

Psychometric properties of the Hospital Anxiety and Depression Scale (HADS) in a Mexican population of cancer patients

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ABSTRACT

Background

Symptoms of anxiety and depression are among the major mental health problems in cancer patients. These symptoms affect quality of life and adherence to treatment, and are associated with other symptoms and longer hospital stays. Valid and reliable screening instruments such as the Hospital Anxiety and Depression Scale (HADS) have made possible the detection of possible cases of depression and anxiety in medically ill patients. However, the psychometric properties of this instrument have not been documented in different types of cancer diagnoses in the Mexican population.

Objective

To determine the psychometric properties of the HADS in a sample of patients with cancer from the Mexican population.

Method

Four hundred patients from the National Cancer Institute participated, of whom 226 were women (56.5%) and 174 were men (43.6%), with a mean age of 47.4 ± 14.1 years. Participants completed the HADS as well as the following concurrent inventories: 1. Beck Depression, 2. Beck Anxiety and 3. Distress Thermometer.

Results

A factor analysis adjusted to two factors explained 48.04% of the variance, with 12 items loading on these two factors in a similar way to the original version. The internal consistency of the overall scale was satisfactory ($\alpha=0.86$). The Cronbach's alphas for each subscale were .79 and .80. The concurrent validity assessed by way of correlations with concurrent measures showed significant associations (Pearson $r=51-71$, $p<0.05$).

Discussion and conclusion

The HADS has adequate construct validity, internal consistency, and concurrent validity for use in cancer patients from the Mexican population. The relevance of these results is that it is a cost effective tool to provide timely mental healthcare early in oncological treatment for those in need. Detecting anxiety and depression symptoms through the HADS may benefit cancer patients by ensuring appropriate care that may increase their quality of life and treatment adherence, and reduce their hospital stays.

Key words: Anxiety, cancer, depression, patients, Mexican population.

RESUMEN

Antecedentes

La sintomatología ansiosa y depresiva es parte de los principales problemas de salud mental en pacientes oncológicos, lo cual afecta la calidad de vida y la adhesión al tratamiento, además de que se asocia con mayor número de síntomas y estancia hospitalaria. Mediante instrumentos de tamizaje válidos y confiables, como la Escala hospitalaria de ansiedad y depresión (HADS), ha sido posible detectar posibles casos en pacientes hospitalarios. Sin embargo, hasta ahora no se habían caracterizado las propiedades psicométricas en pacientes oncológicos en población mexicana.

Objetivo

Determinar las propiedades psicométricas de la HADS en una muestra de pacientes oncológicos.

Método

Participaron 400 pacientes del Instituto Nacional de Cancerología, de los cuales 226 eran mujeres (56.5%) y 174 eran hombres (43.6%); la edad promedio fue de 47.4 ± 14.1 años. Los participantes contestaron, además de la HADS, los siguientes inventarios: depresión de Beck, ansiedad de Beck, termómetro de distrés.

Resultados

Un análisis factorial ajustado a dos factores presentó un instrumento con 12 reactivos, similar a la versión original. La consistencia interna de la escala global mostró un índice satisfactorio ($\alpha=0.86$). Los alfas de Cronbach de cada subescala tuvieron un valor de .79 y .80 que explicaron el 48.04% de la varianza. La validez, por medio de correlación con las medidas concurrentes, mostró resultados significativos (r de Pearson de .51 a .71, $p<0.05$).

Discusión y conclusión

La HADS en pacientes con cáncer en población mexicana presentó adecuadas características psicométricas. La relevancia de los resultados obtenidos radica en que se trata de una población que puede llegar a requerir atención oportuna en salud mental en etapas tem-

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pranas de su tratamiento. La detección de sintomatología ansiosa y depresiva por medio de la HADS deriva en beneficios para la población oncológica y en estrategias funcionales de atención adecuada y costo-efectivas.

Palabras clave: Ansiedad, cáncer, depresión, pacientes, población mexicana.

BACKGROUND

Cancer is among the main public health problems worldwide. In this sense, psychological problems should be identified and treated in patients who have these characteristics.¹

During the process of oncological illness - diagnosis, treatment, and follow-up period - symptoms of anxiety and depression are a constant in the life of a patient with cancer.^{2,3}

Various global investigations show that in the oncological population, between 15% and 58% of patients have depressive symptomatology, and between 24% and 66% have symptoms of anxiety, which are higher rates than those reported in the general population.⁴⁻⁸

Diagnosis and treatment of both psychological pathologies is fundamental, as they can have a negative influence on quality of life, length of hospital stays, suicidal ideation, self-care, adherence to medical treatment, and symptoms such as pain, nausea, vomiting, and fatigue.⁹⁻¹²

