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RESEARCH ARTICLE (ORIGINAL)

Development and validation of a Preoperative Information Assessment Scale

Construção e validação de uma Escala de Avaliação de Informação Pré-Operatória
Construcción y validación de una Escala de Evaluación de la Información Preoperatoria

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Abstract
Background: Preoperative information provision is a strategy used by nurses to control elective surgical patients' anxiety levels. A tool for assessing this information will improve the quality of nursing care.
Objective: To develop and validate a preoperative information assessment scale.
Methodology: Psychometric study. A Likert-type 15-item scale was developed based on a literature review and the researchers' experience. The scale was applied to 200 patients undergoing elective surgery in the preoperative period. Construct validity was assessed through exploratory factor analysis, principal components method, Varimax orthogonal rotation.
Results: The KMO measure (0.92) and Bartlett's test of sphericity confirm the model's suitability. Two factors were extracted with the exploratory factor analysis, explaining 53.48% of the total variance. Cronbach's alpha for the total scale was 0.903.
Conclusion: The final version of the scale has good psychometric properties and allows assessing the patient's perception of the information received.

Keywords: perioperative nursing; preoperative care; health education; validation study; factor analysis

Resumo
Enquadramento: A transmissão de informações no pré-operatório é uma estratégia adotada pelos enfermeiros para controlar os níveis de ansiedade da pessoa que será submetida a cirurgia programada. Uma ferramenta que avalie essa informação contribui para a melhoria da qualidade dos cuidados de enfermagem.
Objetivos: Construir e validar uma escala para avaliação da informação pré-operatória.
Metodologia: Estudo psicométrico. Foi desenvolvida uma lista de 15 itens com base na revisão da literatura e experiência dos investigadores, na forma de escala tipo *likert*, aplicada a 200 pessoas no pré-operatório de cirurgia programada. A validade de construto foi estudada pela análise fatorial exploratória, método dos componentes principais, rotação *varimax*, tipo ortogonal.
Resultados: O valor dos testes de Kaiser-Meyer-Olkin e de esfericidade de Bartlett confirmam a adequabilidade do modelo e a prossecução com a análise fatorial exploratória, extraindo-se dois fatores que explicam 53,48% da variância total. O alfa de Cronbach global foi de 0,903.
Conclusão: A versão final da escala apresenta boas propriedades psicométricas, permitindo avaliar a perceção da pessoa acerca da informação que possui.

Palavras-chave: enfermagem perioperatória; cuidados pré-operatórios; educação em saúde; estudo de validação; análise fatorial

Resumen
Marco contextual: La transmisión de información en el preoperatorio es una estrategia adoptada por los enfermeros para controlar los niveles de ansiedad de la persona que se someterá a una cirugía programada. Una herramienta que evalúa esta información contribuye a mejorar la calidad de la atención de enfermería.
Objetivos: Construir y validar una escala para evaluar la información preoperatoria.
Metodología: Estudio psicométrico. Se elaboró una lista de 15 ítems, basada en la revisión de la literatura y la experiencia de los investigadores, como una escala de tipo Likert, y se aplicó a 200 personas en el período preoperatorio de una cirugía programada. La validez de constructo se estudió mediante el análisis factorial exploratorio, el método de componentes principales, la rotación varimax, el tipo ortogonal.
Resultados: El valor de la prueba de Kaiser-Meyer-Olkin y de esfericidad de Bartlett confirman la adecuación del modelo y la continuación con el análisis factorial exploratorio, extrayendo dos factores que explican el 53,48% de la varianza total. El alfa de Cronbach global fue de 0,903.
Conclusión: La versión final de la escala tiene buenas propiedades psicométricas, lo que permite evaluar la percepción de la información que tiene la persona.

Palabras clave: enfermería perioperatoria; cuidados preoperatorios; educación en salud; estudio de validación; análisis factorial

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Introduction

Nursing plays a key role in meeting patients' needs, particularly their information needs when faced with the possibility of undergoing surgery (Gomes, 2009).
The importance of preoperative education for surgical patients has been widely recognized. According to Gonçalves (2016), each patient should be seen as a unique individual with their concerns and needs, and education should be initiated by nurses as soon as possible and maintained until the patient reaches the operating room. In general, the patient feels the need to obtain information on various health-related aspects, and it is the nurse's responsibility to provide information on their clinical situation and nursing care (Gonçalves, Cerejo, & Martins, 2017).
Therefore, it was important to develop an instrument for assessing elective surgical patients' level of preoperative information. This study aimed to develop and validate a preoperative information assessment scale.

