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To evaluate the level of anxiety and depression in patients admitted in surgical wards: A cross-sectional study

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Abstract

Introduction: To evaluate anxiety and depression, and their prevalence and risk factors in preoperative patients admitted in general surgery wards. Assessing the need for appropriate interventions to better manage these conditions allowing for better outcomes.
Materials and Methods: The study involves 93 pre-operative patients in a Cross-sectional design with face-to-face interviews conducted by the author a day prior to the surgery. General Anxiety Disorder-7 (GAD-7) and Patient Health Questionnaire-9 (PHQ-9) scales were used to assess patient anxiety and depression, respectively. The data obtained was then analyzed and appropriate conclusions were derived.
Result: The prevalence of Anxiety and Depression among preoperative patients was found to be 20.4% and 10.8%, respectively. About 22.2% of female participants and 19.7% of male participants were diagnosed with Anxiety. Among participants with no past operative history, 20.6% and 17.2% were diagnosed with Anxiety and Depression, respectively. Among the participants who had undergone an operation before, 4.3% and 12.8% were diagnosed with Anxiety and Depression, respectively. Among patients with co-morbidities 22.5% and 25% had Anxiety and Depression, respectively.
Conclusion: Female patients and those with comorbidities are at higher risk of developing anxiety and depression in the preoperative period. Therefore precautions should be taken when considering such patients for surgery and use of tools should be promoted for diagnosis of anxiety and depressive disorders in clinical settings.

Keywords: Anxiety disorder, Depression disorder, Evaluation of preoperative anxiety and depression, Effect of comorbidities on preoperative anxiety and depression.

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1. Introduction

Depression and anxiety are among the most commonly experienced mental health disorders in both the general population and different medical conditions. However, they are often under-recognized in medical settings, and this can complicate the patients' recovery. The decision to undergo surgery is often accompanied by a myriad of emotions, including fear, uncertainty and vulnerability. The anticipation of the procedure, coupled with concerns about postoperative outcomes, can contribute to heightened anxiety levels in patients. Moreover, the physical trauma of surgery, the recovery process, and potential complications can amplify the emotional toll, potentially leading to the onset or exacerbation of depressive symptoms.

Preoperative anxiety is described as an unpleasant state of uneasiness or tension that is secondary to a patient being concerned about a disease, hospitalization, anesthesia and surgery, or the unknown.[1] The reported incidence of preoperative anxiety in adults ranges from 11% to 80%, depending on the assessment method.[2,3] Depression can cause feelings of sadness, hopelessness, and a lack of motivation. Depression is a frequent cause of morbidity in surgery patients suffering from a wide range of conditions. Preoperative depression is associated with 1.4-fold increased risk of postoperative early and late mortality.[4]

Anxiety and depression are common among patients admitted to surgical wards. A study by Marcolino *et al*. on surgical cases showed the presence of anxiety and depression

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in 44.3% and 26.6% of patients, respectively, in the preoperative period of general surgery.[5] These mental health conditions can have a significant impact on patients' overall well-being and recovery from surgery. Currently, data exist with respect to the effects of anxiety and fear before surgery on preoperative outcomes, such as heart rate, blood pressure, and neuroendocrinological changes, and postoperative outcomes, such as behavioral recovery and pain and analgesic requirements.[6] Due to these drawbacks, it is necessary to evaluate and prevent anxiety prior to surgery, since this way it is assumed that it will increase patient satisfaction, and as Osco Torres et al. and Díez Álvarez et al. affirmed, possible intraoperative complications related to the intervention and anaesthesia would be reduced. The time of postoperative stay would also be shortened, assuming a lower economic cost for the hospital, as well as a reduction in waiting lists.[7-11]

There is a lack of information regarding the prevalence and risk factors of anxiety and depression symptoms in Indian surgical patients. Therefore more research should be done in this aspect for better planning of appropriate interventions to address these mental health challenges and prevent any complications arising due to them. By shedding light on the prevalence, severity, and risk factors associated with anxiety and depression in surgery patients, we aspire to pave the way for more patient-centred care approaches.

