Brief Methodological Report

Evaluation of the Psychometric and Structural Properties of the Spanish Version of the Hospital Anxiety and Depression Scale in Latina Cancer Patients

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Abstract

Context. The Hospital Anxiety and Depression Scale (HADS) is a brief self-report measure commonly used to screen for symptoms of anxiety and depression in cancer patients. The HADS has demonstrated validity in over 100 languages, including Spanish. However, validation studies have largely used European Spanish-speaking samples with a variety of medical diagnoses.

Objectives. The aim of this study was to examine the psychometric properties of the Spanish version of the HADS in a sample of Spanish-speaking Latina women with cancer in the U.S.

Methods. Participants ($N = 242$) completed self-report measures of anxiety and depression (HADS), quality of life (Functional Assessment of Cancer Therapy—General Version), cancer-related distress (Impact of Events Scale—Revised Version Intrusion Subscale), and cancer symptomatology (Memorial Symptom Assessment Scale—Short Form) before initiating chemotherapy and five to seven weeks later. Analyses evaluated internal consistency and test-retest reliability, construct validity, and convergent validity.

Results. Factor analysis supported a two-factor structure as proposed by the original HADS developers (X^2 [76, $N = 242$] = 143.3, $P < 0.001$, comparative fit index = 0.94, root-mean-square error of approximation = 0.06, and standardized root-mean-square residual = 0.06). The HADS and its subscales demonstrated good internal consistency ($\alpha = 0.83$—0.88) and test-retest reliability (intraclass correlation coefficient = 0.76—0.82). Construct validity was evidenced by factor analysis and item-subscale, item-total, and subscale-total correlations. Convergent validity was demonstrated by strong positive correlations with cancer-related distress ($r = 0.51$—0.71) and symptom severity ($r = 0.54$—0.62) and strong negative correlations with quality of life ($r = -0.63$ to -0.76) (all P's < 0.001).

Conclusion. The Spanish version of the HADS evidenced sound psychometric properties in Latinas with cancer in the U.S., supporting its use in clinical oncology research and practice. J Pain Symptom Manage 2019;58:289—296. © *2019 American Academy of Hospice and Palliative Medicine. Published by Elsevier Inc. All rights reserved.*

Key Words

Psychometric, Latina, cancer, depression, anxiety

Introduction

Cancer diagnosis and treatment are physically and psychologically taxing, and research suggests that over 40% of cancer patients experience psychological distress.[1—3] Psychological distress has been described as an unpleasant psychological, social, or spiritual experience that interferes with the ability to cope

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with cancer and its treatment, including symptoms of depression and anxiety.[4] Distress in cancer patients is associated with worse quality of life and increased risk of morbidity and mortality.[5,6] Nevertheless, distress is not always systematically evaluated in cancer patients, and symptoms of anxiety and mood disorders often go unidentified and untreated.[7,8]

There has been a push toward routine collection of patient-reported outcomes in cancer patients, including regular screening for psychological distress.[9–11] The Hospital Anxiety and Depression Scale (HADS) is a measure that is widely used to assess for symptoms of anxiety and depression in medical populations, including cancer patients.[12–14] The HADS is favorable for use in behavioral oncology research and practice because of its brevity, cost-effectiveness, ease of scoring and interpretation, evidence of reliability and validity, availability of cutoff scores to indicate symptom severity, and availability in many languages, including Spanish.[11,15,16] In addition, the HADS does not assess somatic symptoms (e.g., fatigue, insomnia) that may overlap with disease and treatment-related symptoms that are frequently present in cancer patients, making it favorable compared with other measures of distress. The English version of the HADS has demonstrated sound psychometric properties in English-speaking cancer patients.[11,13,17] However, despite the widespread use of the HADS in cancer research, few studies have focused on the validation of the Spanish version. The HADS was originally translated into Spanish in 1986 for use with psychiatric inpatients.[16] Additional work has since validated the Spanish version of the HADS as a screening tool for depression and anxiety in Spanish-speaking medical patients in Europe.[18,19] However, to our knowledge, there has been no validation study to date of the Spanish version of the HADS in Latina or Hispanic (hereafter referred to as "Latina") patients with cancer with origins in the Caribbean, Central and South America. The aim of the present study was to evaluate the psychometric properties of the HADS in a sample of U.S.-residing Latina cancer patients undergoing chemotherapy. It was hypothesized that exploratory factor analysis (EFA) would indicate a two-factor solution, with seven items loading onto an anxiety subscale and seven items onto a depression subscale, as the best fit for the data. It was also hypothesized that confirmatory factor analysis (CFA) using the two-factor structure would demonstrate acceptable model fit. In addition, it was hypothesized that the HADS would be positively associated with measures of cancer-related distress and cancer-related symptoms and negatively associated with quality of life.

