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IMPACT OF PREOPERATIVE ANXIETY ON INTRAOPERATIVE HEMODYNAMIC CHANGES IN PATIENTS UNDERGOING ELECTIVE SURGERY: A MULTI-CENTER STUDY IN DISTRICT SWAT, KHYBER PAKHTUNKHWA

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Abstract

Patients frequently experience anxiety before surgery. Significant anxiety is common in patients anticipating surgery, and this worry can cause physiological changes which negatively impact the patient's hemodynamic stability all over the procedure. Patient safety may be jeopardized by variations in blood pressure, heart rate, and cardiac output brought on by this anxiety-induced physiological reaction. To assure optimum organ perfusion while mitigating flaws, it is a prerequisite to sustain uniform blood pressure, heart rate, and cardiac output across surgery. For the surgical team, keeping the patient's hemodynamics before surgery is their main concern. Numerous physiological and psychological impairments brought on by perioperative hemodynamic instability may impede a smooth recovery from surgery, lower quality of life, and raise morbidity and death. Objective The study sought to assess the influence of preoperative anxiety on intraoperative hemodynamics in individuals

having elective surgical procedures. A multi-center study was conducted in Malakand Division's Swat district from September to December 2024, in the surgical wards and operating theaters of DHQ Hospital Saidu and (THQ) Hospital Matta. A research study involved 196 patients. Patients with ASA1 and ASA2 physical condition were included in the study. Patients with preexisting hypertension, hypo-tension, a history of cardiac disease, previously identified cognitive impairment, or who had previously undergone a surgical procedure were excluded from the trial. Patients' preoperative anxiety was assessed using an Urdu-translated version of the Amsterdam preoperative anxiety and information scale (APAIS). This study showed that patients with incredibly high preoperative anxiety levels had considerably higher mean arterial pressure, systolic blood pressure, and diastolic blood pressure outside the operating room, before induction, 5 minutes after induction, 15 minutes, and 25 minutes after induction, in contrast to patients with low levels of preoperative anxiety. This study concludes that patients with High level of preoperative anxiety significantly increased mean arterial pressure, systolic blood pressure, and diastolic blood pressure at critical perioperative intervals. Reducing anxiety levels is critical for limiting these increases and maintaining hemodynamic stability during surgery.

INTRODUCTION

Anxiety is a distinct manifestation of fear, arising in anticipation of a potential or upcoming threat. It is commonly accompanied by various somatic and short-lived symptoms such as tachycardia, elevated blood pressure, sweating, restlessness, and a sense of nervousness (1). Patients developed preoperative anxiety may make a decision not to have surgery(2). Many patients consider the day of surgery to be one of the most dangerous days of their life. Age, gender, the kind and scope of the scheduled operation, prior surgical experience, and a person's vulnerability to stressful conditions are some of the variables that affect preoperative anxiety (3). Preoperative anxiety has a number of risk factors. According to ASA, these include past medical history, mental health

conditions, self-perception, depression, and trait anxiety level, pain, smoking history, the extent of the planned surgery, female gender, education levels, and physical condition (4). The primary causes of preoperative anxiety are concerns about the outcome of the surgery, fear of anesthesia, and fear of losing one's ability. It has a detrimental effect which cause post-operative morbidity and the emergence of complications (5). Preoperative anxiety can be caused by a variety of factors, including mistrust of the operation team or hospital conditions, as well as fears of waking up during the procedure, not waking up after the procedure, pain, the possibility of remaining in the intensive care unit, and death (6). Consequently, Fear of pain, physical harm, complications, and death are among the common causes of elevated preoperative anxiety (7).

All of this exacerbates cognitive impairment, which develops as troubles with perception, focus, reasoning, and decision-making (8). Preoperative anxiety prevalence varies by kind of operation , gender, reason for surgery, and nation, and it consistently reaches up to 97%. Preoperative anxiety among surgical patients ranged from 27% to 80%, with Spain having the highest frequency and Holland having the lowest, according to studies done in the European region (9). Preoperative anxiety prevalence ranged from 47% to 70.3% in India, according to studies,(10) whereas it ranged from 62% to 97% in Pakistan (11). Studies conducted in the United States of America revealed that preoperative anxiety was as common as 20.2%,(12) but in Brazil, it was as common as 24%. (13). preoperative anxiety raises the patient's catecholamine secretion which cause tachycardia, hypertension, and arrhythmia's (14). Furthermore, some research revealed that preoperative anxiety results in aberrant hemodynamics due to endocrine, parasympathetic, and sympathetic stimulation (15). These significant changes in intraoperative heart rate, contractile strength, and peripheral vascular resistance that result from increased cortisol release are caused by hypothalamus-pituitary-adrenal axis activation (16). An unpleasant emotional state linked to psychophysiological alterations in reaction to an internal dispute is anxiety. Physiological changes include elevated heart rate, disturbed breathing, trembling, sweating, and vasomotor changes; psychological changes include an uncomfortable sense of impending danger, overwhelming awareness of helplessness, inability to perceive the threat's unreality, a prolonged feeling of tension, and exhausting readiness for the expected danger (18) . A certain amount of anxiety is typically experienced by patients have Worse postoperative recovery and outcomes, such as increased post-surgical pain, slowed wound healing, and low satisfaction, have been linked to anxiety (19). Additionally, it results in a diminished reaction to analgesics

