

## Content validity of the short version of the subscale of the State-Trait Anxiety Inventory (STAI)<sup>1</sup>

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The goal was to describe the content validity of a short version of the state subscale of Spielberger's "State-Trait Anxiety Inventory (STAI)", based on the original version adapted to Spanish, in Spanish patients receiving invasive mechanical ventilation (IMV). The sample consisted of 16 patients receiving IMV at the Alicante Hospital (Spain), who selected the items from the full Spanish version of the STAI-state that were most relevant to them. Items 1, 5, 9, 10, 12 and 20 from the original scale are the most relevant for the Spanish patients receiving IMV and 5 of these are included in the short version of the scale (83.3% agreement). The short scale has shown adequate content validity for Spanish patients receiving IMV.

Descriptors: Anxiety; Test Anxiety Scale; Validity.

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## Validade de conteúdo de versão resumida da subescala do Inventário de Ansiedade Traço-Estado (IDATE)

Teve-se como objetivo descrever a validade de conteúdo de uma versão resumida da subescala estado do State-Trait Anxiety Inventory (STAI) de Spielberger, a partir da versão original adaptada ao espanhol, em pacientes espanhóis, sob ventilação mecânica invasiva (VMI). A amostra foi composta por 16 pacientes, sob VMI, no hospital de Alicante, Espanha, que selecionaram os itens da versão espanhola completa do Idate-estado de maior relevância para eles. Os itens nº1, 5, 9, 10, 12 e 20 da escala original são os mais relevantes para os pacientes espanhóis sob VMI, e 5 deles estão incluídos na versão resumida da escala (83,3% de concordância). A escala resumida mostrou adequada validade de conteúdo para pacientes espanhóis sob VMI.

Descritores: Ansiedade; Escala de Ansiedade Frente a Teste; Validade.

## Validez de contenido de versión corta de la subescala del Cuestionario State-Trait Anxiety Inventory (STAI)

Se tuvo por objetivo describir la validez de contenido de una versión corta de la subescala Estado del State-Trait Anxiety Inventory (STAI) de Spielberger, a partir de la versión original adaptada al español, en pacientes españoles con ventilación mecánica invasora (VMI). La muestra fue integrada por 16 pacientes con VMI en el hospital de Alicante (España), que seleccionaron los ítems de la versión española completa del STAI-estado de mayor relevancia para ellos. Los ítems nº: 1,5,9,10,12 y 20 de la escala original son los más relevantes para los pacientes españoles con VMI; siendo que 5 de ellos están incluidos en la versión corta de la escala (83.3% de acuerdo). La escala corta ha demostrado una adecuada validez de contenido para pacientes españoles con VMI.

Descritores: Ansiedad; Escala de Ansiedad ante Pruebas; Validez.

## Introduction

Anxiety has been appointed as one of the negative experiences Intensive Care Unit (ICU) patients most recall. Discomfort associated with the endotracheal tube and difficulties to communicate with professionals appear as one of the causes of anxiety<sup>(1)</sup>.

ICU professionals do not routinely assess anxiety<sup>(2-3)</sup>. When they do, this assessment is usually based on either physiological indicators<sup>(2)</sup> or professionals' subjective perceptions<sup>(3-4)</sup>. Literature shows that physiological indicators do not reflect patients' anxiety level with precision<sup>(5-9)</sup>, and that professionals' subjective perceptions do not coincide with patients' self-reports<sup>(3-4)</sup>.

In the ICU context, on few occasions, patients' self-reports are used. These should join good psychometric

properties and particular applicability conditions (they should be short and not very demanding in cognitive terms), as patients with physical and/or cognitive impairments, like patients connected to invasive mechanical ventilation (IMV), experience difficulties to complete large instruments<sup>(10)</sup>.

For these patients, the reported evidence recommends the use of instruments of mid length: the Brief Symptom Inventory – BSI – and the short version of the state STAI, both of which comprise six items<sup>(11)</sup>. These two scales have shown good psychometric properties, but the second is the only instrument used in patients with IMV<sup>(12)</sup>. Two short versions of the state STAI were found<sup>(12-13)</sup>, but only Chlan's version<sup>(12)</sup> involved patients submitted to IMV. None of these versions was

adapted to Spanish though, nor used in Spanish patients undergoing IMV. Spielberger's complete original scale (STAI) has been adapted in Spain<sup>(14)</sup>, but has not been used with Spanish patients submitted to IMV either.

As the original 20-item STAI scale was adapted to Spanish, but not the 6-item shortened-version, the latter needs to be adapted to the Spanish context. Thus, the instrument's content validity needs to be established. Today, researchers have paid great attention to content validity for new as well as existing instruments<sup>(15)</sup>. For researchers, it is key to investigate whether items are truly relevant to the respondents, in order to describe their emotional state towards a particular stress situation, in this case submission to IMV. This investigation permits identifying potential problems in answers, whether due to misunderstandings, biased concepts, inconsistent interpretations and context effects<sup>(16)</sup>.

