

ORIGINAL ARTICLE

Correlation Between Anxiety and Blood Pressure in Patient With Pre-operative Laparoscopy: A Cross-sectional Study

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ABSTRACT

Introduction: Laparoscopy surgery is a minimally invasive procedure that utilizes a laparoscope to visualize the abdominal cavity, providing benefits such as faster diagnosis, shorter hospitalization, and reduced morbidity. However, changes in blood pressure, particularly in the pre-operative phase, are common and can impact patient outcomes. Additionally, pre-operative anxiety, which affects a significant portion of patients, can further contribute to blood pressure variability and complicate the surgical process. This study aims to determine the relationship between anxiety and blood pressure patients. **Methods:** This study uses a quantitative design with a cross-sectional method. The sample size in the study amounted to 100 respondents using the total sampling technique. Anxiety was measured using APAIS, while blood pressure was measured using a bedside monitor that had been calibrated 10 minutes after respondents arrived at the Operating Room. Data analysis was carried out using the Person Product-Moment test. **Results:** This study found that there was a significant relationship between anxiety and blood pressure in pre-laparoscopic surgery patients at Tarakan Hospital, Jakarta, with a p-value of 0.001 (p-value < 0.05) and $r = 0.728$ [Igp2.1] [Igp2.2]. **Conclusion:** The anxiety felt will increase blood pressure in the patient. Interventions to lower anxiety in pre-laparoscopic patients need to be performed.

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INTRODUCTION

Laparoscopy is a minimally invasive type of surgery that involves indirect visualization of the abdominal cavity through the use of a laparoscope (thin flexible tube) attached to a camera. A laparoscope is inserted into the abdomen through an incision with a length of 0.5 to 1.5 cm(1–3). Laparoscopy is considered a safe, highly versatile, and rapid surgical approach, where healthcare workers can achieve a faster diagnosis, avoid

large preoperative examinations, minimize morbidity, and require shorter hospitalization times(2). Although considered safe, laparoscopy can cause unpleasant responses that can be experienced by patients such as changes in blood pressure.

Changes in blood pressure have been successfully identified. The results of a previous study stated that there were 71.3% of respondents who experienced changes in blood pressure in the pre-operative phase. This shows that there is a problem that occurs with a considerable number (more than half of the respondents) experiencing changes in blood pressure in the pre-operative phase(4).

Blood pressure variability (hypertension as well as hypotension) has been associated with hemodynamic instability and poor clinical outcomes, while maintaining blood pressure within a certain range is one of the main challenges(5). This is a problem that needs to be overcome to be able to maintain blood pressure in patients who have undergone laparoscopy. Changes in blood pressure during surgery are caused by many factors such as the underlying disease, the concentration of the anesthetic agent, and the surgical position(6,7). One of the factors that needs to be identified is in terms of the patient's psychosocial such as anxiety.

The incidence rate of anxiety in pre-operative patients is quite high. There were 53% of pre-operative patients who experienced mild anxiety, 32.4% of patients who experienced moderate to severe anxiety, and only 14.6% of patients who did not experience anxiety(8). Another research states that there are 84% of pre-operative patients experience moderate anxiety and 16% of patients experience severe anxiety(9). This is a problem because it means that anxiety is still one of the problems experienced by patients before surgery.

Patients have different perceptions or views about the anxiety they experience. Some patients express a feeling of relief because they will be free from the disease. Others consider it one of the most stressful events of a lifetime. Patients feel uncomfortable or worried about the success of surgery, a strong fear of surgical failure, postoperative physical health conditions, and problems in adapting to postoperative situations(10). This will ultimately cause long-lasting effects if left untreated, so this study was conducted to assess the relationship between anxiety and blood pressure in pre-laparoscopic patients.

MATERIALS AND METHODS

Research Design

This study uses a quantitative design with a cross-sectional method. This study consisted of anxiety as an independent variable and blood pressure (systole and diastole) pre-operatively as a dependent variable.

