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Original Article

Assessment of Preoperative Anxiety Utilizing Amsterdam Preoperative Anxiety and Information Scale in Patients Undergoing Intracranial Tumor Surgery: An Exploratory Study

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Abstract

Background Preoperative anxiety in neurosurgical patients is high due to life-threatening illness and uncertainty of the surgical outcome. This study assessed preoperative anxiety and its influencing factors in patients undergoing intracranial tumor surgeries utilizing the Amsterdam Preoperative Anxiety and Information Scale (APAIS).

Methods One-hundred twenty patients, 18 to 65 years of age, of either sex, American Society of Anesthesiologists (ASA) grades I/II posted for elective craniotomy and tumor excision, were selected for the study. Various components of the APAIS were explained, and the level of anxiety and need for information were noted. The level of anxiety and depression by HADS (Hospital Anxiety and Depression Scale) score was also evaluated.

Results The mean age was 38.00 ± 12.15 years. About 57.5% of the patients were male. Eighteen (15%) patients had an educational qualification of class 10, 60(50%) of $10 + 2$, 36 (30%) were graduates, and 6 (5%) had a postgraduate qualification.

The mean APAIS for total anxiety was 11.10 ± 1.79; the score for need for information was 6.28 ± 1.61. Mean total anxiety scores were higher in female patients (11.96 vs. 10.46, $p < 0.001$). Higher anxiety was observed in ASA status I patients (11.33 vs. 10.539 ASA I vs. II, $p = 0.020$). Significantly higher anxiety was observed in patients educated till class 10 ($p = 0.012$). A significantly higher need for information was observed in postgraduates ($p = 0.012$). Eighty (66.7%) patients had clinical anxiety, and 35 (29.2%) had clinical depression on the HADS score.

Conclusion Neurosurgical patients have higher anxiety due to intracranial pathology, site of surgery, and unpredictability of outcome. Demographic and clinical variables do affect anxiety levels.

Keywords
- anxiety
- intracranial tumor
- assessment
- Amsterdam Preoperative Anxiety and Information Scale
- HADS

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Introduction

Anxiety is a state of uneasiness, apprehension, and fear due to anticipation of a threatening event and is common in conjunction with anesthesia and surgery.[1] Preoperative anxiety rates range from 60 to 92% in unselected surgical patients and vary among different surgical groups.[2]

Preoperative anxiety depends on factors like sociocultural status, educational qualifications, personality traits, and the presence of psychiatric comorbidities. Previous experience with surgeries also plays a significant role.[3] Multiple interventions are available to help overcome preoperative anxiety and postoperative outcomes.[4]

Preoperative anxiety influences physical and psychological outcomes, perioperative hemodynamic fluctuations, postoperative pain and analgesic requirements, disability, and infection.[5,6] Higher anxiety level leads to extended hospital stays, increased risk of readmission, and increased morbidity and mortality.[7–10]

Sedative drugs are the mainstay of pharmacological intervention to control anxiety. Anxious patients also benefit from more attention and information from the anesthesiologist.[11]

In the present era of information, there is an increased patient need for information. As the Internet has become a primary means for acquiring health information, web-based health information is of mixed quality and may affect patients' health-related behavior and decisions. Studies have shown that information given to patients before surgery may facilitate recovery; however, some patients like to shut themselves off from communication, whereas others want to be informed as fully as possible.[12]

These different coping styles are rarely honored. It is practically impossible for the anesthesiologist to discriminate between patients who want to be informed as fully as possible and those who want to know as little as possible.[13] Neurosurgical patients have additional concerns as the underlying illness is life-threatening due to their intracranial pathology, the concept of surgery on the brain, and the uncertainty of their surgery outcome.[14]

Spielberger State-Trait Anxiety Inventory (STAI scale) and Hospital Anxiety and Depression Scale (HADS) are questionnaire-based instruments to assess the anxiety and depression in a patient admitted to a hospital.[15,16]

