

The Amsterdam Preoperative Anxiety and Information Scale (APAIS) - the first trial of a German version

Die Amsterdam Preoperative Anxiety and Information Scale (APAIS) - erste Erprobung einer deutschsprachigen Version

Abstract

Objective: Preoperative anxiety influences the result of the treatment in patients. To assess preoperative anxiety the Amsterdam Preoperative Anxiety and Information Scale (APAIS) [1] was developed. The APAIS measures anxiety and the need-for-information with 6 items, with good reliability and validity. This article presents the first test of the German version of this screening instrument.

Methods: The German version of the APAIS was tested on 68 patients questioned before surgery on the lower extremities in the Orthopaedic Department of a University Hospital.

From 68 patients, 47 (69%) were female and the average age was 55 years. Besides the APAIS, several additional questionnaires with similar or divergent content were administered for testing the convergent and discriminant validity of the APAIS (HADS, SCL-9-K, KASA, COSS, STOA).

Results: The two scales anxiety and need-for-information could be replicated by a factor analysis and had high reliability (anxiety: Cronbachs Alpha = 0.92; need-for-information: Cronbachs Alpha = 0.86). As expected the scales of the APAIS correlated highly with different standard questionnaires which measure anxiety (KASA, STOA) and low with questionnaires of divergent contents (HADS depression, COSS). The APAIS-scales are independent of sex, age or previous surgeries. Patients with a higher need-for-information show higher anxiety ($r=0.59$) prior to surgery.

Conclusions: During its first trial the German version of the APAIS proved to be a reliable and valid instrument. Furthermore, it is a good screening instrument to assess preoperative anxiety and need-for-information in clinical practice, especially due to its brevity. In further studies the predictive validity has to be examined in large heterogeneous samples.

Keywords: preoperative anxiety, assessment, Amsterdam Preoperative Anxiety and Information Scale (APAIS), validity, reliability

Zusammenfassung

Zielsetzung: Das präoperative Angstniveau eines Patienten kann entscheidenden Einfluss auf das Behandlungsergebnis haben. Zur Erfassung präoperativer Angst wurde 1996 die Amsterdam Preoperative Anxiety and Information Scale (APAIS) [1] vorgestellt. Dieses Instrument soll die Skalen "Angst vor Anästhesie und Operation" und "Informationsbedürfnis" mit nur sechs Items valide und reliabel erfassen. Dargestellt wird die erste Überprüfung einer deutschen Version dieses Screening-instruments.

Methodik: Die Erprobung erfolgte an 68 Patienten einer orthopädischen Universitätsklinik vor einer Operation an den unteren Extremitäten. 47 (69%) waren weiblich, das Durchschnittsalter betrug 55 Jahre. Zur Prüfung der konvergenten und diskriminanten Validität wurden weitere inhaltsähnliche bzw. -fremde Fragebogenverfahren eingesetzt (HADS, SCL-9-K, KASA, COSS, STOA).

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Ergebnisse: In der Faktorenanalyse konnten die beiden Skalen repliziert werden. Sie besitzen eine hohe Reliabilität (Angst: Cronbachs Alpha = 0,92; Informationsbedürfnis: Cronbachs Alpha = 0,86). Die Skalen der APAIS korrelieren erwartungsgemäß hoch mit anderen spezifischen Angstfragebögen (KASA, STOA) und niedriger mit inhaltsferneren Verfahren (HADS Depressivität, COSS). Die APAIS-Skalen sind nicht abhängig von Geschlecht, Alter oder bisherigen Operationserfahrungen. Patienten mit einem höheren Informationsbedürfnis haben auch ein höheres Angstniveau ($r=0,59$).

Fazit: In der ersten Erprobung erwies sich die deutsche Version der APAIS als reliables und valides Instrument, das aufgrund seiner Kürze sehr gut zum Screening von präoperativer Angst und Informationsbedürfnis im klinischen Alltag geeignet ist. Weitere Studien, insbesondere zur prädiktiven Validität, müssen an umfangreicheren, heterogeneren Stichproben erfolgen.