Background

Surgery is a new reality that causes profound changes in every individual's life and has a significant impact on the patients' well-being, health, and essential individual and family life standards (Gonçalves et al., 2017).
Surgery is considered a health-illness transition experience associated with sudden role changes resulting from changes in the health condition. This transition has several properties identified as awareness, engagement, and change, to which nurses should pay special attention to help patients overcome this transitional phase in a calm and adapted way, namely through health education, patient empowerment, and support to acquire strategies to better cope with surgery (Meleis, 2010).
The information provided by nurses helps increase patient satisfaction, reduce anxiety, and increase the chance of a rapid recovery at home. The content and the method of information delivery to surgical patients have been changing. The approach is sometimes still focused on the task, with limited opportunities for nurse-patient dialogue and for the patient to ask questions (Mitchell, 2016).
According to Medina-Garzón (2019), an informative intervention including empathic communication with the surgical patient will contribute to the reduction of preoperative anxiety in elective surgeries.
Moreover, according to Alacadag and Cilingir (2018), identifying surgical patients' information needs will help address the lack of knowledge and reduce anxiety. This assessment will also help nurses convey information to perioperative patients, increasing their satisfaction and the quality of health services.
Hence the need for a structured approach by the nurses in the preoperative period, particularly through nursing consultations, because the provision of information that meets the patient's interests and doubts during brief meetings is one of the challenges of current elective surgeries.

Research question

What are the psychometric properties of the Preoperative Information Assessment Scale?

Methodology

A psychometric study was conducted.
First, a set of statements (items) was developed based on the researchers' experience and a literature review on preoperative information. This process resulted in a list of 15 items rated on a scale from *not at all informed*, *little informed*, *sufficiently informed* to *too informed*. Each statement was scored 0, 1, 3, or 2 points, respectively. The total score ranged from 0 to 45 points, and the higher the score, the better the patients' perception of the preoperative information received about the anesthetic-surgical event.
The scale consists of 2 factors (subscales). Given that each factor has a different number of items, that had to be reduced to the same order of magnitude and, for this, the sum of each factor was divided by the number of items.
Based on the key criteria of clarity, simple understanding, and thematic representativeness, the items were organized in a table entitled Preoperative Information Assessment Scale. The scale was preceded by a set of instructions as follows: "The following statements are related to the information you have at this moment about anesthesia and surgery. Please mark with an (X) your level of information". At the beginning of the table, the following expression was also included: "I am informed ..." after which each of the items should be read.
The nonprobability convenience or accidental sample consisted of 200 patients undergoing elective surgery and hospitalized in general surgery, orthopedics, gynecology, and urology services of a hospital center in central Portugal, between September and November 2015.
The inclusion criteria (eligibility) were as follows: aged 18 years or older; being able to read, interpret, and give written answers; no hearing or visual impairment or mental alterations that may interfere with the self-completion of the instrument; and awaiting elective surgery in one of the abovementioned surgical specialties.
A pre-test was applied to nine patients. In the first version of the scale, the answer options ranged from *completely disagree*, *disagree*, *neither agree nor disagree*, *agree*, and *completely agree*. Some doubts arose during its completion, and the abovementioned group of answers was chosen.
The final version of the questionnaire included some questions about sociodemographic data and the Preoperative Information Assessment Scale.
A total of 200 patients answered the questionnaire, of whom 54.5% were women and 45.5% were men, with a mean age of 53 years.
After training, the nursing teams of the several services delivered and collected the patients' self-completed questionnaires, following the usual protocol rather than a pre-established preoperative information protocol.
The self-determination of each participant was respected through their voluntary participation and prior informed

consent. The hospital center's board of directors authorized the study, and the Ethics Committee gave its favorable opinion (Letter No. CES/114 and Opinion No. 268/03-2015).