Methods

Participants

Participants were women enrolled in a randomized controlled trial evaluating the impact of a stress management intervention versus usual care on quality of life in Latina women undergoing chemotherapy.[20] The following were the eligible patients: 1) aged more than 18 years, 2) female, 3) self-identified as Hispanic or Latina, 4) capable of speaking and reading Spanish, 5) diagnosed with cancer, 6) scheduled to begin outpatient intravenous chemotherapy for reasons other than symptom palliation at Moffitt Cancer Center or Sylvester Comprehensive Cancer Center, and 7) able to provide written informed consent. Patients were ineligible if they had received chemotherapy in the previous two months or had a documented or observable visual, auditory, psychiatric, or neurological disorder that would interfere with study participation.

Procedures

This study was approved by the University of South Florida (Pro00006699) and University of Miami (20111145) Institutional Review Boards and registered on clinicaltrials.gov (NCT01599520). Participant eligibility was determined through medical record review and consultation with the oncology team. Participants were recruited at an outpatient appointment before initiation of chemotherapy by Spanish-speaking trained research staff. Following informed consent, participants completed a battery of self-report questionnaires and were randomly assigned to the intervention or usual care group. Detailed description of the study intervention and groups has been previously published.[20] Questionnaires were administered again at five or seven weeks after baseline, depending on chemotherapy schedule.

Measures

Sociodemographic and Clinical Characteristics. Sociodemographic information was collected using a standardized self-report form. Sociodemographic variables included age, race, ethnicity, marital status, education, employment status, household income, country of origin, and number of years residing in the U.S. Clinical characteristics (e.g., cancer site, cancer stage) were assessed by medical record review.

Hospital Anxiety and Depression Scale. The HADS is a 14-item questionnaire that comprises a seven-item anxiety subscale (e.g., "I feel tense or wound up") and a seven-item depression subscale (e.g., "I feel as

if I am slowed down").[12,16] Respondents are asked to rate how frequently they have experienced each symptom over the previous week on a four-point Likert scale including "not at all," "sometimes," "very often," and "nearly all of the time." Items are summed to form subscale scores for anxiety (range 0–21) and depression (range 0–21). Subscale scores are summed to create a total psychological distress score (range 0–42), with higher scores indicating greater frequency and severity of symptoms of anxiety and depression. The psychometric properties of the HADS have not been examined in Spanish-language cancer patients.

The Functional Assessment of Cancer Therapy–General Version. The Functional Assessment of Cancer Therapy–General Version (FACT-G) is a 27-item measure used to assess health-related quality of life in cancer patients across the following four domains: emotional, functional, physical, and social well-being.[21] Respondents indicate the extent to which quality of life concerns have impacted them over the past week, rating items on a five-point Likert scale ranging from 0 (not at all) to 4 (very much). Subscale scores can be interpreted independently or summed to create a total score. The Spanish version of the FACT-G has demonstrated adequate psychometric properties in patients with a variety of cancer diagnoses.[22–24]

The Impact of Events Scale–Revised Version, Intrusion Subscale. The Impact of Events Scale–Revised Version, Intrusion Subscale (IES-R) is an eight-item measure used to assess intrusive thoughts related to a stressful event.[25] In the present study, the measure was keyed to "your cancer and cancer diagnosis" to measure cancer-related distress. Respondents indicate how much they were distressed by intrusive thoughts about cancer on a five-point scale ranging from 0 (not at all) to 4 (extremely). There is evidence of validity of the IES-R in cancer samples and for the Spanish language version.[26]

The Memorial Symptom Assessment Scale–Short Form. The Memorial Symptom Assessment Scale–Short Form (MSAS-SF) is a 32-item measure assessing the severity of symptoms commonly experienced by cancer patients (e.g., nausea, fatigue).[27] Respondents indicate if a symptom is present (yes/no) and, if yes, how much the symptom distressed or bothered them over the previous week on a scale ranging from 0 (not at all) to 4 (very much). MSAS-SF items can be examined individually for specific symptoms or summed to form total, psychological, and physical symptom severity scores and a global distress index score. The MSAS-SF Spanish version has demonstrated acceptable psychometric properties.[28]