In 1996, Moerman et al developed the Amsterdam Preoperative Anxiety and Information Scale (APAIS), a self-reported questionnaire that was easy to use, clinically relevant, accepted among patients, and a simple format that facilitates analysis. APAIS consists of six items rated on a five-point Likert scale. APAIS represents two scales: anxiety (items 1, 2, 4, and 5) and need for information (items 3 and 6).[17,18]

In 1986, Zigmond and Snaith developed the HADS, a self-assessment questionnaire to measure anxiety and depression in a general medical population. It consists of 14 items, with 7 per subscale for anxiety and depression each. Items are scored 0, 1, 2, or 3 on the Likert scale. For each of the two scales, scores range from 0 to 21.[19,20]

The primary objective of the study was to assess preoperative anxiety and the need for information with its influencing factors in patients undergoing intracranial tumor surgeries utilizing the APAIS. The secondary objective was to compare the APAIS with the HADS in assessing preoperative anxiety.

Materials and Methods

A cross-sectional study was conducted among patients with intracranial tumors after obtaining Institutional Ethics Committee clearance (IEC/21/199 dated09/04/2021). The study included 120 patients, 18 to 65 years of age, of either sex, under ASA grades 1 and 2 posted for elective craniotomy and tumor excision. Patients with Glasgow Coma Scale less than 15, unable to understand the tool of assessment and with pre-existing long-standing anxiety or psychiatric disorder, were excluded from the study. Written informed consent was taken from the patients.

Patients were evaluated 1 day before surgery, and socioeconomic and clinical parameters such as age, sex, educational qualifications, marital status, employment status, ASA status, tumor location, and any comorbid conditions were noted. Patients were explained the various components of the study tools (APAIS/HADS score), and their responses were evaluated on a Likert scale. HADS was taken as the gold standard. An anxiety score of 11 on the HADS was taken as a cutoff to classify anxiety and non-anxiety cases.

Based on previous study results,[1] the sample size was calculated using the following formula for a 95% confidence interval (CI) level and a margin of error (E) of 1:

$n = (Z\alpha/2X\ \sigma/\ E)^2$, where n = sample size, Z = Z statistic for a level of confidence (for 95% CI, Z = 1.96), σ = Standard deviation, E: Margin of error, SD = 5.5, E = 1. Data were coded and recorded in the MS Excel spreadsheet program. SPSS v23 (IBM Corp.) was used for data analysis. The sample size calculated using the above formula is 120. Mean and standard deviation values for anxiety and need for information were calculated for every clinical and demographic variable. Wilcoxon-Mann–Whitney U test was used to compare data (gender, ASA status, marital, and employment status), which were non-normally distributed in two subgroups. Kruskal–Wallis test was used to compare data (age, education, tumor location, and comorbidity), which were non-normally distributed in more than two subgroups. The Spearman correlation coefficient was used to explore the correlation of the APAIS anxiety score with the APAIS need for information score, HADS anxiety, and depression score. Statistical significance was kept at p-value less than 0.05.

Results

One-hundred twenty patients were eligible for the study. The demographic profile of patients is shown in ►**Table 1**.

Anxiety Score

The median (interquartile range [IQR]) score for anxiety to anesthesia was 5.00 (5.00–6.00), while the median (IQR) score for anxiety to surgery was 6.00 (6.00–7.00) and the median (IQR) score for total anxiety was11.00 (10.00–12.00; ►**Table 2**).

Table 1 Association of APAIS anxiety score and need for information score with demographic and clinical variables