Results

The sample consisted mostly of females (54.5%), from the general surgery service (56.0%), and who would undergo major surgery (57.5%). Their mean age was 53.17 years, with a median of 53 years. The most representative age group was 51-65 years (32.5%). Most of the sampled individuals had completed the 1st cycle of primary education (35.0%). Regarding their professional situation, about 51.0% of the participants were employed, and 33.0% were retired. Regarding marital status, the majority (76.5%) of them were married or co-habiting, and about 60.0% lived in rural areas.

In studying the scale's psychometric characteristics, the overall reliability was analyzed based on the item-total correlation, its impact on the alpha value, and some descriptive measures. An overall alpha value of 0.903 was obtained, which, according to Pestana and Gageiro (2014), is *very good*. The lowest item-total correlation value was 0.121 for item 2 (Table 1). Nevertheless, the authors decided not to delete this item based on the researchers' experience and knowledge about preoperative preparation in surgical services. However, in future studies with larger samples, it may be beneficial to delete it.

Table 1
Item correlation matrix (n = 200)

Items		Item-total correlation	α if item deleted
1	Acerca do que me vão fazer antes da operação (Por exemplo: rapar dos pelos, duche, medicação)	0.327	0.905
2	Da necessidade de fazer alguns exames (Por exemplo: eletrocardiograma, análises ao sangue, Raio-X ao Tórax) antes da operação	0.121	0.908
3	Da hora da operação	0.309	0.907
4	Sobre como se processa a anestesia	0.582	0.897
5	Sobre os vários locais por onde vou passar no dia da operação	0.630	0.895
6	Sobre o tipo de material que terei depois da operação (Por exemplo: soro, drenos, pensos, sondas)	0.686	0.893
7	Sobre quando poderei ter visitas depois da operação	0.564	0.898
8	Sobre o que fazer quando tiver dores depois da operação	0.688	0.893
9	Sobre quando me poderei levantar depois da operação	0.746	0.891
10	Sobre como deverei fazer para tossir depois da operação	0.616	0.896
11	Do modo como me deverei movimentar na cama depois da operação	0.703	0.892
12	Sobre quando é que o meu intestino vai começar a funcionar depois da operação	0.687	0.893
13	Sobre quando poderei beber e comer depois da operação	0.758	0.890
14	Sobre quanto tempo poderei ficar internado no hospital	0.571	0.898
15	Acerca dos cuidados a ter depois da alta (esforços, alimentação, pensos)	0.647	0.895

Na Tabela 2 podem observar-se as medidas estatísticas de cada um dos itens da escala.

Table 2
Statistics by item (n = 200)

Items	Mean	Standard deviation
1	2.585	0.8404
2	2.735	0.6137
3	2.155	1.1652
4	1.540	1.2675
5	1.500	1.2955
6	1.540	1.2754
7	1.910	1.2569
8	1.680	1.3177
9	1.275	1.2639
10	0.915	1.1198
11	1.125	1.2276
12	0.905	1.1280
13	1.255	1.2720
14	1.765	1.2954
15	1.355	1.2637

The values obtained so far made it possible to proceed with the analysis of this instrument's structure. Thus, factor analyses were performed with Varimax orthogonal rotation and Kaiser normalization.

The Kaiser-Meyer-Olkin (KMO) value was 0.912, reflecting good adequacy of the sample for analysis. Bartlett's test of sphericity was X^2 = 1384.083; p = 0.000, which allowed conducting the factor analysis.

The next step was to determine the number of factors to be extracted. According to Filho and Júnior (2010), the objective is to determine the number of factors that best represents the correlation pattern between items. Thus, the criterion of accumulated variance was used to determine the number of factors to be extracted. According to this criterion, factors must be extracted until the level of 60% of the accumulated variance is reached. As a result, two factors were extracted that explain 53.48% of the total variance.

The scree plot (Figure 1) also shows that both factors explain a greater explained variance.