Analytic Plan

Statistical analyses were conducted in SAS, version 9.4 (SAS Institute Inc., Cary, NC); SPSS, version 24.0 (IBM SPSS Statistics for Windows; IBM Corp., Armonk, NY); and Mplus, version 7 (Muthén & Muthén, Los Angeles, CA). At baseline, HADS total scores were similar for participants in usual care ($M = 12.99$) and the intervention ($M = 12.36$) ($P = 0.71$) groups, and there was no significant group by time interaction for HADS total score from baseline to five or seven weeks later ($P = 0.16$). In addition, participants did not differ on baseline scores for other measures included in the current analyses (P's > 0.05). Therefore, baseline data were pooled across groups to increase the statistical power of the current psychometric evaluation. There were no missing data for the HADS at baseline, so analyses include all 242 available cases. Test-retest reliability analyses included patients with HADS data at baseline and five or seven weeks later ($N = 230$).

Descriptive statistics were computed for sociodemographic, clinical, and psychosocial variables. EFA of the HADS using maximum likelihood extraction and orthogonal (varimax) rotation was conducted to determine the suggested number of factors to extract the given current data. CFA was conducted to evaluate whether the two-factor model supported by previous literature fit the current data. CFA model fit was evaluated using the chi-squared index, root-mean-square error of approximation (RMSEA), comparative fit index (CFI), and standardized root-mean-square residual (SRMR). Chi square is considered a reasonable measure of fit (adequate where $P > 0.05$) but is almost always significant with a large sample size and so must be considered alongside other fit indices. RMSEA values of 0.06 or less, CFI values greater than 0.95, and SRMR values less than 0.08 represent acceptable model fit.[29]

Communality reflects the proportion of variation in a variable that is explained by the scale factors. Communalities less than 0.40 were evaluated to determine if an item was not related to other items. A factor loading of 0.32 reflects 10% overlapping variance with other items on that factor. Factor loadings greater than 0.32 for the factor on which the item loaded most strongly were considered adequate. Cross-loading occurs when an item demonstrates loadings greater than 0.32 on two or more factors. Items were evaluated using the 0.32 threshold to determine if cross-loading was present. Given that symptoms of anxiety and depression may overlap in presentation and measures

of anxiety and depression are consistently correlated, it was likely that items may cross-load onto more than one factor.

Cronbach α was computed for the HADS total score and subscales to evaluate internal consistency reliability and was considered acceptable when Cronbach $\alpha \geq 0.70$.[30] Composite reliability (CR) was computed using the standardized factor loadings from the CFA and was considered acceptable when CR ≥ 0.60.[31] The intraclass correlation coefficient (ICC) was calculated to evaluate test-retest reliability and was considered acceptable when ICC ≥ 0.70.[30] Pearson product moment correlation coefficients (r) were calculated between the item and subscale, item and total scale, or subscale and total scale while omitting or correcting for the former to assess construct validity. Correlations greater than 0.30 were considered adequate.[32] Pearson product-moment correlations of the HADS with the IES-R, FACT-G, and MSAS-SF were calculated to assess convergent validity, or the degree to which two scales that should theoretically be correlated are related.

Results

Sample Characteristics

Participants were 242 women with cancer who self-identified as Hispanic or Latina. Sociodemographic and clinical characteristics of the sample are shown in Table 1. Participants were on average 51.7 years old (SD = 10.6), and most were married (52.7%) and diagnosed with breast cancer (81.2%). Women reported a mean baseline HADS total score of 12.6 (SD = 7.6), anxiety subscale score of 7.9 (SD = 4.5), and depression subscale score of 4.7 (SD = 3.9). A score of ≤7 on either subscale indicates nonclinical symptomology; cutoff scores of 8, 11, and 15 are used to indicate mild, moderate, or severe symptomology, respectively.[33] Participants in the current sample were experiencing mild symptoms of anxiety and nonclinical symptoms of depression. Sociodemographic, clinical, and psychosocial correlates of anxiety and depression in the current sample have been previously reported.[34]

Table 1
Demographic, Clinical, and Psychosocial Characteristics (*N* = 242)

