ORIGINAL ARTICLE

Evaluation of Anaesthesia Information Provision on Pre-Operative Anxiety in Patients Undergoing Planned Surgery in a Tertiary Centre

Nair A[a], Mohamad Mahdi SN[b], Budiman M[b], Md Nor N[b], Liu CY[b], Abdul Shokri AF[b]

[a]Department of Anaesthesiology & Critical Care, Hospital Queen Elizabeth, Kota Kinabalu, Sabah.

[b]Department of Anaesthesiology & Intensive Care, Hospital Canselor Tuanku Muhriz, Universiti Kebangsaan Malaysia, Jalan Yaacob Latif, Bandar Tun Razak, Kuala Lumpur.

ABSTRACT

INTRODUCTION: Pre-operative anxiety is associated with physiological and psychological implications in the peri-operative period. Pre-operative education and anaesthesia information provision help alleviate concerns and anxiety regarding anaesthesia for planned surgeries. This study aims to compare differences in levels of anxiety with anaesthesia information provision and factors contributing to anxiety. **MATERIALS AND METHODS**: Seventy patients, aged between 18 and 65, with American Society of Anesthesiologists classes I or II undergoing planned surgery were recruited into this study. They were divided into Group A, which received regular pre-anaesthetic counselling one day prior to surgery, and Group B, which received the counselling and an anaesthesia information sheet (AIS). Both groups were then given an Amsterdam Preoperative Anxiety Information Scale (APAIS) questionnaire at the end of the pre-anaesthetic visit and again on the morning of the planned surgery. The scores were calculated to determine the level of anxiety. **RESULTS**: Group B showed a significant reduction in anxiety levels compared to Group A [Difference (95% CI): -1.51 (-1.96, -1.07); p< 0.001]. For the information desire component, a significant decrease was observed in both Group A (p = 0.037) and Group B (p< 0.001). Group B demonstrated a greater decrease [Difference (95% CI): - 1.17 (-1.62, -0.73)] compared to Group A [Difference (95%CI): -0.40 (-0.77, -0.03)]. Past surgical history was a factor shown to be of statistical significance [coeff (95% CI): -2.39 (-4.21, -0.57); p= 0.011]. **CONCLUSION**: Provision of AIS significantly reduced the level of anxiety in patients undergoing planned surgery and has been shown to alleviate concerns in patients with no past surgical history.

Keywords
Anxiety, Anaesthesia, Information, Pre-operative

Corresponding Author
Asst. Prof. Datin Dr. Siti Nidzwani Mohamad Mahdi
Department of Anaesthesiology & Intensive Care, Hospital Canselor Tuanku Muhriz, Universiti Kebangsaan Malaysia, Jalan Yaacob Latif, Bandar Tun Razak, Kuala Lumpur.
E-mail: nidzwani@hctm.ukm.edu.my

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INTRODUCTION

The definition of anxiety, as per the American Psychological Association, is an emotion characterised by feelings of tension, worried thoughts, and physical changes like increased blood pressure. Patients who undergo surgery are shown to experience anxiety pre-operatively, with a prevalence of around 60-80% in previously done studies.[1,2]

Pre-operative anxiety is related to multiple physiological and psychological changes. Physiological changes include an increased stimulation of the sympathetic nervous system, which manifests as increased blood pressure, tachycardia, and activation of the stress response, which causes increased glucocorticoid secretion and associated depression of the immune system.[3,4,5,6] This leads to increased requirements of anaesthetic and analgesic drugs intra- and post-operatively, a delayed healing process, a higher incidence of post-operative pain scores, slower wound healing, and a longer hospital stay.[7] Anxiety also plays a part in cognition, which affects the process of

thinking, understanding, and accepting information, and affects the ability to make informed judgments.[1,8] In the current era of Enhanced Recovery After Surgery (ERAS), patient education and counselling are emphasised pre-operatively. Routine use of anxiolytic pre-medication is not favoured due to variability in response to differing doses of anxiolytic medication and an anticipated delay in post-operative recovery due to impaired cognitive and motor function.[9] As part of ERAS, preoperative education, minimising fasting times, and pre-operative carbohydrate loading have also been shown to reduce pre -operative anxiety.[10]