and anesthetic medications. Severe preoperative anxiety has been linked in studies to increased rates of post-operative complications like pain, nausea, and vomiting, as well as longer hospital stays and delayed wound healing. Each of these elements adds to the financial strain on the healthcare system (20). Furthermore, research has demonstrated that patients with elevated anxiety have higher postoperative pain scores and anesthetic dosage requirements (21). Significant post-operative complications occur in surgical patients who experience preoperative anxiety. Therefore, before undergoing surgery, anxiety should be assessed and managed (22). There are numerous methods to measure anxiety, including the direct measurement of urine catecholamine's and serum cortisol levels, as well as the indirect measurement of blood pressure and heart rate. New techniques, however, have been proven to measure anxiety levels in patients who are specifically waiting for surgery (24). There are currently two ways to reduce preoperative anxiety: pharmacological interventions, like giving hypnotic drugs prior to surgery, and non-pharmacological interventions, like employing good communication techniques and giving surgical information via written or video format, or during a healthcare provider interview. Preoperative anxiety in patients undergoing surgery has recently been found to be decreased through patient education (32). When the patient is mentally prepared, there is a lower chance of problems during anesthesia and following complications. The type of operation, the patient's health, and the urgency of the surgery determine the extent of the pre-operative examination and diagnostic testing. Preoperative anxiety affects how well patients respond to treatment (33). According to certain research, pre-anesthetic evaluation before major surgery improves surgical results and perioperative care. Reducing preoperative anxiety with benzodiazepines has already been demonstrated to improve postoperative pain management in the particular setting of patients undergoing extremely stressful surgical procedures, such as cancer surgery (34).

Preoperative anxiety represents a critical yet often under recognized factor influencing physiological responses during surgery. Heightened anxiety activates neuroendocrine pathways that can induce significant alterations in hemodynamic parameters, including blood pressure, heart rate, and cardiac output. Such anxiety-related fluctuations may compromise intraoperative stability, diminish organ perfusion, and increase the risk of anesthetic or surgical complications. Given the clinical importance of maintaining hemodynamic equilibrium throughout anesthesia, understanding how preoperative anxiety contributes to intraoperative variability is essential. Despite its relevance, limited regional data exist regarding this association, particularly within the surgical settings of District Swat, Khyber Pakhtunkhwa. Therefore,

this multi-center study aims to investigate the impact of preoperative anxiety on intraoperative hemodynamic changes among patients undergoing elective surgical procedures, addressing a critical gap in the local evidence base and informing strategies to improve perioperative care.

Methods and Materials

This cross sectional observational study was designed to assess the influence of preoperative anxiety on hemodynamics of the patients at Saidu group of teaching hospital (SGTH) swat. Saidu group of teaching hospital offers a wide range of medical services, including emergency care, surgery, ICU, HDU, rehabilitation, cardiology, maternal care, and outpatient services. It also houses specialized departments such as ENT, cardiology, general surgery, neurosurgery, peads, maxillofacial, trauma, obstetrics, gynae, eye, orthopedics, and urology, making it the central healthcare hospital in the region. The focus of this study was the patients admitted to the surgical wards and operating theaters (OT) for elective general, ENT, urology, and orthopedic surgery. The departments included in the study was General Surgery, ear, nose, throat, (ENT), Orthopedics, and Urology department. This study adopted a convenience sampling method whereby ASA 1 and ASA 2 elective surgical patients who had general and spinal anesthesia were included. Sample size was determined by the formula Cochran et al: $n = z^2 \times P (1 - p)/ e^2$ Estimated sample size was 196 patients. Adult patients with age between 18 and 75 with ASA1 and ASA2 physical status underwent elective ear, nose, throat, (ENT), orthopedic, urology and general surgery under spinal and general anesthesia was included. Patients with pre-existing cardiovascular disorder, patients on medication that would affect hemodynamic parameters, cognitive impairment and patients with prior exposure to surgery was excluded. The study was conducted after the submission of a research proposal to the Khyber Medical University Institute of Health Sciences, Swat. Ethical approval was obtained from the Research and Ethics Committee of the institute, the proposal was been submitted to the administration and ethics committees of the concerned hospitals and getting ethical approval for collecting research data from the patients admitted in surgical wards for elective (ENT, orthopedic, urology, and general) surgical procedure. Data was collected from the patients on night before surgery and on day of surgery, from those patient's data was collected who gives voluntarily informed consent and participated in the study. Patient's hemodynamic parameters was measured by a .standard cardiac monitors located in surgical wards in operation theatre of hospital. Patient's anxiety level was assessed and determine by using a structured questionnaire scale Amsterdam preoperative anxiety and information scale (APAIS), on night of surgery. Data was

analyzed by using SPSS version 2022. Socio demographic variable was analyzed by frequency and percentages, and categorical variable was analyzed by chi square test by cross tabulation. For comparison of mean and (SD) of more than two dependent and independent variable (ANOVA) test was used.

Results

The mean age and standard deviation (SD) of participants were 32.15(11.49), with 52% (n=102) being men and 94% (n=48) being women. As indicated in table -1(a), the mean systolic blood pressure with standard deviation (SD) measured outside the operating room was 130.78 (14.69), the mean diastolic blood pressure with SD measured outside the operating room was 83.90 (9.2), and the mean arterial blood pressure with SD was 99.66 (11.42).

