

ORIGINAL PAPER

MEASURING PREOPERATIVE ANXIETY IN PATIENTS UNDERGOING ELECTIVE SURGERY IN CZECH REPUBLIC

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Abstract

Aim: The main aim of the study was to measure preoperative anxiety in patients in the Czech Republic before elective surgery, using the Visual Analogue Scale for Anxiety (VAS-A). *Design:* A cross-sectional descriptive study. *Methods:* The sample consisted of 344 patients undergoing elective surgery. The day before surgery patients completed a questionnaire consisting of demographic data, the Amsterdam Preoperative Anxiety and Information Scale (APAIS) and the VAS-A. Spearman correlation was used to test correlation between the VAS-A and the subscales of the APAIS. Analysis of Variance (ANOVA) and the Kruskal-Wallis test were used for group comparison. A p-value < 0.05 was considered to be significant. *Results:* Female patients and patients without previous experience of surgery had a significantly higher VAS-A score. The anxiety score measured by the VAS-A positively correlated with APAIS-Anxiety ($r = 0.71$) and its subscales. The results also showed that the most common anxieties resulted from postoperative pain, anaesthesiological complications, postoperative nausea and vomiting, concerns about regaining consciousness after anaesthesia, surgical errors, and postponement of surgery. *Conclusion:* The findings of this study support the utility of the VAS-A as a measure of preoperative anxiety. The VAS-A quickly and simply assesses anxiety and may be useful for research as well as clinical purposes when researchers or clinicians have very limited time.

Keywords: preoperative anxiety, elective surgery, VAS-A.

Introduction

Preoperative anxiety is rarely the subject of nursing research in the Czech Republic. It is a challenging concept in the preoperative care of patients. Some level of anxiety is an expected reaction to the unpredictable and potentially life-threatening circumstances involved in surgery and is typical of the preoperative period, especially for a patient's first few surgical experiences (Jawaid et al., 2007). Those with an elevated level of preoperative anxiety require larger doses of anaesthetics, have, on average, a greater peri- and postoperative reliance on analgesics and require longer stays in hospital (Berth et al., 2007). Many international studies have confirmed that patients awaiting surgery experience anxiety. Some groups of patients such as women, patients with higher need-for-information, patients without previous experience of surgery, and younger patients, experience an increased level of preoperative anxiety

(Haugen et al., 2008; Kindler et al., 2000; Moerman et al., 1996b; Nishimori et al., 2002; Shafer, 1996). The level of preoperative anxiety can also be affected by patients' level of education, the type of surgery required, and previous negative experiences of hospital stay (Karanci, 2003).

Several scales to measure preoperative anxiety have been reported and used in research studies: the Hospital Anxiety and Depression Scale – HADS (Zigmond, Snaith, 1983), Spielberg's State-Trait Anxiety Inventory – STAI (Spielberg, 1983), the Amsterdam Preoperative Anxiety and Information Scale – APAIS (Moerman et al., 1996a), the Yale Preoperative Anxiety Scale for children (Kain et al., 1997), the Bypass Grafting Fear Scale – BGFS (Koivula et al., 2001; Koivula et al., 2002), the Surgical Fear Questionnaire – SFQ (Theunissen, 2014), the Coping with Surgical Stress Scale – COSS (Krohne et al., 2001), and the Visual Analogue Scale for Anxiety – VAS-A (Kindler et al., 2000).

Kindler et al. (2000) found that the Visual Analogue Scale for Anxiety – VAS-A is a useful and valid method for measuring preoperative anxiety and compares well with the state anxiety score of the

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STAI. The VAS-A has been further tested in several other studies (Boker et al., 2002; Davey et al., 2007; Hernández-Palazón et al., 2015; Romanik et al., 2009) with similar results. According to Davey et al. (2007) a single question with either a Likert Scale or VAS-A response may be an adequate replacement for the STAI. Both measures quickly and straightforwardly assess anxiety and may be useful for research purposes when researchers have very limited time or questionnaire space or need to reduce the burden on participants of answering many questions. In clinical settings, especially in the preoperative phase, extensive questionnaires might not be applicable (Berth et al., 2007).

Aim

The main aim of the study was to measure preoperative anxiety in patients in the Czech Republic before elective surgery, using the Visual Analogue Scale for Anxiety.

Methods

Design

A cross-sectional descriptive study was used.

Sample

The sample consisted of 344 patients from an urban hospital in the Czech Republic undergoing elective surgery. Patients of 18 years or above scheduled for

elective surgery under general or spinal anesthesia participated in the study.