The causes of anxiety include fear of surgery, effects of anaesthesia, a lack of understanding of potential complications and side effects, as well as fear of poor recovery post-operatively, and are shown to contribute to pre-operative anxiety.[11] Provision of information during pre-medication rounds by anaesthesia medical officer to discuss anaesthesia, its related effects, and possible side-effects is shown to reduce anxiety and help with the mental preparation for surgery.[12] However, this does not apply in emergency surgeries as counselling usually occurs in the operating room, which leads to reduced levels of mental preparation.[13] The amount of information provided to patients pre-operatively has been shown to provide reassurance and guidance regarding what is expected during the day of surgery.[14]

Confounding factors that can affect levels of anxiety include age, gender, level of education, co-morbidities, previous history, or experience of having procedures/ surgeries before, economic status, and pain tolerance.[15] Studying the prevalence of anxiety and learning where it is most prevalent may assist anaesthetists to improve pre-operative preparation of patients and achieve earlier recovery post-operatively.

There are many validated questionnaires which have been used to assess anxiety in patients, namely the State Trait Anxiety Inventory (STAI), Hospital Anxiety and Depression Scale (HADS), Multiple Affect Adjective Checklist (MAACL), Visual Analogue Scale (VAS), as well as the Amsterdam Preoperative Anxiety Information Scale (APAIS).[1,16] The APAIS questionnaire has been translated and used in different countries, including Mexico, Germany, Korea, Japan, and Malaysia.[17] The use of APAIS scores in previous studies has shown comparative results to assess the incidence of anxiety in patients pre-operatively.[18]

This study aims to compare the differences in levels of anxiety with the provision of an anaesthesia information sheet (AIS) and to determine the effect of information provision pre-operatively on the levels of anxiety in patients, as well as factors contributing to anxiety.

MATERIAL AND METHODS

Patients aged between 18 and 65 years, American Society of Anesthesiologists (ASA) physical status I or II, who were planned for surgery under either general anaesthesia (GA), regional anaesthesia (RA) or both (GA+RA), were recruited into the study. Patients who had pre-existing psychiatric illnesses, a history of consuming anxiolytic medications, those diagnosed with clinical anxiety who were on treatment or follow-up, as well as those who were unable to comprehend English or Malay languages were excluded. Written informed consent was obtained from patients who were eligible to be enrolled in the study during premedication visits. Patients were randomized into two groups, Group A and Group B, using computer-generated randomized numbers.

Both groups of patients received standard pre-anaesthetic visits by the anaesthesia medical officer in charge, and underwent pre-operative assessment, counselling, and consent for anaesthesia was obtained. No pre-medication with anxiolytic agents was given to either group. Both groups of patients received an APAIS questionnaire at the end of the session. In addition, Group B patients also received an anaesthesia information sheet (AIS) upon completion of the APAIS questionnaire at the end of the session for personal reference. Both groups of patients were then informed that they would receive a subsequent APAIS questionnaire to be completed on the morning of surgery, prior to being wheeled into the operating room. The enrolment into the study and completion of the APAIS questionnaire were done by the primary

investigator to standardise the time spent with the patient and avoid bias in terms of information provided during assessment of pre-operative anxiety levels.

On the morning of surgery, upon arrival at the waiting bay of the operating theatre complex, patients were assessed by the anaesthesia medical officer in charge via the APAIS questionnaire. A data collection sheet, which contained demographic information as well as information on level of education, history of previous surgery and anaesthesia either under GA, RA, GA and RA, or local anaesthesia (LA), planned surgery for current admission, and duration of surgery was also filled by the medical officer in charge. The APAIS questionnaire, the data collection sheets were then compiled and passed back to the researcher at the end of each day. Patients were considered as drop-outs if they could not complete the questionnaire during the anaesthesia visit or on the day of surgery, or due to cancellation of surgery.