Schlüsselwörter: präoperative Angst, Messung, Amsterdam Preoperative Anxiety and Information Scale (APAIS), Validität, Reliabilität

Introduction

Assessing preoperative anxiety

The success of surgery is influenced by several somatic and medical variables, and to a certain extent, by the psychological characteristics of the patients. Therefore, preoperative anxiety has been in the focus of research in medical psychology for centuries [2]. The concern about the success of surgery, the fear of anaesthesia and postoperative pain have a major influence on the level of preoperative anxiety [3] besides loud noises, unpleasant smells, pain etc. [4].

However, the level of preoperative anxiety also depends on several other factors. These are for example:

- socio-demographic characteristics such as age, sex, current partnership and level of educational background [5].
- characteristics of the medical surgery such as the underlying illness, the expected success, possible complications, previous surgeries, duration of hospital stay [6], the kind of preoperative information [7] or the method of anaesthesia and
- psychosocial variables, such as the general level of anxiety, personality characteristics [8], psychological or psychiatric comorbidity [9], sensitivity to pain [10], social support [11], life satisfaction or coping style [12].

Persons with an elevated level of preoperative anxiety require larger doses of anaesthetics, have in average a higher peri- and postoperative usage of analgesia and longer stay in hospital. Since the preoperative level of anxiety can be influenced by psychological intervention [13], [14] it is important to assess the individual level of preoperative anxiety. Available instruments to measure preoperative anxiety are reviewed in Hüppe et al. [15]. Beside visual analogue scales (e.g. [16]) preoperative

anxiety can be examined by unspecific anxiety questionnaires such as State-Trait-Anxiety-Inventory STAI (see for a review [17]), and newly developed specific instruments like the Anxiety Specific to Surgery Questionnaire ASSQ [5].

In clinical settings - in the preoperative phase - extensive questionnaires are not applicable. External ratings of the preoperative anxiety, e.g. by the attending physician, are not precise [18]. Therefore, it is important to have applicable screening instruments to assess preoperative anxiety. Besides objectivity, reliability and validity, the applicability is essential which refers to brevity, clinical relevance, patients' acceptance as well as a fast and simple analysis format.

The Amsterdam Preoperative Anxiety and Information Scale

In 1996 the Dutch group of Moermann developed the Amsterdam Preoperative Anxiety and Information Scale APAIS [1]. This questionnaire consists of six items (see Table 1) and is, therefore, an economical instrument. The items are rated on a five point Likert scale with the end poles "not at all" (1) and "extremely" (5). It represents the two scales anxiety (Item 1, 2, 4 and 5; Cronbachs $\alpha = 0.86$) and need-for-information (Items 3 and 6; Cronbachs $\alpha = 0.72$). These two scales were factor analytically replicated. In some studies a total value was calculated by adding up the two scales anxiety and need-for-information. The APAIS correlates with the State-Anxiety-Scale (STAI) with $r=0.74$ [1], $r=0.67$ [19] as well as $r=0.64$ [20] which is a good indicator for its validity. Furthermore, this questionnaire is suitable to predict postoperative pain [21], but not postoperative nausea and vomiting [22]. The retest reliability bases on 42 persons and is $r=0.92$ for the scale anxiety and $r=0.62$ for the scale need-for-information (both $p<0.001$) [23]. The high acceptance of the APAIS by patients was proven in different studies from which reference values (M, SD, Cut-offs) are available for different groups of patients.

Table 1: Items of the Amsterdam Preoperative Anxiety and Information Scale English and German version (means and standard deviations of the items)

Original [1]	German version	M (SD) of the items
1. I am worried about the anaesthetic.	1. Ich mache mir Sorgen über die Anästhesie.	2.32 (1.43)
2. The anaesthetic is on my mind continually.	2. Die Anästhesie geht mir ständig durch den Kopf.	2.03 (1.25)
3. I would like to know as much as possible about the anaesthetic.	3. Ich möchte so viel wie möglich über die Anästhesie wissen.	2.72 (1.44)
4. I am worried about the procedure.	4. Ich mache mir Sorgen über die Operation.	2.44 (1.33)
5. The procedure is on my mind continually.	5. Die Operation geht mir ständig durch den Kopf.	2.54 (1.42)
6. I would like to know as much as possible about the procedure.	6. Ich möchte so viel wie möglich über die Operation wissen.	2.89 (1.36)

Comment: The rating of the items bases on a five-point Likert scale with the extreme poles "not at all" (1) to "extremely" (5).