Setting and Sample

This study was conducted in pre-laparoscopic surgery patients from September 2024 to February 2025 at Tarakan Hospital. The sample size used in this study was 100 respondents with a sampling technique using total sampling. Patients who were used as respondents

in this study had criteria such as being ≥ 18 years old, able to communicate verbally, and not having a history of hypertension or mental disorders as evidenced by Electronic Medical Record (EMR).

Instrument

Anxiety variables were measured using the APAIS questionnaire. This questionnaire has been tested for validity and reliability using the Indonesian version. The validity of the construct is measured by the factor analysis method. Internal consistency was evaluated with Cronbach's alpha. A total of 102 patients (42 men and 60 women) were enrolled in this study. Factor analysis showed similar anxiety and information scales compared to the original instrument. The high reliability of Cronbach's alpha anxiety scale and the need for Indonesian APAIS information were 0.825 and 0.863, respectively(11). It is proven that the questionnaire is reliable and valid for measuring preoperative anxiety in the Indonesian population. In measuring anxiety, this questionnaire has a value range of 4 - 20 where the higher the number, the higher the anxiety possessed by the respondents(11,12).

Blood pressure was measured 10 minutes after resting in the operating preparation room. Blood pressure was measured using a bedside monitor that had been calibrated regularly by the Hospital Facilities Maintenance Installation (IPSRS). The results of blood pressure are then written in the patient's observation sheet.

Data Analysis

This study used the Pearson test to assess the relationship between anxiety and blood pressure of pre-operative laparoscopy patients with SPSS version 25. The normality test was first carried out using Kolmogorov-Smirnov on anxiety score, systolic, and diastolic pressure so that the results were obtained of 0.064, 0.060, and 0.264 respectively (p -value > 0.05). These results indicate that the data is normally distributed and the Pearson test can be performed.

RESULTS

Table I shows data from 100 respondents, most of whom were male with 56 respondents (56.0%), 70 respondents (70.0%) had a high school education, 62 respondents (62.0%) had a history of surgery, 80 respondents (80.0%) did not have a comorbidity, and 61 respondents (54.0%) were included in the ASA 2 classification.

Table I: Characteristics of Respondents

Characteristics	Frequency	Persentation (%)
Gender		
Male	56	56,0
Female	44	44,0
Education		
Junior High	14	14,0
School		
Senior High	70	70,0
School		
Higher Education	16	16,0
Surgical History		
Yes	38	38,0
No	62	62,0
Comorbid		
Yes	20	20,0
No	80	80,0
ASA Classification		
ASA 1	22	22,0
ASA 2	61	61,0
ASA 3	17	17,0

Source: Primary Data, 2024

Table II shows that the average age of the respondents is 41.70 years old, with the youngest age being 27 years old and the oldest age being 58 years old. The average patient anxiety was 14.41 with the lowest score of 9 and the highest was 20. The average systolic blood pressure of the patient was 137.54 mmHg and diastolic blood pressure was 80.88 mmHg.

Table II: Characteristics Respondents Based on Age, Anxiety, Systolic, and Diastolic Blood Pressure

Variable	Mean (SD)	Min - Max	95% CI
Age	41,70 (9,461)	27 - 58	39,83- 43,56
Anxiety	14,41 (3,19)	9 - 20	13,77-15,04
Systolic Blood Pressure	137,54 (14,65)	112 - 172	134,63-140,44
Diastolic Blood Pressure	80,88 (9,48)	65 - 97	79,00-82,75

Source: Primary Data, 2024

Table III shows the value of the relationship between anxiety and systolic and diastolic blood pressure. The results showed that each had a statistically significant relationship with a p-value of 0.001 (p-value < 0.05) with strong correlation strength ($r = 0.728$ and 0.784). The direction of the positive correlation means that the higher the patient's anxiety, the higher the pre-operative blood pressure. The relationship also showed a significant correlation because the r values obtained were greater than the minimum r ($0.728 > 0.195$) and ($0.784 > 0.195$).

Table III: Correlation Among Anxiety, Systolic, and Diastolic Blood Pressure

Variable	Systolic Blood Pressure		Diastolic Blood Pressure	
	p-value	r	p-value	r
Anxiety	0,001*	0,728	0,001*	0,784

Source: Primary Data, 2024

Notes: * Significant if p-value < 0,05.