Table-1(a): *Mean And Standard Deviation Of Age And Hemodynamic Parameters Outside OR*

Table-1(a)	Mean (SD)
Age(years)	32.15 (11.49)
SBP outside the OT	130.78 (14.69)
DBP outside the OT	83.90 (9.2)
MAP outside the OT	99.66 (11.42)

Demographics Information of Participants

According to table-1(b) of these 196 patients, 13.3% (n=26) have no formal education, 35.7% (n=70) have a primary level, 23% (n=45) have a secondary level, and 28.1% (n=55) have a college or university level. Similarly, 39.3% (n=77) of the participants were single and 60.7% (n=119) were married. 13.7% (n=66) had ENT surgery, 10.2% (n=20) had urology surgery, 14.3% (n=28) had orthopedic surgery, and 41.8% (n=82) had general surgery.

Table 3.1: *Frequency And Percentages Of Socio-Demographic Variables*

Table-1(b)		Frequency (%)
Gender of patients	Male	102 (52%)
	Female	94 (48%)
Education level	No formal education	26 (13.3%)
	Primary level	70 (35.7%)
	Secondary level	45 (23%)
	College or university	55 (28.1%)

Marital status	Yes	119 (60.7)
	No	77 (39.3)
Surgical procedure	General Surgery	82 (41.8)
	ENT Surgery	66 (33.7)
	Urological Surgery	20 (10.2)
	Orthopedic Surgery	28 (14.3)

Association of Socio Demographic Variable and Surgical Procedure with Level of Anxiety

1: Gender Association with Level of Anxiety

There was no statistically significant association of gender with level of anxiety and no statistically significant difference between male and female patients with a p value >0.05 is =0.601 statistically not significant. Among male patients 56.4% (n=31) was a low anxiety, 53.6% (n=37) was a moderate anxiety, 43.5% (n=20) was a high anxiety, and 53.8% (n=14) was a very high anxiety, and female 43.6% (n=24) was a low anxiety, 46.4% (n=32) was a moderate anxiety, 56.5% (n=26) was a high anxiety, and 46.2% (n=12) was a very high anxiety as shown in table-2.

2: Association of Education Level with Anxiety

There was a statistically significant association between level of education and anxiety with a value of p=.000 which is <0.05 statistically significant. 100.0%(n=26) of patients with no formal education was a very high level of anxiety, 100.0%(n=69) of patients with a primary education was a moderate and 2.2%(n=1) was a high anxiety, similarly 97.8%(n=45) of patients with a secondary education was high anxiety, and 100.0%(n=55) of patients was low level of anxiety as shown in table-2.

3: Association of Marital Status with Anxiety

There was no statistically significant association between marital status and level of anxiety with a p value>0.05 = 0.143 statistically not significant. Among married patients 50.9% (n=28) was low anxiety, 63.8% (n=44) was moderate, 58.7% (n=27) was high, and 76.9% (n=20) was very high level of anxiety. In unmarried patients 49.1% (n=27) was low anxiety, 36.2% (n=25) was moderate, 41.3% (n=19) was high, and 23.1% (n=6) was very high level of anxiety as shown in table-2.

4: Association of Surgical Procedure with Anxiety

There was no statistically significant association between surgical procedure and anxiety with a p value >0.05 =0.358 was statistically not significant. In general surgery patients 41.8% (n=23) was low anxiety, 37.7% (n=26) was moderate, 52.2% (n=24), was high, and 34.6% (n=9) was very high anxiety patients. Similarly, in ENT, 25.5% (n=14) was low anxiety, 40.6% (n=28) was moderate, 32.6% (15) was high, and 34.6% (n=9) was very high anxiety patients. In urological surgery 12.7% (n=7) was low anxiety, 7.2% (n=5) was

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moderate, 6.5% (n=3) was high, and 19.2% (n=5) was very high anxiety patients, and in orthopedic surgery 20.0% (n=11), was low anxiety, 14.5%(n=10) was moderate, 8.7%(n=4) was high, and 11.5%(n=3) was very high anxiety patients as shown in table-2.