The APAIS questionnaire is a validated self-assessment questionnaire, consisting of six questions. It has two questions related to anxiety about anaesthesia, two questions related to anxiety about surgery, and the final two questions related to the desire to obtain more information about surgery and anaesthesia. The APAIS questionnaire took about five minutes to complete. All responses were recorded based on a Likert scale from a score of 1 (not at all) to 5 (extremely). Questions 1, 2, 4, and 5 were anxiety-related and had a range of scores from 4 (not anxious) to 20 (highly anxious). A cut-off value of ≥ 11 was used to denote significant anxiety, as quoted in the original paper used in developing the APAIS questionnaire.[16] Questions 1 and 2 were about anaesthesia-related anxiety, and the scores were added to form sum A. Questions 4 and 5 were about surgery-related anxiety, and the scores were added to form sum S. Sums A + S = sum C, which denoted the total anxiety score. Questions 3 and 6 were related to the information desire components (IDC) and added together to form the sum IDC, which ranged from a score of 2 (no need for information) to 10 (high requirement of information). The APAIS questionnaire was distributed in both English and Malay versions. Both versions of the APAIS questionnaires were used with permission.

The AIS provided for patients was divided into three main components comprising information on anaesthesia pre-, during, and post-surgery. The first component consisted of information provided regarding anaesthesia, different types of anaesthesia, and what would happen the day before surgery. The second component involved explanation regarding the day of surgery, which covered what was to be expected during arrival to the operating theatre, being wheeled into the operating room, what would happen before induction of anaesthesia, and further explanation on how anaesthesia would ensure the patient was kept comfortable and safe throughout surgery. The third component described what was routinely carried out at the end of surgery, including monitoring in the recovery area and prior to discharge to the ward. The information provided a general idea to the patient and allowed the patient to refer back to the AIS should they require any further information or clarification. The AIS was constructed based on local practices, with a focus mostly on general and regional anaesthesia. Explanations were kept simple to allow patients to understand easily. The content of the AIS was validated by four anaesthetic specialists currently practicing in HCTM. The AIS was prepared in English and Malay versions in a pamphlet form. The Malay version was translated by a certified translator via 'Institut Terjemahan & Buku Malaysia Berhad'.

A pilot study was conducted prior to the actual study to determine the sample size. Twelve patients received the AIS while another nine patients did not during the preoperative visit. Following preoperative assessment and obtaining anaesthesia consent, they were assessed for their anxiety scores using the APAIS questionnaire on the day before as well as shortly prior to being wheeled in for surgery. These scores were then collected and used to calculate an appropriate sample size to conduct this study. The power of this study was set at 80%, α-value of 0.05, and using the Snedecor and Cochran formula.[19] A total of 70 patients were required, including the 10% drop-out rate, with 35 patients in each group.

The data was analysed using the SPSS (Statistical Package for the Social Sciences) version 26.0 and STATA version 14.0. Descriptive statistics were used to present the data. The distribution of continuous variables was explored using a histogram and presented as mean and standard deviation if the data were normally distributed, otherwise median (25th percentile, 75th percentile). Categorical variables were presented as frequency and percentage. The differences in patient characteristics between control and intervention groups were explored using an independent sample T test, Mann-Whitney U test, Pearson chi-squared test, and Fisher Exact test, whichever was appropriate. Comparison of anxiety and sum IDC pre and post treatment between the two groups was explored using an independent sample T test as well, and further tested to adjust for age, ASA class, and past surgical history using ANCOVA. On the other hand, the changes in anxiety and sum IDC pre and post treatment in each control and treatment group, respectively, were explored using a paired sample t-test. The factors associated with anxiety were explored using linear regression models. All the tests were two-sided, and statistical significance was denoted as $p< 0.05$.

RESULTS

A total of 72 patients were recruited into this study. However, two patients were considered drop-outs due to the cancellation of surgery. The characteristic data of the patients in both groups are shown in Table I. Out of 70 patients that were recruited into the study, 35 were allocated to Groups A and B, respectively.