2. Materials and Methods

1.1. Study setting

Tertiary Care Hospital, Pune, Maharashtra, India.

1.2. Study design

Cross-sectional study.

1.3. Study duration

Two months. From 20th October, 2023 to 20th December 2023.

1.4. Study population

All preoperative patients between the age of 18-80 years and both genders admitted in general surgery wards at a Tertiary Care Hospital, Pune after giving informed consent and ethical clearance.

1.5. Study participants and sample size

By considering the prevalence of anxiety at 58.9% in the reference article,[12] the calculated sample size is 93 preoperative patients admitted to general surgery wards at a Tertiary Care Hospital, Pune, after giving informed consent and getting ethical clearance from the Institutional Ethics Committee.

1.6. Ethics approval

The study was approved by Institutional Ethics Committee of Bharati Vidyapeeth Medical College, Pune- 411043 India. (DHR Reg. No: EC/NEW/INST/2022/MH/0150) (REF: BVDUMC/IEC/107).

1.7. Sampling technique

1.7.1. Inclusion criteria

Age 18 to 80 years; both sexes; All cases admitted in and under general surgery wards for surgical procedures; Elective and emergency cases.

2.7.2. Exclusion criteria

Intubated cases; Patients unable to consent; Children below 18yrs; Reduced mental status of the patient; History of psychiatric disorder; Chronic sedative medication; Revision of previous operation; Patients undergoing long-lasting treatment; Rejection by patient; Failure to grant written and informed consent.

1.8. Patient and public involvement

Patients or the public was not involved in any stage of the study including design and conduct. The research questions were based on the GAD-7 and PHQ-9 scales, and preoperative patient recruitment details were finalised by the author together with the co-authors.

1.9. Data collection instruments

The tools employed for screening of depression and anxiety in patients are PHQ-9 and GAD-7 respectively. For the GAD-7 and PHQ-9 scales refer to document labelled as SDC_scale.doc.

The PHQ-9 assesses the frequency and severity of symptoms of depression using nine 4-point Likert-scaled items ranging from 0 (not at all) to 3 (nearly every day) (Kroenke & Spitzer, 2002). A total score ranging from 0 to 27 is obtained by summarising all items, with ordinary mean substitution for missing items if no more than one third (no more than three items) are missing. The total score can be categorized at a cut off of 10 to differentiate between minimal/mild versus moderate/severe depression. However, a systematic review indicated that a cut off of 8 might increase sensitivity to depression. PHQ-9 scores of 5, 10, 15, and 20 represented mild, moderate, moderately severe, and severe depression, respectively.[13]

The GAD-7 measures the frequency and severity of generalized anxiety disorder symptoms, using seven 4-point Likert-scale items with a response format ranging from 0 (not at all) to 3 (nearly every day). A total score ranging from 0 to 21 was obtained by summing all items with ordinary mean substitution for missing items if less than one third (less than two items) were missing. The total score can be categorized at a cut off of 10 or 8 to optimize the test's sensitivity and

specificity for identifying other anxiety disorders. The total GAD–7 score ranges from 0 to 21, with total scores of 5, 10, and 15 representing cut–offs for mild, moderate, and severe symptomatology.[14]

2.10. Plan of data analysis

The collected data will be entered in Microsoft excel sheet and analyzed. The results will be presented in tabular and graphic format. All statistical analysis will be done by using SPSS software with version 25.0. Continuous variables results shown by descriptive statistics and categorical variables results will be shown by frequency and percentages. Group comparisons will be done using the Chi-square test for categorical variables like severity and outcome categories. Student-t-test will be used for continuous with normal distribution and Mann-Whitney U-test for continuous variables with abnormal distribution. Throughout results 5% level of significance will be used. All results shown with 95% of confidence. P-value<0.05 considered as significant.

2.11. Methodology

The study group comprises patients above 18 years of age, both genders and fitting the inclusion criteria, who are scheduled for surgical interventions and admitted to surgery wards at a Tertiary Hospital, Pune. The data was collected through bedside interviews using a questionnaire and in the preferred language (Marathi/Hindi) of the patients. Patient interviews and translation of questions and data were carried out by the researcher.