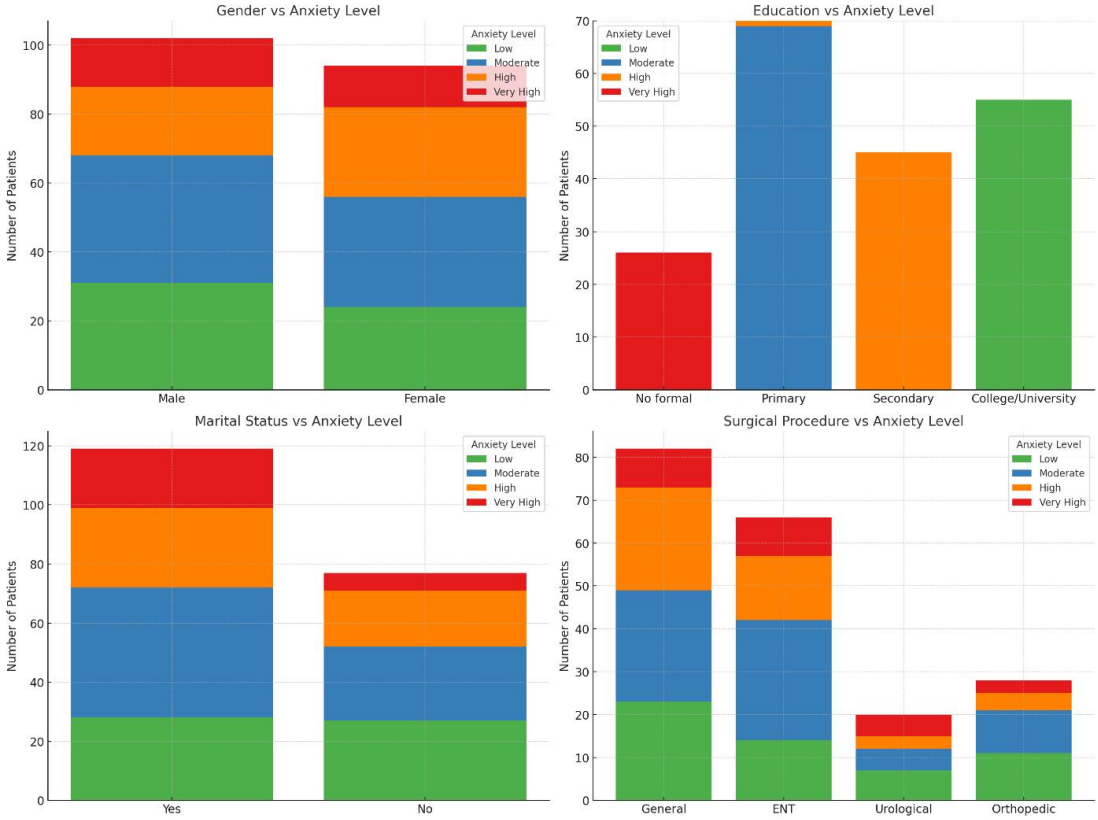
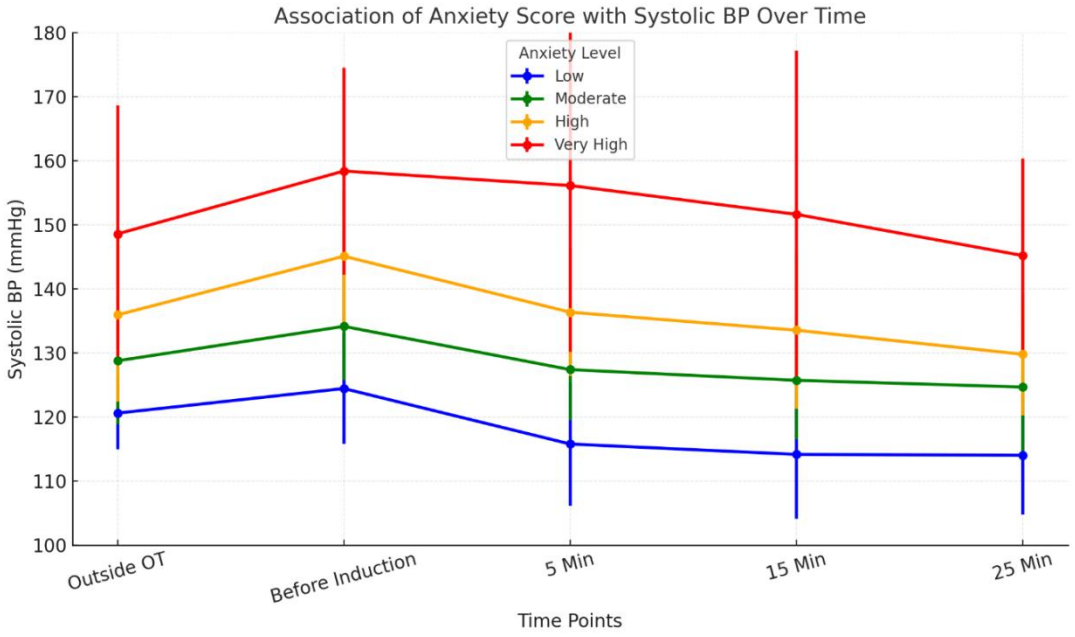


Figure. 1. Showing the association of socio-demographic variables and surgical procedures with anxiety levels.

Association between Anxiety Score and Systolic Blood Pressure at Different Time Points