Demographic and Clinical Characteristics	*N* (%)
Age (mean ± SD), yrs	51.7 (10.6)
Race	
White	192 (82.4%)
Black or African-American	10 (4.3%)
More than one race	31 (13.3%)
Ethnicity	
Hispanic or Latina	242 (100.0%)
Marital status	
Married	127 (52.7%)
Divorced/Separated/Widowed	88 (36.6%)
Single	26 (10.8%)
Education	
Less than high school	80 (33.2%)
High school graduate	41 (17.0%)
Some college	27 (11.2%)
College graduate or beyond	93 (38.6%)
Employment status	
Working full or part time	86 (36.3%)
On leave	9 (3.7%)
Unemployed	142 (59.9%)
Cancer type	
Breast	194 (81.2%)
Gynecologic	16 (6.7%)
Ovarian	15 (6.3%)
Lung	7 (2.9%)
Other	7 (2.9%)
Years residing in the U.S., M (SD)	24.3 (16.7)
Country of origin[a]	
Cuba	76 (32.8%)
U.S.	30 (12.9%)
Puerto Rico	25 (10.8%)
Mexico	20 (8.6%)
Columbia	15 (6.5%)
Cancer stage	
I	45 (19.0%)
II	102 (43.0%)
III	73 (30.8%)
IV	17 (7.2%)
Psychosocial Characteristics	**M (SD) [range]**
HADS total	12.6 (7.6) [0–35]
HADS Anxiety Subscale	7.9 (4.5) [0–21]
HADS Depression Subscale	4.7 (3.9) [0–17]
IES-R	9.7 (7.2) [0–32]
FACT-G	77.4 (17.1) [0–108]
MSAS-SF total	0.6 (0.5) [0–2.2]

HADS = Hospital Anxiety and Depression Scale; IES-R = Impact of Events Scale–Intrusive Thoughts Subscale; FACT-G = Functional Assessment of Cancer Therapy–General; MSAS-SF = Memorial Symptom Assessment Scale–Short Form.
[a]Country of origin for five most commonly cited countries.

Exploratory Factor Analysis

EFA using maximum likelihood extraction and orthogonal (varimax) rotation was conducted to determine the suggested number of factors to extract. The Kaiser-Guttman rule (eigenvalues > 1), scree plots, and pattern matrix factor loadings were evaluated in the context of interpretability of the results and theoretical meaningfulness. Given these criteria, a two-factor structure was suggested, consistent with a priori hypotheses based on previous psychometric evaluations. EFA showed that the two-factor structure accounted for 52.4% of the variance in the items. Three items showed communalities less than 0.40 (see Appendix).

All 14 HADS items demonstrated adequate factor loadings (>0.32) onto at least one of the factors. Five items had factor loadings greater than 0.32 on both the anxiety and depression subscales, demonstrating evidence of cross-loading. EFA suggested that 13 of 14 items loaded more strongly onto a factor composed of the anxiety items or a factor composed

Table 2
CFA of HADS With Original Two-Factor Structure and Standardized Factor Loadings

HADS Item	Anxiety Subscale	Depression Subscale
A1 (Q1) I feel tense or wound up	0.65	
A2 (Q4) I get a sort of frightened feeling like butterflies in the stomach	0.70	
A3 (Q5) I get a sort of frightened feeling as if something bad is about to happen	0.73	
A4 (Q8) I feel restless and have to be on the move	0.67	
A5 (Q9) Worrying thoughts go through my mind	0.78	
A6 (Q12) I get sudden feelings of panic	0.70	
A7 (Q13) I can sit at ease and feel relaxed	0.51	
D1 (Q2) I feel as if I am slowed down		0.55
D2 (Q3) I still enjoy the things I used to enjoy		0.65
D3 (Q6) I have lost interest in my appearance		0.51
D4 (Q7) I can laugh and see the funny side of things		0.69
D5 (Q10) I look forward with enjoyment to things		0.62
D6 (Q11) I feel cheerful		0.71
D7 (Q14) I can enjoy a good book or radio or TV program		0.66

CFA = confirmatory factor analysis; HADS = Hospital Anxiety and Depression Scale; A = Anxiety Subscale; D = Depression Subscale.
All values significant at $P < 0.05$.
Standardized relationship between Anxiety and Depression Subscales = 0.75.

of the depression items in a pattern congruent with that suggested by scale developers and supported by literature to date (see Appendix). Item 13 (I can sit at ease and feel relaxed) did not evidence a stronger loading on the anxiety factor as suggested by previous work. To test a priori hypotheses and facilitate comparison with previous validation studies, the two-factor structure with items loading in the pattern set forth by Zigmond and Snaith was used for CFA.[12]