Data collection

The data were collected from July 2012 to January 2013. Six examiners (anaesthesiological nurses trained to collect data) distributed questionnaires and collected data the evening prior to surgery. Patients were asked to complete the questionnaire according to the examiners' instructions. The questionnaires were then administered verbally or by self-report. The main researcher met once a week with the examiners. Up to five minutes were required to fill out the set of questionnaires, which consisted of demographic data, the Amsterdam Preoperative Anxiety and Information Scale (APAIS) and the Visual Analogue Scale for Anxiety (VAS-A). Patients were also asked to select different factors responsible for their anxiety from a list. The set of questionnaires was reviewed by a clinical psychologist. Permission to use the APAIS scale was obtained from the author of the original version (Moerman et al., 1996b) and it was then translated from English into Czech (Moerman et al., 1996b). The APAIS consists of six items on two scales: APAIS-Anxiety (four items) and APAIS-Need-for-Information (two items). APAIS-Anxiety has two subscales: Anxiety about Anaesthesia (two items) and Anxiety about Surgery (two items).

Table 1 Sample characteristics (n = 344)

Characteristics		n	%
Gender	Female	239	69.5
	Male	105	30.5
Education	Basic education	38	11.1
	Secondary school	131	38.1
	Secondary school with graduation	109	31.7
	Higher education	23	6.7
Occupation	University education	43	12.5
	Employed	158	45.9
	Retired	119	34.6
	Unemployed	30	8.7
	Business	16	4.7
Negative experience	On maternity leave	11	3.2
	In education	10	2.9
	Of hospital staff	58	16.9
	Of previous surgery	44	12.8
Comorbidities	Of health care facilities	31	9.0
	Cardiovascular disease	161	46.8
	Endocrinological disease	79	23
	Musculoskeletal disease	60	17.4
	Respiratory disease	44	12.8
	Neurological disease	22	6.4
Anxiety cases	Others	67	19.5
	Patients without anxiety (< 11 on the APAIS-Anxiety scale)	240	69.8
	Patients with anxiety (≥ 11 on the APAIS-Anxiety scale)	104	30.2

The VAS-A is based on a 100 mm scale with zero anxiety on the far left and maximum preoperative anxiety on the far right. A higher score indicates higher anxiety.

Data analysis

Means, standard deviation (SD), and absolute and relative frequencies were calculated for descriptive statistical analysis. Spearman correlation was used to test the correlation between the VAS-A and the APAIS. Analysis of Variance (ANOVA) and the Kruskal-Wallis test were used for group comparison. A p -value < 0.05 was considered to be significant. A statistical analysis was performed using the Stata v. 10.

Results

The sample characteristics are presented in Table 1. In the sample, 239 participants were female (69.7%) and 105 male (30.5%). Of the entire sample 158 (45.9%) participants were in employment and 119 (34.6%) were retired. Previous negative experiences of hospital staff were confirmed by 58 (16.9%) patients; negative experiences of previous surgery by

44 (12.8%) patients; and negative experiences of health care facilities by 31 patients (9%). Almost half of the patients (46.8%) had cardiovascular disease. Nearly one third of patients (30.2%) had a score ≥ 11 on the APAIS-Anxiety and were considered to be anxiety cases (Moerman et al., 1996b).

Table 2 Basic and clinical sample characteristics

Characteristics	Mean	SD	Min.	Max.
Age	50.7	14.9	18	83
VAS-A	45.3	26.1	0	100
Respiratory rate	15.3	7.5	10	25
Systolic blood pressure	131.3	16.2	90	190
Diastolic blood pressure	78.6	8.7	50	110
Heart rate	74.9	31	53	115

Observing different factors responsible for pre-operative anxiety showed that the most common factors were postoperative pain, fear of anaesthesiological complications, postoperative nausea and vomiting, concerns about regaining consciousness after anaesthesia, surgical errors, fear of postponed surgery, and fear of the unknown.