After identifying eligible patients, their informed consent was obtained and they were interviewed, as per the questionnaire, a day prior to the day of surgery. All included patients are initially subjected to detailed history taking which includes symptoms & duration of the disease, past, personal & family history. A specially designed proforma is filled for each patient. The proforma has general information about the patient's personal details, comorbid conditions, details of the presenting complaint on day of admission, surgical history, diagnosis and the operation planned. The patients were then screened for anxiety and depression using the GAD-7 and PHQ-9 tools respectively. During the study, patients who are identified to be suffering from mild to severe anxiety (GAD-7 score >=5) and/or depression (PHQ-9 score >=5) are considered to have clinically relevant anxiety and/or depressive symptoms. These patients are then referred for counselling and brought to the attention of the anesthesiologist.

3. Results

Participant characteristics

All study participants were patients admitted in general surgery wards for operation at a Tertiary Care Hospital, Pune. The study participants were residents of Pune district and the surrounding district of Satara.

In this study we have recorded the patients' preoperative anxiety and depression levels, and have compared them with possible risk factors such as patients' age, gender, past surgical history and co-morbidities in order to find a definitive co-relation between the risk factors and the preoperative anxiety and depression levels.

Tabular representation of data is as follows:

Table 1: Gender distribution of study participants

		Frequency	Percent
Gender	F	27	29.0
	M	66	71.0
Total		93	100.0

Table 2: Age group distribution of anxiety

			Diagnosis				Total
			None	Minimal	Mild	Moderate	
Age group	<=30	Count	3	4	1	2	10
		% within Age group	30.0%	40.0%	10.0%	20.0%	100.0%
	>30	Count	26	41	11	5	83
		% within Age group	31.3%	49.4%	13.3%	6.0%	100.0%
Total		Count	29	45	12	7	93
		% within Age group	31.2%	48.4%	12.9%	7.5%	100.0%

*P Value = 0.465

- Considering GAD-7 score greater than 4 as diagnostic for anxiety.
- Percentage of study participants in the age group <=30years diagnosed with anxiety is 30%.
- Percentage of study participants in the age group >30years diagnosed with anxiety is 19.3%.

Table 3: Age group distribution of depression

			Diagnosis				Total
			None	Minimal	Mild	Moderate	
Age group	<=30	Count	3	5	1	1	10
		% within Age group	30.0%	50.0%	10.0%	10.0%	100.0%
	>30	Count	20	55	6	2	83
		% within Age group	24.1%	66.3%	7.2%	2.4%	100.0%
Total		Count	23	60	7	3	93
		% within Age group	24.7%	64.5%	7.5%	3.2%	100.0%

*P Value = 0.537

Considering PHQ-9 score greater than 4 as diagnostic for depression,

- 20% of study participants in the age group <=30years are diagnosed with depression.
- 9.6% of study participants in the age group >30years are diagnosed with depression.

Table 4: Relation between Anxiety and Gender of study participants

			Diagnosis Anxiety				Total
			None	Minimal	Mild	Moderate	
Gender	F	Count	9	12	6	0	27
		% within Gender	33.3%	44.4%	22.2%	0.0%	100.0%
	M	Count	20	33	6	7	66
		% within Gender	30.3%	50.0%	9.1%	10.6%	100.0%
Total		Count	29	45	12	7	93
		% within Gender	31.2%	48.4%	12.9%	7.5%	100.0%

*P Value = 0.133

- 22.2% of female participants were diagnosed with Anxiety
- 19.7% of male participants were diagnosed with Anxiety

Table 5: Relation between depression and gender of study participants

			Diagnosis Depression				Total
			None	Minimal	Mild	Moderate	
Gender	F	Count	6	20	1	0	27
		% within Gender	22.2%	74.1%	3.7%	0.0%	100.0%
	M	Count	17	40	6	3	66
		% within Gender	25.8%	60.6%	9.1%	4.5%	100.0%
Total		Count	23	60	7	3	93
		% within Gender	24.7%	64.5%	7.5%	3.2%	100.0%