The APAIS was applied in several international studies in departments of ophthalmology [24], internal medicine [25], in parents of children before surgery [23], [26], [27] or for testing preoperative psychosocial interventions [28]. Besides the Dutch version [1] an English version [20] and a Japanese version [19] of the APAIS exist with several studies proving the validity with performance properties. Further studies from research groups in Mexico [29], Italy [30], Turkey [31], Korea [32], [33] and Thailand [34] implementing the APAIS have been published as well.

A German version of the APAIS has not yet been published. Therefore, the gain of this study is a German translation of the APAIS, the verification of its psychometric properties and its clinical applicability. The APAIS was translated by the authors based on the guidelines (see [35], [36]) with several back and forth translations by well trained English speakers: The items of the original English version and their German translations are shown in Table 1.

Methods

This study has been approved by the ethics committee of the medical faculty Carl Gustav Carus, University of Technology, Dresden (EK92062005). All inpatients of the orthopaedic department undergoing surgery of the meniscus, the cruciate ligament, tibial head osteotomy, unicompartmental knee system or knee prosthesis in the period between the 14th of September and the 13th of December, 2005 were included in the study. The patients were informed about the aim of the study and then requested to participate. In this time frame 72 (87.5%) patients agreed to participate. From these participants, a valid and complete data set exists for 68 (94.4%) patients.

The participants do not differ from the non participants in age and sex distribution.

In this sample 21 participants were male (30.9%) and 47 female (69.1%) with a mean age of 55.6 years (see Table 2). Except for one participant all patients received previous surgery. The average amount of previous surgery in these participants was 4.26 (range = 1-15).

The German version of the APAIS, along with additional questionnaires, were filled out by the patients one day before surgery. The additional questionnaires were: Hospital Anxiety and Depression Scale (HADS) [37], the short form of the Symptom checklist SCL-90-R (SCL-9-K) [38], the Coping with Surgical Stress Scale (COSS) [39], the State-Anxiety-Questionnaire "Cognitive-Autonomic-Somatic Anxiety Symptoms" (KASA) [40] and the State-Scale of the "State-Trait-Operation-Anxiety" questionnaire (STOA) [41].

The HADS assesses anxiety and depression with 14 items. The nine items of the SCL-9-K measure the amount of psychological complaints as well as global distress. Coping with the preoperative situation is evaluated by the COSS with 51 items summarized in seven scales (see Table 4). The 20 items of the KASA can be divided into the areas cognitive, autonomic and somatic reaction. The State-Operation-Anxiety-Scale of the STOA includes 10 items and assesses the current surgery specific (State-) anxiety including its affective and cognitive component.

Analogue to the original version, the items of the APAIS were rated on a five point Likert-Scale of "not at all" (1) to "extremely" (5). The answers were added up to form two scales, anxiety which ranges from 4 to 20 and need-for-information with a range from 2 to 10. A higher value reflects a higher anxiety as well as higher information requirement.

Table 2: Characteristics of the sample (total sample, women, men)