DISCUSSION

This study aimed to analyze the relationship between anxiety and blood pressure (systolic and diastolic) in laparoscopic pre-operative patients. The discussion will be divided into subthemes of the relationship between anxiety and systolic blood pressure and anxiety with diastolic blood pressure.

The Correlation of Anxiety to Systolic Blood Pressure in Laparoscopic Pre-Operative Patients

The results of the study showed that there was a significant relationship between anxiety and systolic blood pressure. The results also showed that the average anxiety moved towards the maximum value which indicated that the respondents had quite high anxiety. These results show the same thing in the average systolic blood pressure of the respondents which is above the normal value of <120 mmHg(13).

The pre-operative phase is a complex stressful event, while anxiety is a feeling of fear that is not clear and not supported by the situation. This can cause various physiological responses, one of which is an increase in blood pressure(14). Blood pressure is the force or pressure exerted by the blood to the walls of blood vessels. Blood pressure must be within an adequate range to maintain tissue perfusion during activity and rest. Maintenance of normal blood pressure and tissue perfusion requires the integration of systemic factors and local peripheral vascular effects. It is regulated by baroreceptors located in the Carotid Sinus and Aortic Arch (1,3). This must be considered in all patients, including patients undergoing surgery.

The results of this study are in line with previous research which stated that there is a significant relationship between anxiety and systolic blood pressure. The relationship has the meaning that the lighter the anxiety, the more stable the systolic blood pressure(15). Pre-operative anxiety is associated with physiological changes that affect hemodynamic parameters such as blood pressure (TD) and heart rate. The index study reported significant changes in systolic blood pressure and heart rate at pre-operative and pre-induction times(16).

The results of other studies that have been conducted have also shown that there is a significant difference in the blood pressure of patients before surgery in patients who have anxiety. The study showed that there was an

average change in respondents' anxiety at the time of the pre-operative assessment and when the respondents arrived at the Operating Room with values of 125.81 mmHg and 142.26 mmHg, respectively. This shows a change of 16.45 mmHg(10).

The anxiety experienced will produce physical changes through the activation of the sympathetic nervous system and the adrenal medulla with the production of catecholamines and the activation of the hypothalamic-pituitary-adrenal axis with the production of cortisol. These effects can cause physical changes in heart rate, and blood pressure. This will have adverse effects such as poor analgesic effects, poor patient satisfaction, and even the cancellation of life-saving surgeries(14,17).

The Correlation of Anxiety to Diastolic Blood Pressure in Laparoscopic Pre-Operative Patients

The results showed a significant association between anxiety and diastolic blood pressure in pre-operative patients. The anxiety felt by the respondents in this study included concerns about surgical procedures and anesthesia. It affects the patient's hemodynamics such as diastolic blood pressure.

Diastolic blood pressure (DBP) is the residual pressure in the arterial system during ventricular relaxation (or filling). The results showed that anxiety increases the risk of diastolic hypertension, which is known to be a cause of diastolic dysfunction. These results show that psychological variables have an impact and account for 7% of the diastolic blood pressure variance(18). A person who has symptoms of anxiety has a 1.02 mmHg greater increase in systolic blood pressure and 0.75 mmHg greater in diastolic blood pressure(19). Changes in diastolic blood pressure have a mechanism due to the anxiety felt by the patient. Anxiety and other mental problems can lead to abnormal activation of the sympathetic nervous system (SNS) that triggers a hormonal cascade that disrupts blood pressure(20,21).

Although the study has been conducted and the results have been presented, this study has limitations such as blood pressure and anxiety measurements were only taken once before surgery, so fluctuations in anxiety and blood pressure before or after that time could not be captured. Research with blood pressure measurements carried out periodically needs to be done.

CONCLUSION

This study showed a significant association between anxiety and blood pressure in pre-laparoscopic patients. Because of its nature as basic research, the results of this study can be used as a basis for conducting interventions or developing interventions to reduce anxiety and improve blood pressure in pre-laparoscopic surgery patients. The results of this study can also be used as teaching materials in adult nursing courses and become

'related conditions' in anxiety nursing problems.

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