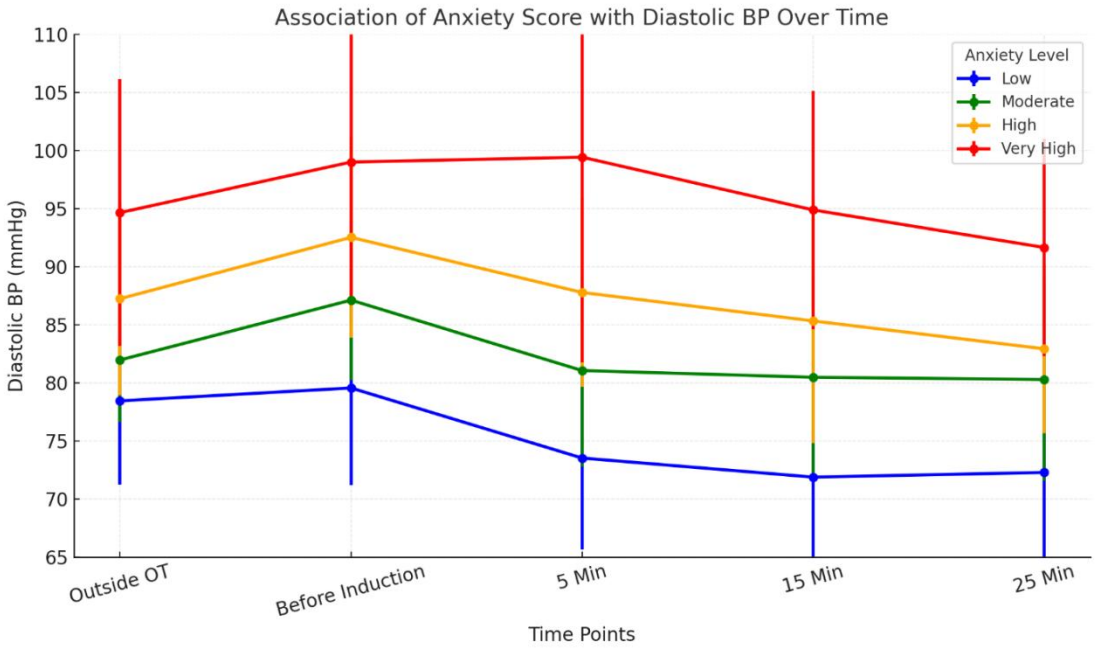
As shown in Table 3-A, the association between patients' anxiety levels and systolic blood pressure (SBP) was evaluated at multiple perioperative time points: outside the operation room, before induction, 5 minutes after induction, 15 minutes after induction, and 25 minutes after induction. The mean ± SD of SBP for patients with low anxiety were 120.6 ± 5.63, 124.4 ± 8.62, 115.7 ± 9.63, 114.1 ± 16.0, and 114.0 ± 9.20 mmHg, respectively. For patients with moderate anxiety, the corresponding values were 128.7 ± 9.86, 134.1 ± 8.40, 127.3 ± 7.90, 125.7 ± 9.20, and 124.6 ± 10.6 mmHg. Patients with high anxiety exhibited SBP values of 135.9 ± 13.5, 145.0 ± 10.3, 136.3 ± 9.9, 133.5 ± 12.2, and 129.7 ± 9.5 mmHg, whereas those with very high anxiety had SBP values of 148.5 ± 20.0, 158.3 ± 16.1, 156.1 ± 25.9, 151.6 ± 25.5, and 145.1 ± 15.1 mmHg across the same time points. Statistical analysis revealed a significant association between anxiety levels

and SBP ($p < 0.001$), indicating that higher anxiety scores were correlated with elevated systolic blood pressure.



Association Of Anxiety Score And Diastolic Blood Pressure (DBP) By Different Duration

According to (table 3-B) which describes association between anxiety score and diastolic blood pressure. The mean value and (SD) of diastolic blood pressure, outside the operation theatre, before induction, 5 minutes after induction, 15 minutes after induction, 25 minutes after induction. Patients with low anxiety was 78.4(7.1), 79.5(8.3), 73.5(7.8), 71.8(9.7), 72.2(10.0), patients with moderate anxiety was 81.9(5.3), 87.1(6.8), 81.0(8.2), 80.4(8.7), and 95.1(8.9). Patients with high anxiety was, 87.2(8.3), 92.5(8.6), 87.7(8.1), 85.3(10.5), and 82.9(7.2). Patients with very high anxiety was 94.6(11.4), 99.0(11.5), 99.4(17.6), 94.8(10.2), and 109.5(10.6). There was significant association between anxiety score and diastolic blood pressure with a p value 0.000 less then<0.05.



Association of Anxiety Score with Mean Arterial Pressure by Different Duration

(Table 3-C) describes association of anxiety score with mean arterial pressure (MAP). The mean value and (SD) of mean arterial pressure , outside operation theatre, before induction, 5 minutes after induction, 15 minutes after induction, and 25 minutes after induction. Patients with low anxiety was 92.3(6.1), 94.0(8.2), 87.5(7.4), 85.5(8.9), 86.0(9.0). Patients with moderate anxiety was 97.4(6.2), 94.0(8.2), 87.5(7.4), 85.5(8.9), 86.0(9.0). Patients with high anxiety was 103.5(9.5), 110.5(8.9), 104.0(8.6), 103.7(17.5), 98.5(7.1). Patients with very high anxiety was 114.1(17.0), 118.9(12.0), 118.1(19.8), 114.0(13.9), 109.5(10.6).There was a statistically significant association between anxiety and mean arterial pressure with a p value =0.000 less then<0.05.

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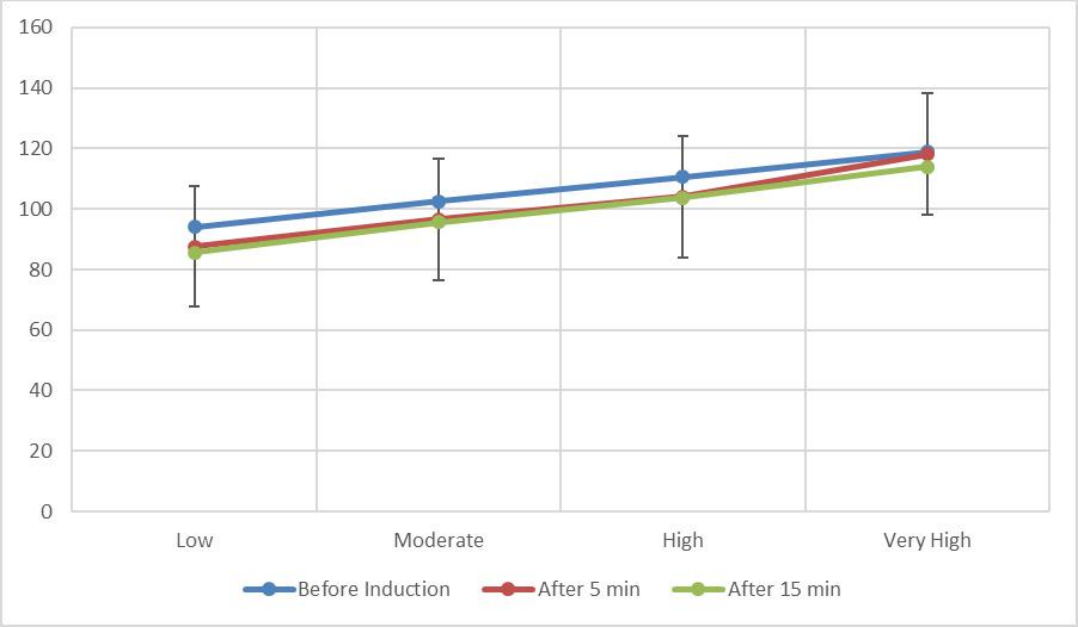