	Total sample (n = 68, 100%)	Men (n = 21, 30.9%)	Women (n = 47, 69.1%)
Age (M, range)	55.6 (18 - 85)	51.5 (18 - 80)	57.4 (22 - 85)
	n (%)	n (%)	n (%)
Occupation			
In education	3 (4.4)	0 (0.0)	3 (6.4)
Full time	13 (9.1)	8 (38.1)	5 (10.6)
Part time	5 (7.4)	0 (0.0)	5 (10.6)
Jobless	8 (11.8)	2 (9.5)	6 (12.8)
On vocational disability benefit	5 (7.4)	0 (0.0)	5 (10.6)
Retired	32 (47.1)	9 (42.9)	23 (48.9)
Miscellaneous debits	2 (2.9)	2 (9.5)	0 (0.0)
Family status			
Single	15 (22.1)	8 (38.1)	7 (14.9)
Married	34 (50.0)	8 (38.1)	26 (55.3)
Divorced/separated	10 (14.7)	3 (14.3)	7 (14.9)
Widowed	8 (11.8)	1 (4.8)	7 (14.9)
Children			
yes	46 (74.2)	7 (33.3)	5 (10.6)
No	12 (17.6)	12 (57.1)	38 (88.4)

Results

In Table 3 the means and standard deviations of all questionnaires are shown for the total sample as well as for females and males separately. The sex differences were tested by a t-test.

The ratings of the APAIS do not differ by sex. In contrast, women have higher scores on two scales of the COSS, all scales of the KASA, the STOA, the HADS and the SCL-9K.

A factor analysis of the six APAIS items revealed an 83.5 percent explained variance (principal component analysis, varimax rotation, eigenvalue >1, not shown here in detail). The two scales identified by Moermann et al. [1] could be replicated. The items 1, 2, 4 and 5 load between 0.80 to 0.91 on the anxiety factor (and <0.40 on the factor need-for-information). The items 3 and 6 load with 0.88 and 0.93 on the factor need-for-information (0.30 and 0.19 on the factor anxiety).

The two APAIS scales show a high reliability (Cronbachs Alpha: anxiety $\alpha=0.92$ and need-for-information $\alpha=0.86$). Scores of $x>14.12$ on the anxiety scale and $x>8.24$ on the scale need-for-information ($x>M+1$ SD) are noticeably high (see Table 3). Thus, 11 participants on anxiety and 12 on need-for-information scored noticeably high.

The scales anxiety and need-for-information correlate with $r=0.59$ (Spearman coefficient, $p<0.01$). The correl-

ation between the two APAIS scales and the other questionnaires are presented in Table 4.

As expected, the anxiety scale shows a low to intermediate correlation with the coping scale (COSS) and the depression scale (HADS D). It shows a high correlation with the other instruments of anxiety (KASA, STOA, HADS A) as well as the global psychological distress (SCL-9-K). The highest association exists between the anxiety scale of the APAIS and the total value of the State-Anxiety scale of the STOA ($r=0.83$) which measures the current anxiety level before surgery. The scale need-for-information also shows an intermediate correlation with the information seeking scale (COSS, $r=0.55$) and a clearly lower correlation with the anxiety scales of the other instruments, the global psychological distress (SCL-9-K), the depression scale (HADS D) and the coping scales (COSS).

Moerman et al. [1] classified the participants in three groups based on low/intermediate/high need-for-information. According to this classification the anxiety scores are presented for the total sample and for each sex group in Table 5.

Table 5 shows the correlations between the anxiety and need-for-information as already described. A higher level of need-for-information is accompanied by a higher level of anxiety. One exception is the very small group of male patients in which the anxiety level does not significantly differ between the three groups of need-for-information. The anxiety scale of the HADS is the gold standard for assessing anxiety. A value of ≥ 11 on this anxiety scale is the cut-off for anxious patients in the clinical setting [37].

Table 3: Results of the study (means, standard deviations)