Confirmatory Factor Analysis

CFA was conducted to evaluate whether the two-factor model supported by previous literature fit the current data. A two-factor model with seven anxiety items loading onto one factor and seven depression items loading onto a second factor was conducted. The standardized factor loadings ranged from 0.51 to 0.78, with all values loading significantly ($P < 0.001$) onto the anxiety or depression subscale as specified by the model (Table 2). Three of the four model fit indices evaluated suggested adequate model fit (χ^2 [76, $N = 242$] = 143.3, $P < 0.001$, CFI = 0.94, RMSEA = 0.06 [90% CI = 0.045, 0.076], SRMR = 0.06).

Table 3
Correlations of the HADS With the FACT-G, IES-R, and MSAS

	Total HADS	HADS Anxiety	HADS Depression
FACT-G total	−0.76	−0.63	−0.74
Emotional well-being	−0.73	−0.71	−0.60
Functional well-being	−0.67	−0.54	−0.67
Physical well-being	−0.55	−0.42	−0.59
Social well-being	−0.34	−0.25	−0.36
IES-R	0.68	0.71	0.51
MSAS-SF total	0.62	0.54	0.58
MSAS-SF psych	0.78	0.77	0.63
MSAS-SF phys	0.45	0.35	0.46
MSAS-SF GDI	0.68	0.63	0.59

HADS = Hospital Anxiety and Depression Scale; FACT-G = Functional Assessment of Cancer Therapy–General; IES-R = Impact of Events Scale–Intrusive Thoughts subscale; MSAS-SF = Memorial Symptom Assessment Scale–Short Form; MSAS-SF Psych = Psychologic Symptom Scale; MSAS-SF Phys = Physical Symptom Scale; MSAS-SF GDI = Global Distress Index.
All *P*s < 0.001.

Reliability

Cronbach α was computed for the HADS total scale and subscales to evaluate internal consistency reliability. The total scale (α = 0.88, CI: 0.87–0.91) and anxiety (α = 0.85, CI: 0.82–0.88) and depression (α = 0.83, CI: 0.79–0.86) subscales all demonstrated good internal consistency. The HADS total scale (CR = 0.91) and anxiety (CR = 0.86) and depression (CR = 0.82) subscales also demonstrated acceptable CR.

Test-retest reliability was estimated as the ICC between HADS total and subscale scores at baseline ($N = 242$) and five to seven weeks later ($N = 230$). The ICC for the HADS total (ICC = 0.82, CI: 0.77–0.86) and anxiety (ICC = 0.80, CI: 0.69–0.86) and depression (ICC = 0.76, CI: 0.68–0.82) subscales suggest acceptable stability of the measure over time.[30]

Validity

Corrected item-subscale (anxiety subscale $r = 0.44–0.70$, depression subscale $r = 0.48–0.61$, all *P*s < 0.001), item-total ($r = 0.42–0.68$, *P*s < 0.001), and subscale-total (anxiety $r = 0.91$, depression $r = 0.88$, *P*s < 0.001) correlations exceeded the $r = 0.30$ value, demonstrating evidence of construct validity (see Appendix).

Correlations between the HADS, IES-R, MSAS-SF, and FACT-G are shown in Table 3. The HADS total scale and anxiety and depression subscales demonstrated moderate to strong positive correlations with the IES-R and MSAS-SF total score and psychological, physical, and global distress index scores and moderate to strong negative correlations with the FACT-G

total scale and subscales (P's < 0.001), providing good evidence of convergent validity.

Discussion

The aim of the present study was to examine the psychometric and structural properties of the HADS in a sample of Latinas with cancer. Multiple statistical methods were used to evaluate evidence of validity and reliability. First, an EFA was conducted to examine the scale factor structure and item loadings and provided support for a two-factor solution. The two-factor structure of the HADS is well supported in the literature and is consistent with a priori hypotheses based on theory and research.[18,19] Examination of the structure matrix from the EFA suggested that Item 13 (I can sit at ease and feel relaxed) cross-loaded on the anxiety and depression subscales and loaded more strongly onto the depression subscale ($r = 0.48$) versus the anxiety subscale ($r = 0.33$). Given the item content, which is most consistent with a positively framed description of anxiety, this finding was discrepant with a priori hypotheses based on theoretical meaningfulness and the factor loading structure suggested by the original scale developers. Several potential considerations may help to explain this finding, including item framing, wording, and cultural considerations that may contribute to measurement error variance.

