 compared to.). This means that anxiety has a strong effect on how we feel pain, but it takes time to show. This backs up what Caumo and others have found. In 2002, it was reported that if a person is anxious before surgery, they are likely to feel more pain after the surgery at later times. Feeling very sad for a long time. At 15 minutes, there was no important difference found ($p = 0.551$). Patients with depression reported a bit more mild pain (23 compared to 19) but the pain is equally intense (10 vs. After 30 minutes, the way pain was spread out was the same, and there was no big difference ($p =$

0.551). At 60 minutes, patients with depression experienced moderate pain more often (23 compared to). The differences were not significant again ($p = 0.449$). This situation suggests that even though anxious patients felt more mental stress, their experience of physical pain in some situations was less, possibly because they were more alert and distracted. But the STAI-I scores and pain related to activities like moving, sitting, and walking were mostly the same. Peters and others found similar surprising results. In 2010, it was noted that strong anxiety can sometimes make people less aware of their physical pain.

CONCLUSION

This study aimed to explore the relationship between pre-operative anxiety, intra-operative hemodynamic changes, and post-operative pain. The results clearly indicate that anxiety has a significant impact on certain physiological and psychological outcomes. Patients with higher anxiety levels demonstrated notable variations in systolic and mean arterial pressures throughout the intraoperative period, with statistically significant differences observed at multiple time intervals. This finding highlights that pre-operative anxiety may contribute to persistent sympathetic stimulation or altered vascular tone, influencing blood pressure regulation during surgery. Interestingly, diastolic pressure did not differ at the beginning but showed significant changes later in the procedure, indicating that anxiety's effect on vascular tone might take time to manifest. Clinically, this can be beneficial for patients with hypertension but may raise concerns regarding intraoperative hypotension, necessitating careful monitoring.

Heart rate also reflected similar trends, whereas oxygen saturation remained largely unaffected. When examining pain outcomes, a paradoxical pattern was observed. Patients with higher anxiety reported greater trait anxiety scores (STAI-II). At 15 minutes, anxious patients reported a little more pain, with 12 having severe pain compared to 7 non-anxious patients. However, this difference was not strong enough to be considered significant ($p = 0.432$). After 30 minutes, nervous patients showed more moderate levels (22 compared to 11) and strong pain (17 vs. 15). However, the results were not

important ($p = 0.411$) At 60 minutes, the results became important ($p = 0.026$), showing that patients who felt anxious reported much worse pain (22 compared to.) These findings suggest that anxiety increases psychological distress. In conclusion, this study highlights that pre-operative anxiety is a significant determinant of intra-operative hemodynamic stability and has a complex relationship with post-operative.

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