	Total sample (n = 68, 100%)	Men (n = 21, 30.9%)	Women (n = 47, 69.1%)
APAIS			
Anxiety	9.33 (4.79)	7.76 (3.31)	10.04 (5.19)
Need-for-information	5.61 (2.63)	4.95 (2.38)	5.91 (2.70)
COSS			
Information seeking	20.24 (6.34)	18.71 (5.33)	20.91 (6.60)
Rumination	18.43 (5.84)	16.81 (4.22)	19.15 (6.35)
Optimism and trust	22.32 (5.03)	20.85 (6.26)	22.98 (4.29)
Comparison downwards*	14.50 (3.99)	13.04 (4.23)	15.15 (3.74)
Advance one's resources	12.29 (3.67)	11.76 (3.83)	12.53 (3.60)
Religion**	6.01 (2.66)	4.67 (1.96)	6.62 (2.72)
Deflection	11.18 (2.93)	10.57 (2.93)	11.45 (10.93)
SCI-9-K			
Distress*	0.88 (0.71)	0.61 (0.49)	1.00 (0.76)
KASA			
Cognitive Anxiety Symptoms*	15.97 (5.97)	13.57 (4.14)	17.04 (6.38)
Autonomic Anxiety Symptoms*	10.0 (3.91)	8.42 (2.23)	10.70 (4.30)
Somatic Anxiety Symptoms*	8.01 (2.86)	7.00 (1.58)	8.46 (3.18)
STOA			
Trait-Anxiety	36.94 (9.96)	36.19 (10.31)	37.28 (9.89)
Cognitive State-Anxiety**	10.03 (4.21)	7.86 (2.59)	11.00 (4.45)
Affective State-Anxiety**	9.10 (3.96)	7.24 (1.95)	9.94 (4.34)
Total value of State-Anxiety**	19.13 (7.90)	15.09 (4.21)	20.94 (8.51)
HADS			
Anxiety**	6.25 (3.45)	4.62 (2.20)	6.98 (3.67)
Depression*	4.51 (3.43)	3.00 (2.19)	5.19 (3.68)

Comment: Comparison of men-women. t-test. *p<0.05. **p<0.01

Table 4: Spearman-Rang-correlation coefficient of the scale anxiety (r A) and need-for-information (r I) of the APAIS with the scales of the COSS, SCL-9-K, KASA, STOA and HADS

Scale (questionnaire)	r A	r I	Scale (questionnaire)	r A	r I
Information seeking (COSS)	.37**	.55**	Cognitive Anxiety Symptoms (KASA)	.78**	.36**
Rumination (COSS)	.67**	.47**	Autonomic Anxiety Symptoms (KASA)	.70**	.36**
Optimism and trust (COSS)	.24*	.28*	Somatic Anxiety Symptoms (KASA)	.41**	.11
Comparison downwards (COSS)	.23	.18	Trait-Anxiety (STOA)	.68**	.36*
Advance one's resources (COSS)	-.20	.01	Cognitive State-Anxiety (STOA)	.78**	.33**
Religion (COSS)	.12	.17	Affective State-Anxiety (STOA)	.80**	.32*
Deflection (COSS)	-.06	.16	Total value of State-Anxiety (STOA)	.83**	.36**
Distress (SCL-9-K)	.65**	.28*	Anxiety (HADS)	.64**	.27*
			Depression (HADS)	.48**	.14

***p<0.001. ** p<0.01. *p<0.05

Table 5: Associations between need-for-information (three groups) and anxiety scale of the APAIS for the total sample and sex (M, SD, analysis of variance)

Need-for-information	Total sample		Men		Women	
	n	M (SD)	n	M (SD)	n	M (SD)
low (2 - 4)	28	6.43 (3.58)	10	6.60 (4.20)	18	6.33 (3.31)
intermediate (5 - 7)	22	10.82 (4.43)	8	8.63 (2.00)	14	12.07 (4.98)
high (8 - 10)	18	12.06 (4.61)	3	9.33 (1.53)	15	12.60 (4.85)
	F = 12.14. p<0.001		F = 1.25. p>0.05		F = 10.58. p<0.001	

Table 6: Sensitivity, specificity und positive predictive value of the anxiety scale of the APAIS for the different cut-off values

	APAIS anxiety scale cut off values			
	10	11	12	13
Sensitivity	100%	100%	83.3%	83.3%
Specificity	59.7%	70.1%	77.4%	85.4%
Positive predictive value	19.3%	25.0%	26.3%	35.7%
Participants (n, (%))				
right positive	6 (8.8)	6 (8.8)	5 (7.4)	5 (7.4)
false positive	25 (36.8)	18 (26.5)	14 (20.6)	9 (13.2)
false negative	0 (0.0)	0 (0.0)	1 (1.4)	1 (1.4)
right negative	37 (54.4)	44 (64.7)	48 (70.6)	53 (77.9)

In this sample six participants (8.8%) show a value higher 11 on the anxiety scale of the HADS. In Table 6 the sensitivity, specificity and positive predictivity value of the four possible cut-off values of the APAIS in relation to the cut-off of the HADS anxiety scale is shown.