Clinical details Number (n) = 120	Number (%)	APAIS anxiety score		APAIS need for information score	
Age in years		**Median (IQR)**	***p*-Value**	**Median (IQR)**	***p*-Value**
18–30 years	36 (30.0)	11 (10.75–13)	0.798	5.5 (5–7)	0.052
31–40 years	37 (30.8)	11 (10.75–13)		5.5 (5–7)	
41–50 years	25 (20.8)	11 (10.75–13)		5.5 (5–7)	
51–60 years	21 (17.5)	11 (10.75–13)		5.5 (5–7)	
61–70 years	1 (0.8)	11 (10.75–13)		5.5 (5–7)	
Gender					
Male	69 (57.5)	11 (10–12)	<0.001	6 (5–8)	0.732
Female	51 (42.5)	11 (10–12)		6 (5–8)	
ASA status					
I	86 (71.7)	11 (11–12)	0.020	6 (5–8)	0.813
II	34 (28.3)	11 (11–12)		6 (5–8)	
Educational qualification					
10	18 (15.0)	12 (11–13)	0.012	5 (4–6.5)	<0.001
10 + 2	60 (50.0)	12 (11–13)		5 (4–6.5)	
Graduation	36 (30.0)	12 (11–13)		5 (4–6.5)	
Postgraduation	6 (5.0)	12 (11–13)		5 (4–6.5)	
Marital status					
Unmarried	32 (26.7)	11 (11–12.25)	0.313	5.5 (5-7)	0.070
Married	88 (73.3)	11 (11–12.25)		5.5 (5-7)	
Employment status					
Employed	39 (32.5)	11 (10–12)	0.050	7 (5–8)	0.117
Unemployed	81(67.5)	11 (10–12)		7 (5–8)	
Tumor location					
Frontal	36 (30.0)	11 (10–12)	0.024	6.5 (5–8)	0.890
Parietal	4 (3.3)	11 (10–12)		6.5 (5–8)	
Temporal	32 (26.7)	11 (10–12)		6.5 (5–8)	
Occipital	15 (12.5)	11 (10–12)		6.5 (5–8)	
Frontoparietal	3 (2.5)	11 (10–12)		6.5 (5–8)	
Frontotemporal	3 (2.5)	11 (10–12)		6.5 (5–8)	
Parietotemporal	5 (4.2)	11 (10–12)		6.5 (5–8)	
Parietooccipital	3 (2.5)	11 (10–12)		6.5 (5–8)	
Infratentorial	19 (15.8)	11 (10–12)		6.5 (5–8)	
Comorbidity					
Diabetes mellitus	5 (4.2)	11 (10–11.75)	0.132	6 (5–8)	0.469
Hypertension	15 (12.5)	11 (10–11.75)		6 (5–8)	
Chronic obstructive pulmonary disease	9 (7.5)	11 (10–11.75)		6 (5–8)	
Hypothyroidism	5 (4.2)	11 (10–11.75)		6 (5–8)	

Abbreviations: APAIS, Amsterdam Preoperative Anxiety and Information Scale; ASA, American Society of Anesthesiologists; HADS, Hospital Anxiety and Depression Scale; IQR, interquartile range.

Mean total anxiety scores were higher in female patients (11.96 vs. 10.46 in males, $p < 0.001$). Higher anxiety was observed in ASA status I patients compared to ASA II patients (11.33 vs. 10.539, $p = 0.020$; ►**Table 1**).

With a mean score of 11.83, 11.33, 10.33, and 11.17 for total anxiety in patients educated till class 10,10 + 2, graduation, and postgraduation, respectively, significantly higher anxiety was seen in patients educated till class 10 ($p = 0.012$).

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Table 2 Factor analysis of APAIS score and HADS score

	Median (IQR)	Min–Max
APAIS anxiety to anesthesia	5.00 (5.00–6.00)	3.0–7.0
APSIS anxiety to surgery	6.00 (6.00–7.00)	4.0–8.0
APAIS total anxiety	11.00 (10.00–12.00)	7.0–15.0
APAIS need for information	6.00 (5.00–8.00)	3.0–9.0
HADS anxiety	12.00 (10.00–15.00)	8.0–18.0
HADS depression	10.00 (9.00–11.00)	7.0–15.0

Abbreviations: APAIS, Amsterdam Preoperative Anxiety and Information Scale; HADS, Hospital Anxiety and Depression Scale; IQR, interquartile range.

Correlating tumor location with anxiety showed significant differences in anxiety scores ($p = 0.024$). The total anxiety score was higher in patients with tumors in the frontoparietal area.