In our study, the prevalence of anxiety in a population of 70 patients, only 32 patients (46%) had anxiety scores ≥ 11. Group A had 12 patients (35%), whereas Group B had 20 patients (57%). The difference in scores relating to anxiety (sum C) and information desire component (sum IDC) was then compared between Groups A and B pre- and post-intervention, as shown in Table II. No significant difference was observed between the two groups in both the univariable model and the multivariable model adjusted for age, ASA status, and past surgical history.

Table I: Demographic data, surgical and anaesthesia characteristics.

Characteristics	Group A (n=35)	Group B (n=35)	p Value
Age (in years)	42.89 ± 13.24	34.89 ± 11.80	0.010[a]
Gender			
Female	19 (54.3)	19 (54.3)	>0.950[c]
Male	16 (45.7)	16 (45.7)	
Race			
Malay	24 (68.6)	27 (77.1)	0.510[d]
Chinese	9 (25.7)	3 (8.6)	
Indian	1 (2.9)	4 (11.4)	
Others	1 (2.9)	1 (2.9)	
ASA class			
I	12 (34.3)	23 (65.7)	0.009[c]
II	23 (65.7)	12 (34.3)	
BMI (kg/m²)	26.54 ± 5.46	25.74 ± 2.58	0.546[a]
Level of education			
Secondary	6 (17.1)	6 (17.1)	0.858[c]
Tertiary	20 (57.1)	18 (51.4)	
Higher	9 (25.7)	11 (31.4)	
Duration of surgery			
< 1 hour	1 (2.9)	2 (5.7)	
< 2 hours	18 (51.4)	13 (37.1)	0.507[d]
< 3 hours	10 (28.6)	16 (45.7)	
< 4 hours	5 (14.3)	4 (11.4)	
< 5 hours	1 (2.9)	0 (0.0)	
Mode of anaesthesia			
GA	26 (74.3)	28 (80.0)	0.745[d]
RA	6 (17.1)	6 (17.1)	
GA+RA	3 (8.6)	1 (2.9)	
Past surgical history			
No	7 (20.0)	16 (45.7)	0.022[c]
Yes	28 (80.0)	19 (54.3)	
Number of past surgery(s)	2 [1-3]	2 [1-3]	0.360[b]
Type of anaesthesia in previous surgery(s)			
GA	20 (71.4)	11 (57.9)	0.315[d]
LA	1 (3.6)	2 (10.5)	
RA	1 (3.6)	3 (15.8)	
GA+LA	0 (0.0)	1 (5.3)	
GA+RA	4 (14.3)	2 (10.5)	
GA+RA+LA	2 (7.1)	0 (0.0)	

Data expressed as mean ± standard deviation and frequency (percentage). P values obtained are denoted based on the type of test used [[a] independent sample t test; [b] Mann-Whitney U test; [c] Pearson chi-squared test, [d] Fisher Exact test].

Table II: Difference in anxiety and IDC scores between Groups A & B between the day prior to and on the morning of surgery.

	Group A (n=35)	Group B (n=35)	[a]p value	Difference (95% CI)	[b]p value
The day prior to surgery					
Anxiety score (Sum C)	10.00 ± 3.80	11.06 ± 3.65	0.239	-0.72 (-2.79, 1.35)	0.492
Information desire component score (sum IDC)	6.60 ± 2.13	7.09 ± 2.11	0.341	-0.82 (-2.06, 0.43)	0.195
Day of surgery					
Anxiety score (Sum C)	10.31 ± 3.47	9.54 ± 3.05	0.327	0.93 (-0.86, 2.72)	0.302
Information desire component score (sum IDC)	6.20 ± 1.84	5.91 ± 1.63	0.495	0.09 (-0.93, 1.12)	0.858

Data expressed as mean ± standard deviation.
[a]p-value- independent sample t-test.
[b]p value- ANCOVA (adjustments made for age, ASA status, and past surgical history status).