The HADS depression and anxiety subscales contain a different number of positively and negatively framed items. Scale developers would recommend having an equal number of positively and negatively worded items on each subscale as individuals' attitudes may influence response to item framing. Moreover, Item 13 contains a double question (sit at ease AND feel relaxed); individuals may have responded to one or both pieces of this question, further complicating item interpretation. Finally, the potential influence of regional variations in Spanish language among Hispanic groups should be considered. Although beneficial for international research efforts that the HADS has been adapted for use in many languages,[35] there are potential issues of unchecked translation and cross-cultural differences in item interpretation and response.[36] It is possible that Spanish speakers from South and Central America and the Caribbean responded to this item differently than European native Spanish speakers. Future studies should further evaluate the cultural equivalence of the Spanish version of the HADS in Spanish speakers from different geographic regions, and with the scale in other languages. If the scales are thought to be conceptually equivalent, differential item functioning analyses can be used to determine whether systematic differences in responses that are not a product of what is being measured may account for differences in rates of symptoms (i.e., because of group membership).[37] For example, findings from the larger parent trial for the current analyses suggest that less acculturation is associated with greater anxiety and depressive symptoms.[34] This highlights how cultural factors, such as time in the U.S. and degree of assimilation, may be important to consider when screening for distress in Latina patients with cancer.

Next, CFA supported a priori hypotheses that the original two-factor structure of the HADS demonstrated acceptable fit and was retained for validity and reliability testing. Internal consistency reliability in the current sample was good, and values were nearly identical to those found in previous studies.[18,19] The HADS and its subscales demonstrated acceptable test-retest reliability, providing evidence of the stability of the scale over time. Strong positive correlations between the HADS total and subscale scores with measures of intrusive thoughts about cancer and symptom severity, and strong negative correlations with a measure of quality of life were consistent with a priori hypotheses and provide evidence of convergent validity. Future research should examine discriminant validity of the Spanish version of the HADS with scales that would not be expected to be strongly associated with symptoms of anxiety and depression.

Strengths of the current psychometric evaluation include the large sample size and novelty of examining evidence of validity in a previously unexplored population. However, there are several limitations to the present study. Clinical interviews were not conducted to assess for clinical diagnoses of depression or anxiety, so it is unknown whether the women in the present study had clinically significant symptoms of anxiety or depression warranting mood or anxiety disorder diagnoses. Similarly, it is not possible to know whether women were endorsing symptoms of anxiety or depression in the context of their cancer diagnosis and beginning treatment or whether these women had symptoms before diagnosis. Findings are mixed regarding the sensitivity and specificity of the English version of the HADS to identify anxiety and mood disorders[33,38,39]; the ability of the HADS-Spanish to correctly identify cases and noncases in Latinas should be evaluated. It has been recommended that the HADS be used as an initial screening tool and in conjunction with other assessments to best measure symptoms of distress. Specifically, concern has been raised about the ability of the HADS depression subscale to identify depression in ill populations as the HADS items may capture an increase in anhedonia with physical disease burden and not true depressive symptoms.[40] Psychometric analyses show strong, positive correlations of the Spanish- and English-language HADS total and subscale scores

with other measures commonly used to assess for depression and anxiety in patients with chronic illness,[11,41] affirming the utility of the HADS as a screening tool to assess for distress that may be followed up with more detailed assessment. In addition, the present study only included women. Future studies should be replicated with Spanish-speaking Latino male cancer samples.

Overall, the HADS evidenced sound psychometric properties in assessing overall distress and symptoms of anxiety and depression in Latina women with cancer, supporting its use in clinical oncology research and practice. Future research should further evaluate the cultural equivalence of the Spanish version of the HADS in Spanish-speaking patients with cancer from different geographic regions and with the measure in other languages.