A sensitivity of 100% is reached for the APAIS value of 10. Nevertheless, not satisfying is the specificity and the positive predictive value. Moermann et al. [1] proposed for the original version of the APAIS - concerning the State-Trait-Anxiety-Inventory (STAI) as the gold standard - a cut-off of 11 on the anxiety scale. Based on the results shown in Table 6 a value of 12 is the best cut-off value for the German version of the scale anxiety (APAIS) respecting the sample specificities (see discussion) until new representative data are available.

As presented the APAIS-scales do not show sex specificities. Furthermore, the possible influences of other factors on anxiety and need-for-information were tested (here not shown). Neither by correlation nor by comparison of subgroups could influencing factors be identified for this design. Similarly, no influence by age, other socio-demographic variables, previous surgeries and the kind of illness could be identified.

Discussion

The German version of the APAIS showed its high-quality psychometric properties in this study. The two scales of the original version of the APAIS could be precisely replicated by a factor analysis. The scales do show a high reliability despite their brevity. Correlation analyses proved the concordant and discriminant validity of the scales anxiety and need-for-information.

With its only six items the German version of the APAIS is an economic instrument. The two scales anxiety and need-for-information assess important constructs for anaesthesia, surgery and other surgical aspects that influence the success of treatment. Therefore, the questionnaire is of high necessity. Since the items are formulated in a general manner (I am worried about the anaesthesia/surgery) and not specifically for one illness or treatment the application area of the APAIS is very broad. The German version of the APAIS is well accepted by the patients and the physicians because of its brevity (assessment time is 1 minute) and the high comprehensibility of the items. For the analysis the item scores have to be summed up which takes just a few minutes and shows high objectivity. Means and standard deviations are shown in Table 1 and respectively the cut-off-scores in Table 6 can serve as preliminary norm values. The German version of the APAIS allows for an international study to compare preoperative anxiety and need-for-information across countries.

Besides the precise replication of the scales in the German version both of them are significantly associated with each other and, therefore, not independent similar to Moermann et al.'s [1] findings for the English version. Furthermore, differences in anxiety depending on need-for-information could be replicated. The size of the correlation between the APAIS-anxiety scale and the State as well as the total value of the Trate-Anxiety scale of STOA documents the ability of the APAIS to assess specific surgical state anxiety and less likely a trait anxiety. No differences could be identified for sex and previous surgery which is explainable by the sex distribution and the high amount of previous surgeries in the sample.

The results of this study have to be critically judged because the sample consists of 68 patients only with a high selectivity: The majority of the patients is female and 50% of the participants are retired. Furthermore, the participants are very homogeneous since all were recruited by the orthopaedic department. The illnesses and the reasons for surgery were not life-threatening. However, the anxiety level of other samples (e.g. cancer patients, patients with extensive surgeries with a high impact for the patients etc.) is presumably higher. This still has to be examined. The cross-sectional design limits the possibility to detect causal associations. Therefore, a longitudinal study is planned to prove the retest reliability and predictive validity of the APAIS.

The proposed cut-off values have to be used with caution until further studies are available. These should include larger sample sizes, patients with other diagnoses and more anxious patients with noticeably high values on the anxiety scale of the HADS. However, this latter anxiety scale is unspecific for the preoperative situation and not a gold standard for this specific kind of anxiety.

The APAIS can be used as a screening instrument. In case of high levels of anxiety and need-for-information further instrument, as the KASA [40] or the STOA [41], should be used. The brevity and simplicity of this questionnaire allows the use of the APAIS during the routine of every clinic before surgery.

Notes

Conflicts of interest

None declared.

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