Table 3 Correlations between VAS-A and scales/subscales of APAIS

	APAIS-Need for information	APAIS-Anxiety	Anxiety about anaesthesia**	Anxiety about surgery***
VAS-A	0.43*	0.71*	0.60*	0.71*

* $p < 0.05$; **Subscale of APAIS-Anxiety; ***Subscale of APAIS-Anxiety

Table 4 Group comparisons VAS-A

Characteristics	Mean \pm SD	p value
Gender		
Male (n = 105)	36.3 \pm 25.5	
Female (n = 239)	49.3 \pm 25.4	< 0.001
Previous surgery		
No (n = 86)	51.2 \pm 25.7	
Yes (n = 256)	43.4 \pm 26.0	0.0168
Previous negative experience		
No (n = 264)	44.0 \pm 25.7	
Yes (n = 80)	49.8 \pm 26.9	0.0846
Type of surgery		
Breast surgery (n = 62)	52.7 \pm 28.1	
Abdominal surgery (n = 180)	42.4 \pm 26.5	
Surgery for oncological disease (n = 39)	47.7 \pm 20.5	0.0554
Gynecological surgery (n = 63)	44.9 \pm 25.1	
Comorbidities		
No (n = 107)	41.9 \pm 25.5	
Yes (n = 237)	46.9 \pm 26.3	0.1022
Education		
Basic and secondary education without graduation (n = 169)	44.2 \pm 26.2	
Secondary and higher education (n = 132)	46.2 \pm 26.5	0.7066
University education (n = 43)	47.3 \pm 24.6	

The mean age of the patients was 50.7 years (range: 18 to 83 years). The mean score of VAS-A was 45.3 (SD 26.1). The mean respiratory rate was 15.3 (SD 7.5). The mean heart rate was 74.9 (SD 31), (Table 2).

The anxiety score measured by the VAS-A correlated positively with APAIS-Anxiety ($r = 0.71$), and with both subscales of APAIS-Anxiety: anxiety about anaesthesia (0.60) and anxiety about surgery (0.71), (Table 3).

Preoperative anxiety differed significantly between male and female patients. Female patients had a statistically significant higher level of anxiety before elective surgery. The VAS-A did not differ significantly between groups of patients with various types of surgery and different levels of education. Preoperative anxiety measured by the VAS-A also did not differ significantly between patients with no comorbidities and patients with comorbidities: However, there was a difference between the groups with previous experience of surgery and those without. Patients with previous surgery had an average score of VAS-A 43.4 while patients without previous surgery had a significantly higher average score of VAS-A 51.2 (Table 4).

Discussion

Although anaesthesia and surgery have become safer and more successful than ever before, preoperative anxiety is still a common problem in patients awaiting surgery (Nishimori et al., 2002). Although preoperative anxiety can be measured many different ways, the most popular methods are scales such as the APAIS, VAS-A or STAI. In our study we used the VAS-A and APAIS as quick and easy to use scales for measuring preoperative anxiety. Nearly one third of patients of the sample had a score ≥ 11 on the APAIS-Anxiety and were considered to be anxiety cases. Moerman et al. (1996b) recommend the use of a score of 11 for identifying anxious patients in clinical practice. Preoperative anxiety can also be measured easily using the VAS-A. In the presented study, the mean score of VAS-A for preoperative anxiety was 45.3. Kindler et al. (2000) reported a pre-operative anxiety score of 33 for surgery and 29 for anaesthesia by the VAS-A, while Jawaid et al. (2007) reported a pre-operative anxiety score of 57.7 for surgery and 38.1 for anaesthesia by the VAS-A.

It was found that female patients had higher preoperative anxiety. The same results have been ascertained in many other studies (Caumo et al., 2001; Conceição et al., 2004; Jawaid et al., 2007; Jlala et al., 2010; Moerman et al., 1996b; Nishimori

et al., 2002). Another finding of the study was that patients without previous experience of surgery had a higher level of preoperative anxiety. Caumo et al. (2001) also found that previous surgery was associated with lower risk of preoperative anxiety. Contrary to this, the studies of Jawaid et al. (2007), Hernández-Palazón et al. (2015) and Nishimori et al. (2002) did not confirm a significant influence of previous surgical experience on anxiety level.

Another finding of the study was that previous negative experiences, comorbidities and higher level of education were not significantly associated with a higher level of anxiety.

Surgeries associated with high preoperative anxiety in our study include breast surgery and surgery for oncological disease. In a study by Kindler et al. (2000) surgeries with high preoperative anxiety included thoracic and otorhinolaryngological surgery. High preoperative anxiety is also associated with a history of cancer (Caumo et al., 2001).

In addition, our results showed that the most common anxieties resulted from postoperative pain, anaesthesiologic complications, postoperative nausea and vomiting, concerns about regaining consciousness after anaesthesia, surgical errors, and postponed surgery. Hernández-Palazón et al. (2015), in their study of 300 patients, found that the most common anxieties resulted from the operation, postoperative pain, and awareness during anaesthesia.