One of the most practical and economic tools for the timely detection of anxious and depressive symptomatology is valid and reliable screening instruments, as these give an approach for the detection of possible clinical cases. With the aim of identifying the presence of anxious and depressive symptomatology in a hospital context, the Hospital anxiety and depression scale (HADS), developed by Zigmond and Snaith (1983),¹³ is a self-applied tool made up of 14 items which can be used in non-psychiatric hospital environments or in primary care. It is an instrument which considers cognitive and affective dimensions, and omits somatic aspects¹⁴ (insomnia, fatigue, loss of appetite, etc.), and thereby avoids attributing them to the illness. The original scale has been adapted and validated in various populations and cultures, and has always shown adequate sensitivity and reliability in discriminating anxiety and depression.¹⁵⁻¹⁸

Bjelland et al. (2002), in a review of 747 studies on the validity of the HADS in difference chronic degenerative illnesses, found adequate factorial structure of the instrument, with a Cronbach's alpha of 0.68 to 0.93 for anxious symptomatology and .67 to .90 for depressive symptomatology. Sensitivity and specificity for both factors is 0.80. The conclusion is that the HADS is a valid and reliable instrument for the hospital population.¹⁹

In oncological populations, it has shown to be an adequate means of identifying anxious and depressive symptomatology, by producing ranges between .74 and .84 for sensitivity, .78 to .80 for specificity, a high internal consistency

(alphas between .83 and .85), high test retest reliability ($r=.75$), adequate convergent validity ($p<.05$), and a factorial structure that is similar to the original version.^{14,18,20,21} Furthermore, the HADS has been shown to be an adequate instrument that is sensitive to changes both during the course of the illness and in response to psychotherapeutic treatment and psychopharmacological interventions.^{19,21,22}

However, there is a lack of data around its validity and reliability in the Mexican population with cancer. As such, the aim of this study is to obtain the psychometric properties of the HADS. As a result of this validation, the identification of anxiety and depression symptomatology will be facilitated, as well as the evaluation of the effects of psychological intervention, the comparison of findings with international studies, and possible recommendations to help improve options for psychological treatment of patients with cancer.

METHOD

Participants

Some 400 oncology patients of both sexes were included, aged between 16 and 80 years (table 1). Obtaining the sample was done by availability in the National Cancer Institute (INCAN).

In the HADS, the mean scores were 6.48(± 3.70) for anxiety and 5.07(± 3.83) for depression; the total average score for the sample was 11.34(± 6.50).

Procedure

The sample of participants was obtained during consultations in the Medical Oncology, Surgery, Radiotherapy, and Psycho-Oncology Services, both in outpatients as well as those in hospital. This was carried out between June and December 2012. The project was approved by the Scientific and Bioethics Committees of INCAN and each of the participants agreed to participate in the present study through the understanding and signing of an informed consent to research letter.

Participants were selected based on the following inclusion criteria: 1. Patients in oncological treatment (curative or palliative) or a follow-up period (maximum six months), 2. Any type of oncological diagnosis and stage of the oncological process, 3. Know how to read and write, and 4. Karnofsky Scale equal to or greater than 60. Exclu-

Table 1. Description of the sample

	f	%		f	%
N	400	100	Diagnostic		
			Breast	137	34.1
Age (Range)			Urinary-genital	71	18.7
16-80			Head and neck	46	11.5
Sex			Gynecological	35	8.6
Male	174	43.6	Lung	31	7.5
Female	226	56.5	Hematological	30	7.4
Education			Gastric	23	5.6
None	28	7.0	Skin neoplasms	21	5.4
Elementary	96	24.8	Others	6	1.2
Secondary	112	28.0	Illness		
High school	91	22.8	Localized	76	19.0
Bachelor's	66	16.5	Loco-regional	150	37.5
Postgraduate	7	1.8	Metastatic	174	43.5
Civil status			Treatment		
Single	94	23.6	CT	150	37.5
Married/civil union	217	54.3	Surgery + CT	78	19.5
Separated or divorced	43	10.8	Surgery + CT + RT	58	14.5
Widowed	21	5.3	CT + RT	50	12.5
Other	25	6.3	Surgery	25	6.3
			Others	39	9.7

Note: CT= Chemotherapy, RT=Radiotherapy.

sion criteria: 1. Patients who had severe psychiatric symptoms and 2. Major vascular complications, dyspnea, cognitive deficiencies, or severe auditory or visual problems.

Instruments

Hospital anxiety and depression scale. The HADS is made up of two subscales of seven interlinked items. The subscale for depression is based on the concept of anhedonia as a nuclear symptom of this clinical framework, and which mainly differs anxiety from depression. Each question has four possible answers scoring between 0 and 3, for a total between 0 and 21. For both the anxiety and depression scores, zero to seven is considered normal, eight to ten is considered doubtful, and 11 and upwards is considered a problem.