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Appendix

Supplemental Table 1
Item Means, SDs, and Interitem Correlations

	Mean	SD	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Q1	1.38	.81	1.00													
Q2	0.95	.85	0.35	1.00												
Q3	0.74	.82	0.31	0.45	1.00											
Q4	1.01	.73	0.48	0.26	0.27	1.00										
Q5	1.23	.97	0.46	0.36	0.33	0.48	1.00									
Q6	0.58	.88	0.28	0.30	0.30	0.18	0.32	1.00								
Q7	0.43	.65	0.37	0.40	0.44	0.36	0.46	0.40	1.00							
Q8	1.19	.93	0.42	0.21	0.27	0.54	0.45	0.11	0.33	1.00						
Q9	1.21	1.05	0.51	0.29	0.36	0.54	0.58	0.27	0.44	0.55	1.00					
Q10	0.79	.96	0.21	0.28	0.41	0.17	0.32	0.40	0.41	0.17	0.32	1.00				
Q11	0.62	.72	0.39	0.37	0.43	0.33	0.46	0.32	0.44	0.30	0.46	0.49	1.00			
Q12	0.74	.88	0.43	0.31	0.22	0.51	0.53	0.22	0.37	0.49	0.54	0.24	0.38	1.00		
Q13	1.16	.77	0.31	0.23	0.35	0.35	0.34	0.15	0.40	0.33	0.34	0.37	0.48	0.36	1.00	
Q14	0.57	.83	0.32	0.28	0.46	0.28	0.40	0.30	0.43	0.36	0.37	0.44	0.48	0.34	0.47	1.00

Range for each item = 0–3.

Supplemental Table 2
Factor Matrix of the HADS Resulting From EFA With Maximum Likelihood Extraction and Varimax Rotation

	Factor I (Anxiety)	Factor II (Depression)	Communality
Anxiety			
A1 (Q1) I feel tense or wound up	**0.57**	0.30	0.42
A2 (Q4) I get a sort of frightened feeling like butterflies in the stomach	**0.72**	0.17	0.54
A3 (Q5) I get a sort of frightened feeling as if something bad is about to happen	**0.60**	0.40	0.52
A4 (Q8) I feel restless and have to be on the move	**0.69**	0.16	0.51
A5 (Q9) Worrying thoughts go through my mind	**0.69**	0.34	0.59
A6 (Q12) I get sudden feelings of panic	**0.66**	0.24	0.50
A7 (Q13) I can sit at ease and feel relaxed	0.33	**0.48**	0.34
Depression			
D1 (Q2) I feel as if I am slowed down	0.25	**0.46**	0.28
D2 (Q3) I still enjoy the things I used to enjoy	0.21	**0.61**	0.42
D3 (Q6) I have lost interest in my appearance	0.13	**0.50**	0.27
D4 (Q7) I can laugh and see the funny side of things	0.36	**0.57**	0.46
D5 (Q10) I look forward with enjoyment to things	0.09	**0.69**	0.48
D6 (Q11) I feel cheerful	0.33	**0.64**	0.51
D7 (Q14) I can enjoy a good book or radio or TV program	0.29	**0.60**	0.44

HADS = Hospital Anxiety and Depression Scale; EFA = exploratory factor analysis.
Rotated factor pattern from EFA with varimax (orthogonal) rotation.
Factor loadings are bolded for the factor on which the item loaded most strongly.

Supplemental Table 3

Corrected Item-Subscale, Corrected Item-Total, and Subscale-Total Correlations

	Anxiety Subscale	Depression Subscale	Total Scale
Total scale ($\alpha = 0.88$, 0.87–0.91)	0.91	0.88	
Anxiety ($\alpha = 0.85$, 0.82–0.88)			
A1 (Q1) I feel tense or wound up	0.59		0.58
A2 (Q4) I get a sort of frightened feeling like butterflies in the stomach	0.66		0.54
A3 (Q5) I get a sort of frightened feeling as if something bad is about to happen	0.65		0.67
A4 (Q8) I feel restless and have to be on the move	0.63		0.54
A5 (Q9) Worrying thoughts go through my mind	0.70		0.68
A6 (Q12) I get sudden feelings of panic	0.65		0.59
A7 (Q13) I can sit at ease and feel relaxed	0.44		0.53
Depression ($\alpha = 0.83$, 0.79–0.86)			
D1 (Q2) I feel as if I am slowed down		0.48	0.48
D2 (Q3) I still enjoy the things I used to enjoy		0.60	0.54
D3 (Q6) I have lost interest in my appearance		0.47	0.42
D4 (Q7) I can laugh and see the funny side of things		0.60	0.63
D5 (Q10) I look forward with enjoyment to things		0.58	0.50
D6 (Q11) I feel cheerful		0.61	0.64
D7 (Q14) I can enjoy a good book or radio or TV program		0.57	0.59

A = Anxiety Subscale; D = Depression Subscale.
All values are significant at $P < 0.001$.