Age, marital status, employment status, and presence of comorbid conditions did not show an association with anxiety scores ($p > 0.05$).

Need for Information Score

The median score for need for information for surgery and anesthesia was 6.00 (6.00–8.00). Seventeen patients had little or no information requirements (scores 2–4), 63 patients had average information requirements (scores 5–7), and the rest (40 patients) had high information requirements (scores 8–10).

A significantly higher need for information was seen in patients educated till postgraduation ($p = 0.012$), with a median score of 5, 6, 6.5, and 8.5 in patients educated till 10, 12, and postgraduation, respectively.

Age, gender, ASA status, marital status, employment status, tumor locations, and presence of comorbid conditions did not show an association with an increased need for information.

Correlations of Anxiety Scores of APAIS with the Need for Information and HADS score

On evaluating clinical anxiety/depression utilizing the HADS score, anxiety scale (>11) was present in 80 (66.7%) patients, while 35 (29.2%) had clinical depression.

Total anxiety score and need for information score of APAIS did not show a statistically significant correlation (rho = 0.03, $p = 0.766$). A moderate and statistically significant positive correlation was seen between the total anxiety score of APAIS and the anxiety score of the HADS (rho = 0.45, $p < 0.001$; ►**Fig. 1**). No statistically significant correlation was present between the total anxiety score of the APAIS and the depression score of the HADS (rho = 0.13, $p = 0.166$).

On comparing the APAIS score total anxiety with the HADS anxiety score, the mean score was 10.18 and 11.56 in patients with HADS anxiety scores of less than 11(anxiety absent) and more than or equal to 11(anxiety present), respectively. Significantly higher anxiety scores were seen in patients having HADS: anxiety score of more than or equal to 11. ($p < 0.001$; ►**Fig. 1**).

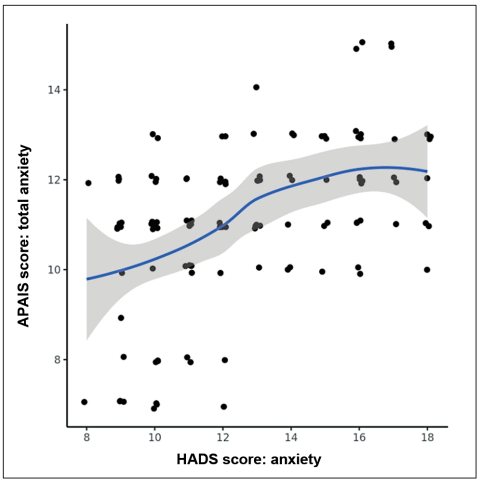

Fig. 1 Correlations of anxiety scores of Amsterdam Preoperative Anxiety and Information Scale (APAIS) with Hospital Anxiety and Depression Scale (HADS) anxiety score.

Discussion

Our study showed higher anxiety in adult patients scheduled to undergo intracranial surgeries.

In our study of 120 patients with intracranial tumors, we reported a mean anxiety score of 11.10 ± 1.79. Berth et al,[21] in their study of 68 nonselected surgical patients, reported an anxiety score of 9.33 ± 4.79. Goebel et al,[4] in their study of 180 patients with intracranial tumors, observed that as the underlying illness was life-threatening, patients reported higher preoperative anxiety scores (10.22 ± 4.24).

The influence of age did not have any bearing on the preoperative anxiety scores in our study. Our results were similar to studies done by Moerman et al,[2] Celik and Edipoglu,[6] and Laufenberg-Feldmann and Kappis,[17] which did not show any bearing of age on anxiety scores. In contrast, Maurice-Szamburski et al,[22] in their validation study, observed that patients older than 55 years had higher anxiety scores.

Our study showed a higher anxiety score in females (11.96 ± 1.34) than in males (10.46 ± 1.82). Srinivasaiah et al,[23] Wu et al,[24] and Zeleníková et al[25] observed higher anxiety scores in females in their respective validation studies. In contrast to our research, Vergara-Romero et al[11] found that males exhibited higher levels of anxiety scores, and Boker et al,[9] in their comparison study of different anxiety questionnaire scales, observed a lack of gender effect on anxiety scores.