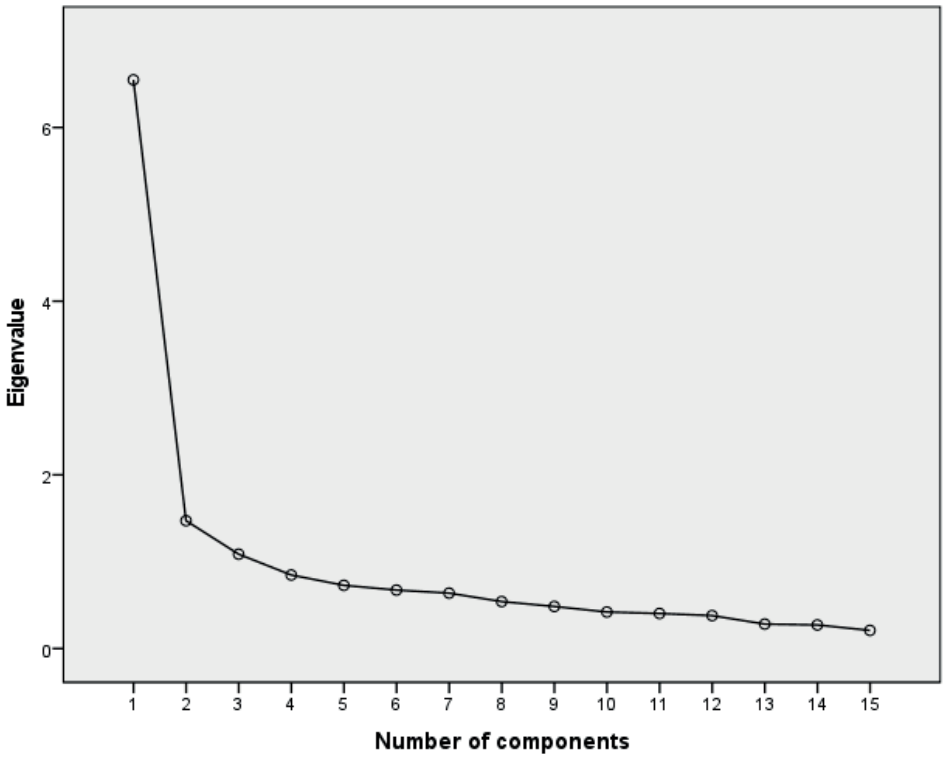

Figure 1. Scree Plot.

After the analysis and the extraction of the components, the researchers determined the items in each of the factors. In the end, both factors were constituted as follows:
1) Items 4, 6, 8, 9, 10, 11, 12, 13, 14, and 15 loaded in Factor 1. These items are mainly related to aspects inherent to nursing care, so this factor was entitled dimension Nursing care;
2) Items 1, 2, 3, 5, and 7 loaded in Factor 2. These items are associated with organizational and logistical aspects, so it was designated as dimension Administrative/organizational aspects.
Factor 1 has an eigenvalue of 6.549 and 43.66% of variance explained, while factor 2 has an eigenvalue of 1.473 and 9.82% of variance explained.
This division obtained by factor analysis proposes a construct with rational meaning (Table 3). All factors have high factor loadings, as well as communalities in the items greater than 0.40.

Table 3
Saturation matrix of the items in the factors for the rotated Varimax orthogonal solution with Kaiser normalization for two factors and communalities (n = 200)

Items	Rotated component matrix		Communalities
	Factor		
	1	2	
1	0.133	0.628	0.558
2	-0.109	0.615	0.708
3	0.119	0.623	0.652
4	0.540	0.374	0.588
5	0.525	0.514	0.596
6	0.694	0.276	0.570
7	0.474	0.481	0.463
8	0.652	0.373	0.565
9	0.750	0.283	0.645
10	0.752	-0.003	0.584
11	0.835	0.014	0.734
12	0.812	0.021	0.668
13	0.842	0.114	0.722
14	0.580	0.258	0.413
15	0.758	0.056	0.645

Table 4 shows some descriptive statistical values for the total scale and each of its dimensions. The items' total score ranged from 0 to 3 points, and the higher the score, the better the patients' perception of the preoperative information received. The mean of the items for the dimension Nursing care was 1.33 points, with a standard deviation of 0.92 points, while the dimension Administrative/organizational aspects had a higher item mean (2.17 points) and a standard deviation of 0.67 points. Overall, the mean was 1.75 points, and the standard deviation was 0.71 points.