Discussion

Anxiety is defined by the American Psychological Association (APA) as a series of strong sensations of tension, apprehension, uneasiness, dread, discomfort, and heightened autonomic activity produced by the prospect of danger, a terrible event, or the unknown. Anxiety is a normal, predictable, emotional, and rational response to a real or perceived threat. Compared to the low anxiety group, which had mean arterial pressures of 92.3(6.1), 94.0(8.2), 87.5(7.4), 85.5(8.9), and 86.0(9.0), our study indicated that individuals with very high anxiety levels had significantly greater mean arterial pressure from outside the operating theater before induction, 5 minutes after induction, 15 minutes, and 25 minutes after induction. There mean values and (SD) seemed 114.1(17.0), 118.9(12.0), 118.1(19.8), 114.0(13.9), and 109.5(10.6), respectively.

In this study, the mean and SD of systolic blood pressure in the very high anxiety group were 148.5(20.0), 158.3(16.1), 156.1(25.9), 151.6(25.5), and 145.1(15.1) during outside the operation room, before induction, 5 minutes, 15 minutes, and 25 minutes after induction, respectively, while in the low anxiety level group were 120.6(5.63), 124.4(8.62), 115.7(9.63), 114.1(16), and 114.02(9.20), respectively, which is statistically significant with a p value <0.05. The mean and SD of diastolic blood pressure in the very high anxiety group were 94.6(11.4), 99.0(11.5), 99.4(17.6), 94.8(10.2), and 109.5(10.6) during outside operation room, before induction, 5 minutes, 15 minutes, and 25 minutes after induction, respectively, while in the low anxiety group were 78.4(7.1), 79.5(8.3),

73.5(7.8), 71.8(9.7), and 72.2(10.0), respectively, which is statistically significant with a p value <0.05.

In comparison to the low anxiety group, our investigation revealed that patients with high anxiety had significantly higher mean arterial pressure outside the operating room, before to anesthetic induction, and five, fifteen, and twenty-five minutes after induction ($P < 0.05$). This is in line with a 2010 study by Won-Sung Kim in Masan, Korea, which discovered a substantial correlation between changes in mean blood pressure and heart rate during anesthetic induction and high levels of preoperative anxiety (36).

The results of our study are also align with a 2020 study by Muhiddin Tadesse at Al at Dilla University Referral Hospital on the hemodynamic effects of preoperative anxiety in patients undergoing elective surgery. The study demonstrated that the high anxiety groups experienced significantly higher mean arterial pressure, systolic blood pressure, and heart rate upon arrival in the operating room, following the induction of anesthesia, on the 15th and 30th minutes, as compared to the low anxiety group. According to our research, there were significant differences ($P <0.05$) in the mean arterial pressure and systolic blood pressure between the groups throughout the preoperative period outside the operating room, before anesthesia was induced, and five, fifteen, and twenty-five minutes following induction, respectively (37).

In contrast to patients with low anxiety levels, individuals with high anxiety levels had significantly higher systolic and diastolic blood pressure ($P < 0.05$) outside the operating room, prior to induction, and five, fifteen, and twenty-five minutes following induction. Our results are in parallel to those of Aysegul Bayrak et al., who found in 2019 that, in comparison to low preoperative anxiety groups, high preoperative anxiety results in a statistically significant increase in systolic blood pressure, diastolic blood pressure, and heart rate values prior to surgery at the 5th, 15th, 30th, and 60th minutes (16).

High perioperative anxiety groups had substantially higher SBP (136 ±15 vs. 118 ±14 mmHg, $P <0.05$) and DBP (79 ±9 vs. 72 ±9 mmHg, $P <0.05$) than their baseline values, and both SBP and DBP dropped following the procedure, according to a 2013 study by Liao Chunhui, Li Ju-Xiang et al. Our results agree with the studies mentioned above (38).

Another study conducted by Jasmina Ahmetovic-Djug et al. on the impact of preoperative anxiety in patients on hemodynamic changes and anesthetic dose during induction of anesthesia found that average values of mean arterial pressure differed by 15.4 mm/Hg between groups, but there was no statistically significant relationship

between anxiety and blood pressure differences (39). Our findings differ from those of the preceding study, which might be attributed to their limited sample size.

In contrast to our findings, Jean Carlos Fernandes Goulart et al. from Brazil reported no statistically significant change in heart rate, systolic and diastolic blood pressure in connection to anxiety during dental treatment. This contradicting outcome may be attributable to the fact that they employed a small sample size (60 people) whereas we had 196 research participants (40).