*P Value = 0.457

- 3.7% of female participants were diagnosed with Depression
- 13.6% of male participants were diagnosed with Depression

Table 6: Relation between Anxiety diagnosis and no. of times operated

			Diagnosis Anxiety				Total
			None	Minimal	Mild	Moderate	
No. of times operated	0	Count	7	16	5	1	29
		% within No. of times operated	24.1%	55.2%	17.2%	3.4%	100.0%
	1	Count	12	15	1	5	33
		% within No. of times operated	36.4%	45.5%	3.0%	15.2%	100.0%
	2	Count	7	7	3	0	17
		% within No. of times operated	41.2%	41.2%	17.6%	0.0%	100.0%
	3 or more	Count	3	7	3	1	14
		% within No. of times operated	21.4%	50.0%	21.4%	7.1%	100.0%
Total		Count	29	45	12	7	93

	% within No. of times operated	31.2%	48.4%	12.9%	7.5%	100.0%

*P value = 0.296

- Among the participants who had not undergone any kind of operation before, 20.6% were diagnosed with Anxiety
- Among the participants who had undergone an operation once in the past, 18.2% were diagnosed with Anxiety
- Among the participants who had undergone two operations in the past, 17.6% were diagnosed with Anxiety
- Among the participants who had undergone three or more operations in the past, 28.5% were diagnosed with Anxiety

Table 7: Relation between Depression diagnosis and No. of times operated

			Diagnosis Depression				**Total**
			None	Minimal	Mild	Moderate	
No. of times operated	0	Count	5	19	3	2	29
		% within No. of times operated	17.2%	65.5%	10.3%	6.9%	100.0%
	1	Count	7	23	2	1	33
		% within No. of times operated	21.2%	69.7%	6.1%	3.0%	100.0%
	2	Count	7	9	1	0	17
		% within No. of times operated	41.2%	52.9%	5.9%	0.0%	100.0%
	3 or More	Count	4	9	1	0	14
		% within No. of times operated	28.6%	64.3%	7.1%	0.0%	100.0%
Total		Count	23	60	7	3	93
		% within No. of times operated	24.7%	64.5%	7.5%	3.2%	100.0%

*P Value = 0.746

- Among the participants who had not undergone any kind of operation before, 17.2% were diagnosed with Depression
- Among the participants who had undergone an operation once in the past, 9.1% were diagnosed with Depression
- Among the participants who had undergone two operations in the past, 5.9% were diagnosed with Depression
- Among the participants who had undergone three or more operations in the past, 7.1% were diagnosed with Depression

Table 8: Relation between Anxiety diagnosis and patient co-morbidities

			Diagnosis Anxiety				**Total**
			None	Minimal	Mild	Moderate	
Co-morbidities	DM	Count	0	4	0	1	5
		% within Co-morbidities	0.0%	80.0%	0.0%	20.0%	100.0%
	DM, HTN	Count	2	3	2	3	10
		% within Co-morbidities	20.0%	30.0%	20.0%	30.0%	100.0%
	HTN	Count	6	14	1	1	22
		% within Co-morbidities	27.3%	63.6%	4.5%	4.5%	100.0%
	NOTA	Count	21	22	8	2	53
		% within Co-morbidities	39.6%	41.5%	15.1%	3.8%	100.0%
	Other	Count	0	2	1	0	3
		% within Co-morbidities	0.0%	66.7%	33.3%	0.0%	100.0%
Total		Count	29	45	12	7	93
		% within Co-morbidities	31.2%	48.4%	12.9%	7.5%	100.0%

*P Value= 0.061

- 20% of diabetic study participants were diagnosed with Anxiety
- 9% of hypertensive participants were diagnosed with Anxiety
- 50% of participants suffering from both diabetes and hypertension were diagnosed with Anxiety
- 33.3% of participants suffering from other co-morbidities (thyroid, asthma) were diagnosed with Anxiety
- 18.9% of participants with no co-morbidities were diagnosed with Anxiety

Table 9: Relation between Depression diagnosis and patient co-morbidities

			Diagnosis Depression				**Total**
			None	Minimal	Mild	Moderate	
Co-morbidities	DM	Count	1	4	0	0	5
		% within Co-morbidities	20.0%	80.0%	0.0%	0.0%	100.0%