According to Pritchard (2009) anxiety causes a wide range of physical responses – including elevated heart rate, blood pressure and temperature. But Conceição et al. (2004) found that heart rate and blood pressure do not reflect the level of preoperative anxiety. In their randomized study of 145 patients (Conceição et al., 2004), there were no significant differences between anxious and non-anxious patients in age, systolic and diastolic blood pressure, and heart rate.

In addition, the findings of this study support the utility of the VAS-A as a measure of preoperative anxiety. The VAS-A significantly correlated with both subscales of APAIS-Anxiety. A significant correlation between the VAS-A and STAI has been confirmed in many other studies (Jlala et al., 2010; Kindler et al., 2000).

According to Kindler et al. (2000) the idea of using the VAS-A, which allows patients to indicate easily their degree of preoperative anxiety by simply marking a point on a horizontal line, is appealing.

Preoperative anxiety can be relieved by nursing interventions. Several studies have been conducted to test the effect of specific interventions on preoperative anxiety, such as preoperative

information (Sjöling et al., 2003), continuous information (Haugen et al., 2009), music (Arslan et al., 2008), or anxiolytic premedication (Carroll et al., 2012). Receiving continuous information and being able to ask questions reduces patients' anxiety in the intraoperative period (Haugen et al., 2009). Arslan et al. (2008) recommended that music should become a routine component of the care provide to patients during the preoperative period. Patients with high levels of anxiety may be identified preoperatively and interventions designed to reduce anxiety could be targeted at this vulnerable group (Carr et al., 2006).

Limitation of study

The main limitation of the study was that it was conducted in a single hospital. The sample was also limited to those patients who agreed to participate and reflects only one geographical area of the Czech Republic. Thus the results may not be generalized for the whole Czech population.

Conclusion

Groups of patients with a higher degree of preoperative anxiety can be identified using the Visual Analogue Scale for Anxiety. The anxiety score measured by the VAS-A correlated positively with APAIS-Anxiety and both its subscales. Female patients and patients without previous experience of surgery had a significantly higher score on the VAS-A. The findings of this study support the utility of the VAS-A as a measure of preoperative anxiety. The VAS-A quickly and easily assesses anxiety and may be useful for research as well as clinical purposes when researchers or clinicians have very limited time. Preoperative anxiety is frequently experienced by patients undergoing surgery and can affect patients' healing processes. More attention should be devoted to pre-operative anxiety.

Ethical aspects and conflict of interest

The authors declare no conflict of interest. Prior to data collection, approval was obtained from the Ethical committee of the hospital where the study was conducted. All patients were informed of the purpose of the study. Verbal permission was obtained from all patients. Participants were guaranteed confidentiality and anonymity of responses.

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Author contribution

Conception and design (RZ, PH), data collection (PH), data analysis and interpretation (PH, RZ), manuscript draft (RZ, PH), critical revision of the manuscript (RZ, PH), final approval of the manuscript (RZ, PH).

References

- Arslan S, Ozer N, Özyurt F. Effect of music on preoperative anxiety in men undergoing urogenital surgery. *Australian Journal of Advanced Nursing*. 2008;26(2):46–54.
- Berth H, Petrowski K, Balck F. The Amsterdam preoperative anxiety and information scale (APAIS) – the first trial of a German version. *Psycho-social Medicine*. 2007;4:Doc01.
- Boker A, Brownell L, Donen N. The Amsterdam preoperative anxiety and information scale provides a simple and reliable measure of preoperative anxiety. *Canadian Journal of Anesthesiology*. 2002;49(8):792–798.
- Carroll JK, Cullinan E, Clarke L, Davis NF. The role of anxiolytic premedication in reducing preoperative anxiety. *British Journal of Nursing*. 2012;21(8):479–483.
- Carr E, Brockbank K, Allen S, Strike P. Patterns and frequency of anxiety in women undergoing gynaecological surgery. *Journal of Clinical Nursing*. 2006;15(3):341–352.
- Caumo W, Schmidt AP, Schneider CN, Bergmann J, Iwamoto CW, Bandeira D, Ferreira MB. Risk factors for preoperative anxiety in adults. *Acta Anaesthesiologica Scandinavica*. 2001;45(3):298–307.
- Conceição DB, Schonhorst L, Conceição MJ, Oliveira Filho GR. Heart rate and blood pressure are not good parameters to evaluate preoperative anxiety. *Revista Brasileira de Anestesiologia*. 2004;54(6):769–773.
- Davey HM, Barratt AL, Butow PN, Deeks JJ. A one-item question with a Likert or Visual Analog Scale adequately measured current anxiety. *Journal of Clinical Epidemiology*. 2007;60(4):356–360.
- Haugen AS, Eide GE, Olsen MV, Haukeland B, Remme AR, Wahl AK. Anxiety in the operating theatre: a study of frequency and environmental impact in patients having local, plexus or regional anaesthesia. *Journal of Clinical Nursing*. 2009;18(16):2301–2310.
- Hernández-Palazón J, Fuentes-García D, Falcón-Araña L, Rodríguez-Ribó A, García-Palenciano C, Roca-Calvo MJ. Visual analogue scale for anxiety and Amsterdam preoperative anxiety scale provide a simple and reliable measurement of preoperative anxiety in patients undergoing cardiac surgery. *International Cardiovascular Research Journal*. 2015;9(1):1–6.
- Jawaid M, Mushtaq A, Mukhtar S, Khan Z. Preoperative anxiety before elective surgery. *Neuroscience*. 2007;12(2):145–148.
- Jlala HA, French JL, Foxall GL, Hardman JG, Bedfordth NM. Effect of preoperative multimedia information on perioperative anxiety in patients undergoing procedures under regional anaesthesia. *British Journal of Anaesthesia*. 2010;104(3):369–374.
- Kain ZN, Mayes LC, Cichetti DV, Bagnall AL, Finley JD, Hofstadter MB. The Yale preoperative anxiety scale: how does it compare with the 'gold standard?' *Anesthesia & Analgesia*. 1997;85(4):783–788.