Conclusion

Patients exhibiting high levels of preoperative anxiety demonstrated significantly elevated mean arterial pressure (MAP), systolic blood pressure (SBP), and diastolic blood pressure (DBP) across multiple critical perioperative time points, including measurements taken outside the operating room, immediately before induction of anesthesia, and at 5, 15, and 25 minutes following induction. These findings suggest a robust association between heightened anxiety and exaggerated cardiovascular responses during the perioperative period. The observed increases in MAP, SBP, and DBP reflect an activation of the sympathetic nervous system and heightened catecholamine release in response to psychological stress, which can contribute to intraoperative hemodynamic instability. Such physiological alterations not only pose potential risks for cardiovascular complications but may also influence anesthetic requirements, surgical field conditions, and postoperative recovery. Collectively, these results underscore the clinical importance of identifying and addressing preoperative anxiety through targeted interventions—such as preoperative counseling, anxiolytic pharmacotherapy, or non-pharmacological strategies—to mitigate stress-induced hemodynamic fluctuations, enhance patient safety, and optimize perioperative outcomes.

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Conflict of Interest: Nothing to declare

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References

1. Ahmetovic-Djug J, Hasukic S, Djug H, Hasukic B, Jahic A. Impact of Preoperative Anxiety in Patients on Hemodynamic Changes and a Dose of Anesthetic During Induction of Anesthesia. Med Arch. 2017 Oct 1;71(5):330–3.
2. Ramesh C, Nayak BS, Pai VB, George A, George LS, Devi ES. Pre-operative anxiety in patients undergoing coronary artery bypass graft surgery – A cross-sectional study. Int J Afr Nurs Sci. 2017;7:31–6.

3. Almalki MS, Hakami OAO, Al-Amri AM. Assessment of Preoperative Anxiety among Patients Undergoing Elective Surgery. Egypt J Hosp Med. 2017 Oct;69(4):2329–33.
4. Jawaid M, Mushtaq A, Mukhtar S, Khan Z. Preoperative anxiety before elective surgery.
5. Roomruangwong C, Tangwongchai S, Chokchainon A. Preoperative Anxiety among Patients Who Were about to Receive Uterine Dilatation and Curettage. Vol. 95, J Med Assoc Thai. 2012.
6. Ersoy A, Güven BB, Ertürk T, Caki AC, Aksoy NT, Eksi I. Evaluation of the effect of preoperative anxiety on intraoperative hemodynamic stability and drug consumption in patients who underwent BIS-guided total intravenous anesthesia (TIVA) for neurophysiological monitoring in spine surgery. Signa Vitae. 2023;19(1):93–100.
7. Almalki MS, Hakami OAO, Al-Amri AM. Assessment of Preoperative Anxiety among Patients Undergoing Elective Surgery. Egypt J Hosp Med. 2017 Oct;69(4):2329–33.
8. Woldegerima YB, Fitwi GL, Yimer HT, Hailekiros AG. Prevalence and factors associated with preoperative anxiety among elective surgical patients at University of Gondar Hospital. Gondar, Northwest Ethiopia, 2017. A cross-sectional study. International Journal of Surgery Open. 2018;10:21–9.
9. Abate SM, Chekol YA, Basu B. Global prevalence and determinants of preoperative anxiety among surgical patients: A systematic review and meta-analysis. Vol. 25, International Journal of Surgery Open. Elsevier Ltd; 2020. p. 6–16.
10. Bansal V, Poddar A, Ghosh-Roy R. Identifying a medical department based on unstructured data: A big data application in healthcare. Information (Switzerland). 2019 Jan 11;10(1).
11. Zeb A, . H, Ali M, Baig R, Rahman S. Pre-Operative Anxiety in Patients at Tertiary Care Hospital Peshawar Pakistan. South Asian Research Journal of Nursing and Healthcare. 2019 Sep 30;01(01):26–30.
12. Majumdar J, Vertosick E, Cohen B, Assel M, Levine M, Barton-Burke M. Preoperative Anxiety in Patients Undergoing Outpatient Cancer Surgery. Asia Pac J Oncol Nurs. 2019 Oct 1;6(4):440–5.
13. Ribeiro CF, Lemos CMC, Alt NN, Marins RLT, Corbiceiro WCH, Nascimento MI do. Prevalence of and Factors Associated with Depression and Anxiety in Brazilian Medical Students. Rev Bras Educ Med. 2020;44(1).
14. Kim WS, Byeon GJ, Song BJ, Lee HJ. Availability of preoperative anxiety scale as a predictive factor for hemodynamic changes during induction of anesthesia. Korean J Anesthesiol. 2010 Apr;58(4):328–33.