Within each group, Group B showed a significant decrease in the level of anxiety with the provision of AIS [Difference (95% CI): -1.51 (-1.96, -1.07); $p<0.001$] compared to Group A, as shown in Table III. For the IDC, a significant decrease was observed in both Group A ($p=0.037$) and Group B ($p<0.001$). Group B, however, demonstrated a greater decrease [Difference (95% CI): -

1.17 (-1.62, -0.73)] compared to Group A [Difference (95%CI): -0.40 (-0.77, -0.03)].

Table III: Within-group changes of Anxiety and IDC Score in control and intervention groups.

	Group A (n=35)			Group B (n=35)		
	Mean ± SD	Difference (95% CI)	p value	Mean ± SD	Difference (95% CI)	p value
Anxiety Score						
The day before surgery	10.00 ± 3.80	0.31 (-0.09, 0.72)	0.125	11.06 ± 3.65	-1.51	<0.001
Morning of surgery	10.31 ± 3.47			9.54 ± 3.05		
IDC Score						
The day before surgery	6.60 ± 2.13	-0.40 (-0.77, -0.03)	0.037	7.09 ± 2.11	-1.17 (-1.62, -0.73)	<0.001
Morning of surgery	6.20 ± 1.84			5.91 ± 1.63		

Data expressed as mean ± standard deviation (SD).

Factors associated with levels of anxiety were also studied using the control group data via linear regression models, as shown in Table IV. It was observed that patients with a history of previous surgery(s) had lower anxiety levels compared to those without [coeff (95% CI): -2.39 (-4.21, -0.57); p= 0.011].

Table IV: Factors associated with levels of anxiety.

	SIMPLE LINEAR REGRESSION		
	coeff	95% CI	p value
Age	-0.02	-0.09, 0.05	0.610
Gender			
Female	Ref		
Male	1.20	-2.98, 0.57	0.181
Race			
Malay	Ref		
Chinese	-2.11	-4.47, 0.25	0.079
Indian	0.66	-2.79, 4.10	0.704
Others	-3.44	-8.74, 1.86	0.199
ASA class			
I	Ref		
II	-0.25	-2.05, 1.54	0.776
BMI	0.09	-0.07, 0.26	0.249
Level of education			
Secondary	Ref		
Tertiary	0.94	-1.54, 3.42	0.451
Higher	1.52	-1.22, 4.25	0.272
Duration (hours)			
< 1 hour	Ref		
< 2 hours	-1.04	-5.58, 3.50	0.648
< 3 hours	-0.26	-4.60, 4.55	0.991
< 4 hours	-2.33	-7.34, 2.67	0.355
< 5 hours	-2.33	-11.00, 6.34	0.593
Mode of anaesthesia			
GA	Ref		0.225
RA	1.42	-0.89, 3.73	0.050
GA+RA	-3.75	-7.50, 0.00	
Past surgical history, n (%)			
No	Ref		0.011
Yes	-2.39	-4.21, -0.57	

DISCUSSION

We aim to study the effect of providing AIS in relation to the alleviation of anxiety or reduction in pre-operative levels of anxiety faced by patients. The results obtained show that patients in Group B who received the AIS had lower anxiety and desire for information scores compared to Group A. Interestingly, Group A patients also showed lower scores for information desire on the morning of surgery compared to the day prior, albeit not as much as Group B. This suggests that additional information provision does help alleviate concerns regarding the lack of anaesthesia information. This was similarly seen in a study which showed lower levels of anxiety in patient groups who received anaesthesia information sheets as compared to the group that received verbal counselling.[6] Another study conducted via perusal of an audiovisual aid during preoperative counselling showed reduced levels of anxiety in patients compared to those who were not exposed to the material.[20] However, in this study, patients were obstetric in origin and planned for caesarean sections, and thus multimedia aid provision was constructed in accordance with a focus on the process of a Caesarean section. In view of the general pool of cases involved in our study, a tailored approach for each surgical type or anaesthetic technique of concern was not feasible.