Table 4
Descriptive statistics of both dimensions and the total scale (n = 200)

Statistics	Dimension Nursing care	Dimension Administrative/organizational aspects	Total
Mean	1.33	2.17	1.75
Median	1.30	2.20	1.80
Mode	0.00	3.00	1.50
Standard deviation	0.92	0.67	0.71
Variance	0.86	0.45	0.51
Minimum	0.00	0.20	0.15
Maximum	3.00	3.00	3.00

The distribution of the values for the total scale and each of the dimensions was analyzed through the Kolmogorov-Smirnov test with Lilliefors correction. The results show that the distribution was not normal for both the dimension Nursing care and the dimension Administrative/organizational aspects ($p < 0.05$), so nonparametric measurements were used in the following tests. Thus, Spearman's correlation significance tests were performed (Table 5) to establish correlations between both dimensions and the total scale. Each of the dimensions was strongly correlated with the total scale, and these correlations were statistically significant. A statistically significant moderate correlation was found between the dimension Nursing care and the dimension Administrative/organizational aspects.

Table 5
Results of Spearman's Correlation Test between the dimensions and the total scale (n = 200)

		Dimension Nursing care	Dimension Administrative/organizational aspects
Dimension Nursing care	r_s		0.594*
	Sig. (2-tailed)		0.000
Dimension Administrative/organizational aspects	r_s	0.594*	
	Sig. (2-tailed)	0.000	
Total	r_s	0.937*	0.827*
	Sig. (2-tailed)	0.000	0.000

Note. *Significant correlation at $p < 0.01$.

Discussion

Given the results, certain study limitations that affect its generalization should be considered. On the one hand, the lack of assessment instruments on this topic means it is important to develop and validate the scale; on the other hand, it impedes the study of concurrent validity. Furthermore, other limitations related to the analysis of the scale properties are that temporal stability was not assessed through the test-retest and that the scale was not analyzed by a set of experts in the field. Thus, it would have been important to include in the experts' panel nurses with experience in research in this area and academic and professional training in perioperative nursing and involved in caring for surgical patients, and research professors in the area to validate content and obtain a final consensual version.

Still, the development and initial validation of the Preoperative Information Assessment Scale seems to contribute to the scientific validation of the results and indicates the potential for using the scale in future studies.

Cronbach's alpha value for the total 15-item scale was 0.903, revealing good internal consistency. Factor analysis, followed by Varimax rotation, extracted two dimensions. The composition of the dimensions suggests the following meanings: Nursing care and Administrative/organizational aspects.

Nigussie, Belachew, and Wolancho (2014) concluded that information provision in the preoperative period could reduce anxiety in surgical patients. There is an inverse correlation because as information provision about the anesthetic-surgical event increased, preoperative state anxiety decreased, reinforcing the importance of assessing preoperative information.

According to Ortiz, Wang, Elayda, and Tolpin (2015), the preoperative patient education about the type of anesthesia, options for pain control, what they should do on the day of surgery, among others, improved patient satisfaction with their knowledge of the perioperative process.

As previously mentioned, studies show that the information provided to patients before surgery influences preoperative anxiety. In Spain, a cross-sectional study with 99 patients selected for elective surgery corroborated the hypothesis that patients who believe they need more knowledge and information about the surgical procedure have higher levels of preoperative anxiety than those who consider themselves informed and with sufficient knowledge (Marín, Cortés, Sanz, & Serrano, 2015).

In general, patients feel the need to obtain information on various health-related aspects, and it is the nurse's responsibility to convey information about nursing care after a correct assessment of their information needs.

Conclusion

Surgical patient education has been identified to reduce preoperative anxiety, and the information provided to patients effectively reduces anxiety in elective surgical procedures. Thus, nurses are encouraged to develop preoperative information provision models.

According to these results, the patients' perception of the information they have about the anesthetic-surgical event is low in the preoperative period. Nevertheless, they perceive themselves as better informed about administrative, organizational, and logistical aspects than the nursing care they will receive during the perioperative period.

Having not found any instrument in the literature that would allow assessing the level of information of elective surgical patients in the preoperative period, and understanding that this would be a central aspect, the researchers proposed to develop and validate an instrument to achieve this purpose. After the exploratory factor analysis, the scale consisted of two dimensions in a total of 15 items,

which, based on the results, allows its application in a larger sample, further validating the scale.
The assessment of elective surgical patients' level of information has become a central aspect in the continuous improvement of the quality of nursing care during the perioperative period.
Finally, the scale should be applied more broadly to increase its robustness and in random samples to generalize the results and consider it a valid and reliable scale.

Author contributions

Conceptualization: Gonçalves, M. A., Cerejo, M. N.
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