Our goal, therefore, is to assess what items of the full Spanish state STAI version IMV patients select to describe their emotional state and whether these items coincide with those included in the shortened version, developed for IMV patients<sup>(12)</sup>. Thus, this study aims to describe the content validity of a shortened version of the state subscale of Spielberger's State-Trait Anxiety Inventory (STAI), based on the original version adapted to Spanish, in Spanish patients submitted to IMV.

## Method

### Design and sample

The population of interest comprised ICU patients at Hospital General Universitario de Alicante (Spain) using endotracheal tubes. This referral hospital in the province of Alicante offers 820 hospitalization beds and an adult ICU with 19 beds. Patients whose cognitive state did not allow them to understand the questionnaire statements, the interviewers' explanations or who were unable to stay concentrated were excluded. The same happened with pediatric patients and patients with neurological disorders. Non-probabilistic consecutive sampling was used between July and November 2007. Sixteen patients were selected, representing the main theoretical sampling characteristics to define this type of patients: age, gender, education level, medical diagnosis, type and duration of intubation and administration of sedatives and/or analgesics.

### Procedure

The procedure currently recommended in literature<sup>(15,17)</sup> to guarantee an existing instrument's

content validity considers interviewing the respondents very important, so as to find out whether the items are truly relevant to them. In line with this recommendation, patients were asked to indicate what items in the full Spanish version of Spielberger's state STAI best described the state implied in being hospitalized at an ICU with IMV. They were asked to score each item, ranging from "describes my state well", "describes my state neither poorly nor well" or "describes my state poorly". They were also asked to indicate what items they found confusing or whose meaning they did not understand.

Three nurses working at the unit, experienced in patient care and accustomed to communication with intubated patients held the interviews. They were trained to interview the patients and received a manual to administer the questionnaire. This included a plasticized card with the three alternative answers, so that the patients could mark the selected alternative while the interviewer consecutively read the items to them.

### Instruments

Spanish adaptation of the state subscale of Spielberger's State-Trait Anxiety Inventory (STAI)<sup>(14)</sup>. This questionnaire comprises 20 items and the answer scale ranges from 0=nothing to 3=a lot, with a score range from 0 to 60.

A notebook was elaborated for data collection, which included other variables: whether pauses occurred during the interview and why, the way the patient answered (writing, marking on a card, raising fingers, etc.), whether the Likert scale seemed confused, whether the STAI scale seemed long and whether they experienced difficulties to understand the meaning of some item. Socio-demographic and clinical variables were also collected: age, gender, education level, medical diagnosis, type and duration of intubation and administration of sedatives and/or analgesics.

### Data analysis

Descriptive analysis was performed, using median and range for continuous variables and frequencies for categorical variables. SPSS for Windows version 14 was used for calculations.

### Ethical considerations

This study (PI06/90476-90492) received approval from the Vice-Rector of Research at Universidad de Alicante and the Board of Hospital general Universitario de Alicante. All patients participated voluntarily, giving their consent verbally or through a head gesture.

## Results

The mean age was 52.50 years, ranging between 17 and 80. Women corresponded to 56.3% (n=9) and 43.8% (n=7) had finished primary education. Regarding clinical variables, the main medical diagnosis was post-operative phase of cardiac surgery (31.3%; n=5), 87.5% (n=14) underwent no previous intubations, 50% (n=8) received analgesia and no patient was sedated. Most patients used their voice to answer (62.5%; n=10). 56.3% (n=9) found the questionnaire long and the answer scale confusing. 43.8% (n=7) had to rest during the interview due to fatigue.

The relevance of each of the 20 items in Spielberger's state STAI for patients is displayed in Table 1. The six most relevant items were 1, 5, 9, 10, 12 and 20, as a large part of patients find them important (68.8% – 93.8%). Five of these items coincide with the six items of Chlan's shortened version<sup>(12)</sup>, supposing an 83.3% agreement level between both versions. Half of the patients consider item No 17 (Concerned) relevant, included in Chlan's shortened version<sup>(12)</sup>, while item No 1 (Calmed down), which most patients in the study consider important, is not included in the shortened version.

Table 1 – Relevance of items to patients (n=16)