- Karanci AN, Dirik G. Predictors of pre- and postoperative anxiety in emergency surgery patients. *Journal of Psychosomatic Research*. 2003;55(4):363–369.
- Kindler CH, Harms C, Amsler F, Ihde-Scholl T, Scheidegger D. The visual analog scale allows effective measurement of preoperative anxiety and detection of patients' anesthetic concerns. *Anesthesia & Analgesia*. 2000;90(3):706–712.
- Koivula M, Tarkka MT, Tarkka M, Laippala P, Paunonen-Ilmonen M. Fear and anxiety in patients at different time-points in the coronary artery bypass process. *International Journal of Nursing Studies*. 2002;39(8):811–822.
- Koivula M, Paunonen-Ilmonen M, Tarkka MT, Tarkka M, Laippala P. Fear and anxiety in patients awaiting coronary artery bypass grafting. *Heart & Lung*. 2001;30(4):302–311.
- Krohne HW, DeBruin JT, El-giamal M, Schmukle SC. The assessment of surgery-related coping: The coping with surgical stress scale (COSS). *Psychology & Health*. 2000;15(1):135–149.
- Moerman N. *Psychological aspects of anesthesia*. University of Amsterdam, 1996a.
- Moerman N, van Dam FS, Muller MJ, Oosting H. The Amsterdam preoperative anxiety and information scale (APAIS). *Anesthesia & Analgesia*. 1996b;82:445–451.
- Nishimori M, Moerman N, Fukuhara S, van Dam FS, Muller MJ, Hanaoka K, Yamada Y. Translation and validation of the Amsterdam preoperative anxiety and information scale (APAIS) for use in Japan. *Quality of Life Research*. 2002;11(4):361–364.
- Pritchard MJ. Managing anxiety in the elective surgical patient. *British Journal of Nursing*. 2009;18(7):416–419.
- Romanik W, Kański A, Soluch P, Szymańska O. Preoperative anxiety assessed by questionnaires and patient declarations. *Anestezjologia Intensywna Terapia*. 2009;41(2):94–99.
- Shafer A, Fish MP, Gregg KM, Saavello J, Kosek P. Preoperative anxiety and fear: a comparison of assessments by patients and anesthesia and surgery residents. *Anesthesia and Analgesia*. 1996;83(6):1285–1291.
- Sjöling M, Nordahl G, Olofsson N, Asplund K. The impact of preoperative information on state anxiety, postoperative pain and satisfaction with pain management. *Patient Education and Counseling*. 2003;51(2):169–176.
- Spielberger CD, Gorsuch RL, Lushene R, Vagg PR, Jacobs GA. *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologist Press, 1983.
- Theunissen M, Peters ML, Schouten EG, Fiddelaers AA, Willemsen MG, Pinto PR, Gramke HF, Marcus MA. Validation of the surgical fear questionnaire in adult patients waiting for elective surgery. *PLoS One*. 2014;9(6):e100225. doi:10.1371/journal.pone.0100225.
- Zigmond AS, Snaith PR. The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica* 1983;67(6):361–370.