	DM, HTN	Count	3	5	1	1	10
		% within Co-morbidities	30.0%	50.0%	10.0%	10.0%	100.0%
	HTN	Count	3	17	2	0	22
		% within Co-morbidities	13.6%	77.3%	9.1%	0.0%	100.0%
	NOTA	Count	15	33	3	2	53
		% within Co-morbidities	28.3%	62.3%	5.7%	3.8%	100.0%
	Other	Count	1	1	1	0	3
		% within Co-morbidities	33.3%	33.3%	33.3%	0.0%	100.0%
Total		Count	23	60	7	3	93
		% within Co-morbidities	24.7%	64.5%	7.5%	3.2%	100.0%

*P Value= 0.699

- 0% of diabetic study participants were diagnosed with Depression
- 9.1% of hypertensive participants were diagnosed with Depression
- 20% of participants suffering from both diabetes and hypertension were diagnosed with Depression
- 33.3% of participants suffering from other co-morbidities (thyroid, asthma) were diagnosed with Depression
- 9.5% of participants with no co-morbidities were diagnosed with Depression

Table 10: Anxiety diagnosis

		Frequency	**Percent**
Anxiety Diagnosis	None	29	31.2
	Minimal	45	48.4
	Mild	12	12.9
	Moderate	7	7.5
Total		93	100.0

*20.4% of study participants are suffering from Anxiety

Table 11: Depression diagnosis

		Frequency	**Percent**
Depression Diagnosis	None	21	22.6
	Minimal	62	66.7
	Mild	7	7.5
	Mild to Moderate	1	1.1
	Moderate	2	2.2
Total		93	100.0

*10.8% study participants are suffering from Depression

4. Discussion

The results of this study showed that at least one out of ten surgery inpatients have depression and around one quarter have anxiety indicating that these conditions are not rare. The prevalence of preoperative Anxiety and Depression among study participants was 20.4% and 10.8%, respectively (**Table 10**, **Table 11**). Women have been found to have higher anxiety,[15] which is in line with the findings of our study (**Table 4**). It is thought that women more easily express their anxiety, the separation from their family affects women more, and these differences have been proposed to account for the positive correlation between anxiety and female gender.

In present study, patients with comorbidities were found to have higher anxiety (GAD-7) and depression (PHQ-9) scores than those without comorbidities. Among patients with co-morbidities 22.5% and 25% had Anxiety and Depression, respectively (**Table 8**, **Table 9**). This might be due to the increased risk of mortality and postoperative complications associated with comorbidities. Other studies have shown a similar relationship between patient comorbidities and their mental health preoperatively.[16] Patients who had not undergone any operation before were found to have more depression than those who had undergone an operation before (**Table 7**). This might be explained by the fact that patients who had undergone an operation before had more knowledge about the general aspects of an operation and the pre and postoperative events. This may not apply to patients who had undergone a minor operation before and are now scheduled for a major operation. Therefore further studies in this aspect will be helpful to provide better understanding.

Prevalence of anxiety and depression was greater among study participants in the age group <=30 years **(Tables 2, 3)**. This finding needs to be studied in future studies as the material available presently does not provide satisfactory evidence about the relation between age and the mental state

of preoperative patients. Most of the evidence does not confirm age as a risk factor for preoperative anxiety.[17] Givel et al. studied the question of how much information patients want or need prior to surgery and has attracted attention to the importance of not only answering patients' questions, but also making them aware of the available information, thus helping them to get through this difficult process.[18] De Oliveira et al. found that overestimation of perioperative mortality risk is common in patients undergoing general surgery and it is highly associated with preoperative anxiety. The authors offered improved communication strategies to minimize misleading risk perception in surgical patients.[19]

All study participants were counseled by the surgeon prior to admission as part of the hospital admission procedure. This also proves that counselling of patients is an effective intervention as throughout the duration of the study none of the participants were diagnosed with severe anxiety and/or depression. This study offers insight into the mental state of preoperative patients in India and acknowledges its own limitations, which can be corrected and applied in similar studies in order to better understand the various aspects of anxiety and depression in Indian surgical patients.