According to Herrmann (1997), various studies report response rates of 95% to 100%. The scale can be completed in five to six minutes, which makes for easy application by healthcare teams.

In México, the HADS has been validated by Villegas (2004)²³ in women with a complicated postpartum period, high-risk pregnancy, gynecology, and oncology. Rojas (1991)²⁴ validated it in the geriatric population, Whaley (1992)²⁵ did the same in burn patients, and López-Alveranga et al. (2002)²⁶ did so in obese patients.

Beck depression inventory: The BDI (1961)²⁷ was standardized for a Mexican population by Jurado, Villegas,

Méndez, Rodríguez, Loperena, and Varela (1998),²⁸ and designed to assess the intensity of depressive symptomatology. It is self-applicable and consists of 21 questions with four response options which describe the spectrum of severity of the symptomatic and behavioral category. The categories evaluated by the BDI are 1. mood, 2. pessimism, 3. feeling of failure, 4. dissatisfaction, 5. feelings of guilt, 6. feelings of punishment, 7. self-acceptance, 8. self-accusation, 9. suicidal ideation, 10. crying, 11. irritability, 12. isolation, 13. indecision, 14. body image, 15. work performance, 16. sleep disorders, 17. fatigue, 18. appetite, 19. weight loss, 20. somatic concerns, and 21. loss of libido. The psychometric properties of the BDI in the Mexican population show that the reliability by internal consistency obtained was a Cronbach's alpha=.87. The factorial analysis showed that it was made up of three factors. In terms of the concurrent validity between the BDI and the Zung Scale,²⁹ statistical correlation was $r=0.70$, $p<0.00$.

Beck anxiety inventory: The BAI (Beck, Epstein, Brown, and Steer, 1988)³⁰ was standardized for the Mexican population by Robles, Varela, Jurado, and Páez (2011).³¹ It is a self-reporting instrument made up of 21 questions which determine the severity of the symptomatic and behavioral categories. The categories assessed by the BAI are: 1. subjective, 2. neurophysiological, 3. autonomic, and 4. panic. The BAI is characterized by a high internal consistency (alphas over 0.90), moderate divergent validity (correlations lower than 0.60), and adequate convergent validity (correlations over 0.50). Factorial analyses have extracted four primary factors, which have been called subjective, neurophysiological, autonomic, and panic. The psychometric properties of the BAI for the Mexican population are characterized by a high internal consistency (alphas 0.84 and 0.83), a high test-retest coefficient of reliability ($r=.75$), convergent validity, and adequate factorial structure.

Distress thermometer: The Distress Thermometer (Holland, 1999)³² was validated for the Mexican population by Almanza-Muñoz, Juárez, and Pérez (2008),³³ and it has two parts. The first is an analogous visual scale from 0 to 10, to assess the distress experienced in the past week. The second sets out a list of 35 common practical problems in patients with cancer. The convergent validity by means of ROC analysis showed an area beneath the curve of 0.63, sensitivity of 93%, specificity of 76%, positive predictive value of 82%, and negative predictive value of 90%, with a cutoff point of four or more, which produces a distress prevalence of 61.8%.

Statistical analysis

The factorial structure was determined by means of a factorial analysis of primary components with Varimax rotation. The criteria used for the factorial analysis were: 1. factorial loads ≥ 0.40 ; 2. factors with at least three questions, and 3. coefficient of internal consistency for each Cronbach's alpha

factor $\geq .60$. The relationship between HADS and the concurrent measures was analyzed through Person's coefficient of correlation, and internal consistency was analyzed with Cronbach's alpha. Cutoff points for both scales were established, adjusting to the 75th percentile as the cutoff point which sets out a statistical and clinical difference between groups with minor and major attributing quantities (<0.05).

RESULTS

Cutoff points

To calculate the cutoff points, values obtained after the 75th percentile were considered a mild case of anxious or depressive symptomatology.

This was also the case to consider patients without depression (0-5), mild depression (6-8), moderate depression (9-11), and severe depression (12 and over). For the subscale of anxiety: no anxiety (0-5), mild anxiety (6-8), moderate anxiety (9-11), and severe anxiety (12 and over).

Factorial structure

The Bartlett sphericity test obtained ($p=.001$), and a sampling adequacy index of ($KMO=0.83$) was obtained.