Most previous studies done about pre-operative anxiety and its contributing factors saw female patients, those with lower levels of education, and those with no prior surgical history exhibiting higher anxiety levels. In our study, there were no significant predisposing factors to higher scores in relation to gender or educational status.[1,13,15,21] An interesting point to note was that in the population of 70 patients, everyone had a minimum of secondary school education, which correlated to a better understanding and comprehension, possibly leading to reduced levels of anxiety. Group B patients (57%) had a significantly higher number of patients who had higher pre-operative anxiety scores on the day before surgery compared to Group A (32%). While age was not a primary variable studied regarding levels of anxiety in itself, Group B patients were generally younger, and this may have been a possible reason for higher anxiety levels due to uncertainty regarding surgery and anaesthesia, as well as better understanding and comprehension with counselling, which led to lower scores on the morning of surgery with the provision of AIS. The significant findings from our study show that those with past surgical history had lower levels of anxiety, further

proving that those who were naïve to surgery tended to have greater anxiety. This was also seen in a study that showed higher pre-operative anxiety scores in patients who had no previous surgical history.[2] The common concerns in patients who were undergoing surgery for the first time were related to a fear of complications, post-operative pain, poor recovery, impact post-operatively, and fear of death.[2,8] The duration of surgery did not correlate with higher levels of anxiety, which is likely attributable to the heterogeneity of cases. No previous studies have studied the levels of anxiety in relation to varying anticipated operative duration.

Anaesthetic pre-operative visits are a vital part of pre-operative assessment, optimization, and planning. The time spent between an anaesthetist and the patient is invaluable in recognizing co-morbidities and other related issues that may hinder a smooth peri-operative surgical period and good recovery. Pre-operative assessments allow patients to get sufficient information as to what they are going to be exposed to or what to expect on the day of surgery and after. While verbal communication is important, the ability of patients to retain sufficient information and comprehension of all delivered information may not always be possible.[6] Perusal of other methods of information delivery via pamphlets, audio aids, videos, as well as simulated walk-throughs, has been shown to help patients understand better, as well as reduce their anxiety and clear worries before proceeding with surgery.[6,20] In some centres, patients were screened up to two or three weeks before surgery and received videos regarding anaesthesia via post prior to being seen in a clinic.[14] However, a study conducted over two decades ago highlighted that the availability of media players to view the video guide was not widely available to all patients.[14] The ability to provide information in an accessible, easily available format enables better delivery of material to the patient. Another study had also shown a greater reduction in anxiety levels in patients post-operatively when given a multimedia aid compared to those who did not receive the same in a population of patients undergoing procedures under regional anaesthesia.[22] This helped patients understand better, ask directed questions, and seek answers to matters of particular concern. In our centre, in view of the ongoing pandemic of COVID-19 during the data collection period, cases were generally planned on a week-to-week basis based on availability of theatres and operating time, and hence screening patients beforehand was more challenging than usual.

We compared anxiety levels and information desire components as a whole, and the subdivisions of each component were not broken down for individual assessment. This is because we aimed to compare the general prevalence of anxiety and its alleviation based on information provision. A possible follow-through would be to assess individual anxiety scores based on surgical versus anaesthetic-related anxiety. A possible improvement would be to choose surgical specialties with particular types of surgeries and compare the patient population within that group to obtain better demographic data and comparison. Another potential concern with the use of information sheets in a diverse population is their applicability to patients who cannot comprehend either English or the Malay language. This may necessitate multi-lingual versions to apply it in a more rural setting. In ideal pre-operative preparatory methods, all patients should be seen in a pre-operative anaesthetic clinic and receive adequate counselling and information, allowing discussions regarding anaesthesia and its associated concerns. However, in view of the pandemic and a reduction of planned cases and operating room slots, this was of limited use and practicality in our centre.

CONCLUSION

Provision of AIS significantly reduced the level of anxiety in patients undergoing planned surgery and has been shown to alleviate concerns in patients with no past surgical history.

CONFLICT OF INTEREST

The authors have no conflicts of interest to report.

INSTITUTIONAL REVIEW BOARD (ETHIC COMMITTEE)

This prospective, observational, randomized study was conducted after obtaining institutional ethics committee

approval (JEP-2022-225) between May and November 2022 at Hospital Canselor Tuanku Muhriz (HCTM), Universiti Kebangsaan Malaysia (UKM).

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