The influence of ASA grade on anxiety was seen in our study. Patients of ASA grade I had significantly higher anxiety scores than ASA grade II patients (10.53 ± 1.93). An observational study conducted by Acharya et al[16] on patients undergoing elective surgery did not find any significant difference in anxiety scores between ASA grade I and ASA grade II

patients. Contrary to our study, Kumar et al,[26] in their observational study, found higher anxiety scores in ASA grade II than in ASA grade I patients.

Anxiety scores in our study were highest in patients educated until class 10 (11.83 ± 1.72) and lowest in patients with postgraduation educational qualifications. Our study agreed with the study of Kumar et al,[26] who also observed higher anxiety scores in less educated patients. Wu et al,[24] Buonanno et al,[27] and Aloweidi et al[28] did not find any relation between educational qualification and anxiety score in their respective studies. Contrary to our study, Acharya et al[16] observed that patients with higher educational qualifications had higher anxiety scores.

Evaluation of the location of intracranial tumors with anxiety in our study showed that higher anxiety scores in patients with frontoparietal tumors compared to other locations. No influence of tumor location on the degree of anxiety was noted in the study by Goebel et al.[4]

The influence of pre-existing comorbid conditions on anxiety scores was absent in our study. This was in accordance with the studies of Zeleníková et al[25] and Buonanno et al,[27] where no impact of comorbidity on anxiety score was noted. In contrast to our study, Srinivasaiah et al[23] observed higher anxiety scores in patients with a history of the coexisting disease.

Our study showed that patients educated till postgraduation had a higher need for information scores than patients with lower educational qualifications. Age, gender, ASA status, marital status, employment status, presence of comorbid conditions, and tumor location did not influence the need for information scores.

Celik and Edipoglu[6] noticed a higher score of need for information in patients with higher educational qualifications. Contrary to our study, Matthias and Samarasekera[15] observed no significant difference in the need for information scores in patients with different educational qualifications; however, no impact of age, sex, marital status, and employment status on the need for information scores was noted in the agreement with our study.

Laufenberg-Feldmann and Kappis[17] observed that age was correlated with information requirement, indicating older patients had higher demands. But, contrary to our study, it has no impact of gender and educational qualification on information demands.

Contrary to our findings, Celik and Edipoglu,[6] in their study, found a negative correlation between age and desire for information; as patients get older, their desire for information decreases.

Our study demonstrated that patients with an anxiety score of more than or equal to 11 (anxiety cases) on the HADS have a higher anxiety score on the APAIS with a moderate positive correlation. No association was observed between anxiety scores on the APAIS and HADS depression score.

Goebel et al[4] studied 180 patients with intracranial tumors. They observed medium associations between the APAIS anxiety score and the HADS anxiety score, and correlations between the APAIS anxiety score and the HADS depression scores were lower.

Berth et al[21] observed that anxiety score shows a low-to-intermediate correlation with the depression score of HADS and a high correlation with the anxiety scores of HADS. Maurício et al[29] observed that the APAIS anxiety score correlates slightly better with the HADS anxiety score than with the HADS depression score.

Limitations of our study were a single-centered study, a smaller sample size, thus decreasing the power of the study, assessment was 1 day before surgery, which may affect the level of anxiety and, only one type of surgical condition was assessed (intracranial tumors). A larger sample size and multicentric study will better evaluate preoperative anxiety in patients in the Indian scenario.

Conclusion

Neurosurgical patients have higher anxiety due to intracranial pathology, site of surgery, and unpredictability of outcome. Demographic and clinical variables such as gender, education, marital status, ASA grade, location of tumor, and comorbid conditions do affect the level of anxiety. APAIS can be used as one of the tools during the routine anesthesiologist visit to assess the patient's anxiety level and thus, it helps in better management of anxiety and its effects on perioperative anesthesia response and postoperative care.

Conflict of Interest
None declared.

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