The first exploratory factorial analysis (method of component principles and Varimax rotation) with 14 questions produced a model with three factors with eigenvalues over 1.00; although it explained 53.74% of the variance, it did not agree with the two factors of the original version. In the third factor, questions 7, "I can sit quietly and feel relaxed" and 8, "I feel as though I am getting slower and slower" grouped together, because of which they were eliminated due to not corresponding conceptually with the original subscales. Because of this, a confirmatory factorial analysis was carried

out with 12 questions that obtained 48.04% of the variance. (table 2). Furthermore, two factor analyses with the 12 questions were carried out. In both subsamples, outpatients and hospitalized patients obtained 46.73% and 48.42% of the variance, respectively.

Internal consistency

The Cronbach's alpha of the HADS anxiety subscale (six questions) was 0.79, while the subscale of depression (six questions) was 0.80. Cronbach's alpha, with 12 questions, reached 0.86. The Cronbach's alpha in both subsamples (outpatients and hospitalized patients) was 0.82 and 0.87. In general terms, the consistence could be considered adequate.

External validity by means of correlations with concurrent measures

Table 3 shows the summary of the associations between HADS and the concurrent administrative measures of BDI, BAI, and Distress Thermometer. All correlations were positive and statistically significant (Pearson's r of 0.51 to 0.71, $p<0.05$) (table 3). Additionally, the HADS was correlated to the Karnofsky Scale ($r=-.337$), HAD-A ($r=-.244$) and the HAD-D ($r=-.238$) $p<0.01$, which indicates an inversely proportional correlation.

DISCUSSION AND CONCLUSION

The evaluation of anxious and depressive symptomatology in oncological patients is very relevant due to their relationship with severe damage during treatment. The HADS by Zigmond and Snaith (1983)¹³ is an instrument designed to measure these constructs, which has shown adequate psychometric characteristics replicated in studies in various

Table 2. Factor analysis of elements

Global Scale $\alpha=.86$ Explained variance = 48.04%	Factor load	Explained variance	Cronbach's Alpha
HADS - A Anxiety subscale		36.55%	$\alpha=.79$
1. I feel tense or nervous	.689		
3. I feel afraid, as if something awful were about to happen	.793		
5. My mind is full of worry	.628		
9. I have a strange feeling like butterflies in the stomach	.519		
11. I feel unsettled, like I can't stop moving	.641		
13. I am bothered by sudden feelings of panic	.736		
HADS - D Depression subscale		11.49%	$\alpha=.80$
2. I still enjoy what I used to enjoy	.658		
4. I can laugh and see the funny side of things	.756		
6. I feel happy	.650		
10. I have lost interest in my personal appearance	.649		
12. I feel optimistic about the future	.663		
14. I entertain myself with a good book, the radio, or a TV show	.738		

Table 3. Correlations between the HADS and concurrent measurements

	1	2	3	4	5
1. HADS total					
2. HADS - A	.849*				
3. HADS - D	.911*	.557*			
4. BDI	.711*	.560*	.682*		
5. BAI	.612*	.537*	.545*	.660*	
6. Distress	.532*	.505*	.443*	.477*	.530*

* Pearson's correlations with $p < .001$.

countries. In the Mexican population, the HADS showed a similar structure and acceptable reliability. However, the omission of items 7 and 8 may indicate a different construct. In spite of the scale seeking to exclude somatic symptoms, these two items do not seem to meet with that objective. The findings may indicate an additional component, such as that identified by Rico et al., 2005,²⁰ with questions 8 and 9 and the studies identified by Bjelland et al., 2002.¹⁹

An adequate concurrent validity, through associations with the BDI and the BAI which include somatic elements, as well as distress, which is an emotional discomfort which interferes with the ability to confront cancer, indicates that the HADS sets out a construct centered on anhedonia with stable cognitive behavioral elements. Finally, associations that are inversely proportional with the Karnofsky Scale confirm that the greater the symptoms of anxiety and depression, the lower the patient's level of functionality. In relation to cutoff points, these differ from Zigmund and Snaith's original (1983),¹³ because of which the number of questions for each subscale was modified.

The advantage of the HADS for this oncological population over other instruments which assess anxious and depressive symptomatology, is that it does not include somatic symptoms which may be explained by the cancer itself and the treatment for it. This may contribute to an over-estimation by the other instruments.

As it is an instrument which is brief, easy to apply, and reliable for clinical practice and research in an oncological population, it is relevant to determine the scale of the problem, as well as prevention and implementation of actions to treat it.

An adequate recognition of psychosocial damages is crucial to identify the group of patients with such damage, carry out a timely handover to mental health services,^{34,35} and provide the psychological interventions that have shown beneficial effects in this group of patients^{36,37} with the aim of maintaining acceptable parameters of psychological wellbeing in this population.

Among the limitations of this study is the lack of a psychiatric interview to confirm the anxious and depressive symptomatology.

Finally, the data supports the need to increase efforts oriented towards making mental healthcare services more accessible to this group of patients.

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Conflict of interest

The authors do not declare any conflict of interest.

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