5. Limitations of the Study

It is a limited duration study involving a small study population, therefore the data may not be applicable to all surgery inpatients. The results of this study may differ from those of similar studies due to difference in the assessment tools used, population studied and a small sample size. We could not effectively determine the relation between age and preoperative anxiety and depression, mainly due to the disproportionate age-distribution of the study participants **(Table 2, Table 3)**. Since all study participants were given prior counselling by the surgeon, the true base anxiety and depression in pre-operative patients may vary from the data obtained in this study. The same reason may explain the lack of patients with severe anxiety and/or depression throughout the study.

6. Conclusions

Evaluation of psychological status of preoperative patients is important as they are more susceptible to anxiety and depression disorders which have further adverse effects on the outcome of the operation. Therefore, use of predictors for anxiety and depression which is feasible in routine practice for general surgery inpatients, and application of preventive measures to overcome such situations are indispensable to improve the psychological status of the patients and promote better outcomes. Patients with comorbidities have a greater risk of developing anxiety and depression in the preoperative period. Therefore such patients should be carefully considered for the risk of preoperative anxiety and depression.

This study proves that Indian surgical patients suffer from preoperative anxiety and depression, and that these conditions can be prevented and overcome using appropriate measures. Further research should be focused on a larger population taking into consideration the effects of these psychological disorders on the patients' health and the various methods to effectively tackle these situations.

7. Summary

Patients admitted in hospitals waiting for their operation often suffer from mental disorders like anxiety and depression which further have a negative effect on the patients' health and recovery. By studying the prevalence of these conditions and the associated contributing factors, we aim to improve our understanding of these conditions which will in turn help in the management of such conditions. The data was collected by a detailed questionnaire consisting of various parameters like demographic details, the complaints of the patient, the operation planned, number of times operated previously and patient comorbidities. The preoperative patients were assessed for anxiety and depression using the PHQ-9 and GAD-7 scales, respectively. This study was conducted on 93 preoperative patients admitted in the surgery ward. They were given a questionnaire and their PHQ-9 and GAD-7 scores were recorded.

Our study shows that 20.4% and 10.8% (**Table 10**, **Table 11**) of the preoperative patients were diagnosed with anxiety and depression, respectively. It was seen that women were related with higher anxiety levels (**Table 4**). There is greater prevalence of anxiety and depression among preoperative patients with comorbidities (**Table 8**, **Table 9**). There is a negative correlation between the history of previous operations and patients' anxiety and depression scores (**Table 6**, **Table 7**). Prior to admission, patient counseling is a useful strategy for managing patients' anxiety and depression. Early detection of mental health disorders is important for better management of the condition, therefore tools such as PHQ-9 and GAD-7 scales should be used in hospitals for easy and quick diagnosis of anxiety and depressive symptoms. This study also gives rise to questions like – Does a patient with history of previous operations feel the same amount of anxiety and depression for both major and minor operations; What is the effect of chronic diseases on patient anxiety and depression scores?; Effectiveness of different measures in management of anxiety and depression in preoperative patients.

8. List of Abbreviations

1. GAD-7: General Anxiety Disorder-7
2. PHQ-9: Patient Health Questionnaire-9

9. Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

10. Authors' Contributions

Contributors: Juthikaa Abhijit Deherkar conceived and designed the study. Swapnil Pramod Korde did the analyses and drafted the manuscript. Juthikaa Abhijit Deherkar and Swapnil Pramod Korde had full access to all the data in the study and take responsibility for the integrity of the data and accuracy of the data analysis. Abhay Gajendra Kumar is involved in project administration, validation, supervision and data curation. Juthikaa Abhijit Deherkar is the guarantor. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted. All authors interpreted the data, critically revised the manuscript for important intellectual content, and approved the final version.

11. Patient Consent Statement

Informed consent for participation and publication was obtained from all individual participants included in the study.

12. Source of Funding

We have received no funding for the study.

13. Conflict of Interest

The authors of this study have no conflict of interest.

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