Item No	Describes my state poorly n (%)	Describes my state neither poorly nor well n (%)	Describes my state well n (%)
1. <b>Calmed down</b>	1 (6.3%)	2 (12.5%)	13 ( <b>81.3%</b> )
2. Safe	1 (6.3%)	6 (37.5%)	9 (56.3%)
3. Tense	5 (31.3%)	6 (37.5%)	5 (31.3%)
4. <i>Annoyed</i>	7 (43.8%)	6 (37.5%)	3 (18.8%)
5. <b>Comfortable</b>	-	1 (6.3%)	15 ( <b>93.8%</b> )
6. Upset	3 (18.8%)	3 (18.8%)	10 (62.5%)
7. <i>Concerned with future misfortunes</i>	8 (50%)	5 (31.3%)	3 (18.8%)
8. <i>Relaxed</i>	2 (12.5%)	4 (25%)	10 (62.5%)
9. <b>Anguished</b>	3 (18.8%)	1 (6.3%)	12 ( <b>75%</b> )
10. <b>At ease</b>	-	3 (18.8%)	13 ( <b>81.3%</b> )
11. <i>Self-confidence</i>	3 (18.8%)	4 (25%)	9 (56.3%)
12. <b>Nervous</b>	2 (12.5%)	2 (12.5%)	12 ( <b>75%</b> )
13. <i>Restless</i>	5 (31.3%)	8 (50%)	3 (18.8%)
14. <i>Downhearted</i>	6 (37.5%)	4 (25%)	6 (37.5%)
15. Rested	3 (18.8%)	3 (18.8%)	9 (56.3%)
16. <i>Satisfied</i>	2 (12.5%)	8 (50%)	6 (37.5%)
17. <b>Concerned</b>	3 (18.8%)	4 (25%)	9 (56.3%)
18. Stunned	6 (37.5%)	3 (18.8%)	7 (43.8%)
19. <i>Happy</i>	7 (43.8%)	1 (6.3%)	8 (50%)
20. <b>I feel good</b>	1 (6.3%)	4 (25%)	11 ( <b>68.8%</b> )

Items the highest % of patients consider important are marked in **bold**.

The six items included in the shortened version of Chlan's scale are underlined<sup>(12)</sup>.

The eight items of the original scale with Chlan<sup>(12)</sup> excluded because they are problematic are shown in *italics*.

On the other hand, about 31.3% (n=5) of patients faced difficulties to understand or interpret some of the items. Items 7, 13, 16 and 19 were identified as confusing and had already been excluded from Chlan's shortened scale version because they were considered problematic<sup>(12)</sup>. Together with the remainder of the items Chlan excluded<sup>(12)</sup>, our patients considered these items the ones that least described their state at the ICU.

## Discussion

The results obtained in our study are very similar to the results Chlan obtained in patients submitted to

IMV<sup>(12)</sup>. Between both studies, agreement levels on what items best describe the state anxiety of ICU patients submitted to IMV exceed 80%, although the studies were developed in different contexts and used distinct analysis methods: factor analysis<sup>(12)</sup> and patients' judgment. On the other hand, more than one third of our patients experienced difficulties to understand or interpret any of the items, against 17% of patients in Chlan's study<sup>(12)</sup>. Reasons also coincide: not understanding well the meaning of the item (for example: item 7 "I am concerned with future misfortunes" and item 13 "I am restless"), or items that do not describe the situation of being connected to mechanical ventilation (for example:

item 16 "I feel satisfied" and item 19 "I feel happy"). Our patients considered these items, as well as the items Chlan eliminated<sup>(12)</sup> because they were problematic, as the least relevant.

Differently from Chlan's study, which includes item 17, "Concerned", our patients do not consider this item relevant and, instead, prefer item 1, "Calmed down". It would be interesting to include it in future studies of the short scale, so as to assess its weight and compare its functioning with item 17.

More than half of our patients submitted to IMV considered that the complete state STAI was long, that the three-point Likert scale was confusing, and more than one third needed to rest once while completing the scale due to fatigue. About 15.5% of patients in Chlan's study<sup>(12)</sup> also indicated this difficulty, supporting the idea that physically or cognitively weakened patients face difficulties to answer long instruments<sup>(3,7,10,12,18-20)</sup>.

Establishing the content validity of an existing instrument, widely used in distinct population groups, is a relevant aspect in the review process of the tool<sup>(15)</sup>. This type of analysis improves the understanding and semantic and linguistic equivalence of items in a particular population, in this case ICU patients submitted to IMV.

When an instrument is produced, its creators should include a set of items that constitute a representative sample of all items that could define the construct. In our case, the sample of items representing the state anxiety construct has been used in the Spanish version of the state STAI<sup>(14)</sup>. Therefore, we have not gone deeper into the meaning of the items, as our intent was not to modify them, but to seek the most representative subsample for our patients.

It would have been recommendable to inquire on the reasons for choosing these items instead of others, but difficulties to communicate with this type of patients advised against this.

The fact that our results coincide with Chlan's<sup>(12)</sup> allow us to confirm this scale's content validity in Spanish patients submitted to IMV and hospitalized at ICU and the psychometric properties of Chlan's scale and of the Spanish version of the state STAI allow us to put forward good internal consistency, good item-test correlations and a single factor structure. Nevertheless, the scale cannot be used until its psychometric performance has been confirmed.

## Conclusion

This study contributes by reviewing the contents of a widely used instrument on an international scale,

resulting in a short version that coincides with Chlan's version, elaborated in another geographical context and using another method.

The six-item version of Spielberger's State STAI shows adequate content validity for Spanish patients submitted to IMV and hospitalized at ICU's.

Figure 1 shows the scale items:

1. I feel comfortable
2. I feel anguished
3. I feel at ease
4. I feel nervous
5. I feel concerned
6. Right now I feel good

Figure 1 - Items in the short scale

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