15. Tadesse M, Ahmed S, Regassa T, Girma T, Mohammed A. The hemodynamic impacts of preoperative anxiety among patients undergoing elective surgery: An institution-based prospective cohort study. International Journal of Surgery Open. 2022 Jun 1;43.
16. Bayrak A;, Sagiroglu G, Yerkoy Y. 50+ years of INIS 50+ years of INIS International Nuclear Information System Effects of preoperative anxiety on intraoperative hemodynamics and postoperative pain. 2022.
17. Engda AS, Yigzaw HB, Engdaw NA, Basha EA, Adem A, Wubetu AD, et al. Magnitude of Preoperative Anxiety and Associated Factors Among Adult Surgical Patients in Debre Berhan Comprehensive Specialized Hospital. Int J Gen Med. 2022;15:5999–6007.
18. Kuzminskaitė V, Kaklauskaitė J, Petkevičiūtė J. Incidence and features of preoperative anxiety in patients undergoing elective non-cardiac surgery. Vol. 26. 2019.
19. Khalili N, Karvandian K, Ardebili HE, Eftekhar N, Nabavian O. Predictive Factors of Preoperative Anxiety in the Anesthesia Clinic: A Survey of 231 Surgical Candidates Background: Despite the growing advancements of surgical and anesthetic techniques resulting in [Internet]. Vol. 5, Archives of Anesthesiology and Critical Care. 2019. Available from: http://aacc.tums.ac.ir
20. Karaca O, Kuzucu I. The effect of demographic characteristics on anxiety and hemodynamic response during intubation in patients undergoing septoplasty. Ann Med Res. 2020;27(2):717.
21. Kebede YN, Denu ZA, Aytolign HA, Mersha AT. Magnitude and factors associated with preoperative depression among elective surgical patients at University of Gondar comprehensive specialized hospital, North West Ethiopia: A cross-sectional study. Annals of Medicine and Surgery. 2022 Mar 1;75.
22. Msoma RAGH, Khamis RH, Rwanyuma LP, Akoko LO, Mkulo AZ, Msinde P. Prevalence of Pre-Operative Anxiety and Predictors among Elective Surgical Patients and Their Pre-Operative Hemodynamic Changes at Muhimbili National Hospital. Open J Med Psychol. 2023;12(02):55–70.
23. Bruss GS, Gruenberg AM, Goldstein RD, Barber JP. Hamilton Anxiety Rating Scale Interview Guide: Joint Interview and Test-Retest Methods for Interrater Reliability. Vol. 53, Psychiatry Research.
24. Shillingford JP, Aitken CB. Section of Measurement in Medicine A Growing Edge of Measurement of Feelings [Abridged]. Vol. 62. 1969.
25. Kvaal K, Ulstein I, Nordhus IH, Engedal K. The Spielberger State-Trait Anxiety Inventory (STAI): The state scale in detecting mental disorders in geriatric patients. Int J Geriatr Psychiatry. 2005 Jul;20(7):629–34.

26. Zhong QY, Gelaye B, Zaslavsky AM, Fann JR, Rondon MB, Sánchez SE, et al. Diagnostic validity of the generalized anxiety disorder - 7 (GAD-7) among pregnant women. PLoS One. 2015 Apr 27;10(4).
27. Wu H, Zhao X, Chu S, Xu F, Song J, Ma Z, et al. Validation of the Chinese version of the Amsterdam Preoperative Anxiety and Information Scale (APAIS). Health Qual Life Outcomes. 2020 Mar 11;18(1).
28. Ayele B, Tadesse M, Tilahun R, Nega B. Translation of the Amsterdam Preoperative Anxiety and Information Score (APAIS) into the Amharic Version and Its Validation for Evaluation of Preoperative Anxiety. Ethiop J Health Sci. 2021 Mar 1;31(2):349–58.
29. Doan L V., Blitz J. Preoperative Assessment and Management of Patients with Pain and Anxiety Disorders. Vol. 10, Current Anesthesiology Reports. Springer; 2020. p. 28–34.
30. Badner mr NH, Nielson Pht WR, Munk ms S, Kwiatkowska C, Gelb AW, Gelb A. Preoperative anxiety: detection and contributing factors. Reducing anxiety in preoperative patients: a systematic review. 2014.
32. Gulia P, Dhankar V, Vachhani P, Singh I, Juneja K, Bhardwaj A, et al. EFFECT OF PREOPERATIVE ANXIETY ON HAEMODYNAMIC PARAMETERS DURING INDUCTION OF ANAESTHESIA.
33. Lemos MF, Lemos-Neto S V., Barrucand L, Verçosa N, Tibirica E. Preoperative education reduces preoperative anxiety in cancer patients undergoing surgery: Usefulness of the self-reported Beck anxiety inventory. Brazilian Journal of Anesthesiology (English Edition). 2019 Jan;69(1):1–6.
34. Isabel Torres-González M, Javier Manzano-Moreno F, Francisco Vallecillo-Capilla M, Victoria Olmedo-Gaya M. Preoperative oral pregabalin for anxiety control: a systematic review. Available from: https://doi.org/10.1007/s00784-020-03352-y
35. Kim WS, Byeon GJ, Song BJ, Lee HJ. Availability of preoperative anxiety scale as a predictive factor for hemodynamic changes during induction of anesthesia. Korean J Anesthesiol. 2010 Apr;58(4):328–33.
36. Tadesse M, Ahmed S, Regassa T, Girma T, Mohammed A. The hemodynamic impacts of preoperative anxiety among patients undergoing elective surgery: An institution-based prospective cohort study. International Journal of Surgery Open. 2022 Jun 1;43.
37. Yuzkat N, Soyalp C, Turk O, Keskin S, Gulhas N. Effects of showing the operating room on preoperative anxiety and hemodynamics among patients with hypertension: A randomized controlled trial. Clin Exp Hypertens. 2020 Aug 17;42(6):553–8.
38. Ahmetovic-Djug J, Hasukic S, Djug H, Hasukic B, Jahic A. Impact of Preoperative Anxiety in Patients on Hemodynamic Changes and a Dose of Anesthetic During Induction of Anesthesia. Med Arch. 2017 Oct 1;71(5):330–3.

39. Carlos J, Goulart F, Dias Pinheiro M, Rodrigues RV, De Sant' F, Santos A Dos, et al. Influence of anxiety on blood pressure and heart rate during dental treatment Influência da ansiedade na pressão arterial e frequência cardíaca durante o tratamento odontológico. 2011.