Original Article

Development of an Impact Thermometer for Use in Combination with the Distress Thermometer as a Brief Screening Tool for Adjustment Disorders and/or Major Depression in Cancer Patients

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Abstract

Screening cancer patients for adjustment disorders and major depression is important, because both are prevalent and often underrecognized. The purpose of this study was to validate the Distress and Impact Thermometer, a 2-item questionnaire, which we newly developed as a brief screening tool for detection of adjustment disorders and/or major depression. Two hundred ninety-five cancer patients completed the Distress and Impact Thermometer and the Hospital Anxiety and Depression Scale (HADS), and were examined by psychiatrists based on DSM-IV criteria. Using cutoff points for detection of adjustment disorders and major depression of "3/4" on "distress" score and "2/3" on "impact," the sensitivity and specificity were 0.82 and 0.82, respectively. Screening performance of the Distress and Impact Thermometer was comparable to that of the Hospital Anxiety and Depression Scale. Its brevity and good performance suggest that the Distress and Impact Thermometer is an effective tool for routine screening in clinical oncology settings. J Pain Symptom Manage 2005;29:91–99. © *2005 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.*

Key Words

Screening, cancer, adjustment disorders, major depression, suicidal ideation

Introduction

Derogatis et al. reported that about half of all cancer patients have psychiatric disorders, with the most common being adjustment disorders and major depression.[1] Subsequent research on the prevalence of psychiatric disorders in cancer patients confirmed that adjustment disorders and major depression are often the

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most prevalent psychiatric disorders among cancer patients.[2,3] Although their prevalence varies with patient characteristics (i.e., type of cancer and staging), and the tools used to measure them, the prevalence of adjustment disorders in cancer patients has been reported to be 4–35%, and the prevalence of major depression has been reported to be 3–26%.[1–8]

Adjustment disorders are relatively brief maladaptive reactions to stress and are often associated with depressed mood and/or anxiety.[2] Major depression is a psychiatric syndrome characterized by two core symptoms, depressed mood and loss of interest or pleasure that persist for at least two weeks and interfere with normal functioning.[9] Although adjustment disorders and major depression are different disorders, they are often associated with significant psychological distress, mainly anxiety and depressed mood.[10] Both disorders are known to have various adverse effects; for example, depressed mood often leads to impaired quality of life (QOL)[11] and is related to desire to die.[12] Major depression affects patients' decision making about cancer treatment,[13] and psychological distress affects caregiver's QOL.[14]

Both psychotherapy and pharmacotherapy are effective against these disorders, and early diagnosis and treatment are considered to be important.[15] However, they are often underrecognized by the medical staff in clinical oncology settings.[16,17] Both clinicians' and patients' belief that depressive mood or anxiety is an appropriate reaction to cancer, the lack of physician training in the treatment of depression, and the stigma attached to the words "psychiatric" and "psychological" are possible reasons for reluctance to talk about emotional issues.[15,18]

Screening is useful for detecting diseases that are prevalent in the population, are not evident, and are treatable; screening may be particularly important if there is an advantage to early treatment.[19] Several screening tools for adjustment disorders and major depression in cancer patients have been developed, and they have been reported to be valid,[10,20–26] but they are not brief enough for use in cancer patients in clinical oncology settings. Important points that need to be borne in mind when devising tools to screen cancer patients for adjustment disorders and major depression are that the screening items should not include somatic symptoms that are difficult to interpret;[15] the screening should be brief enough to use in cancer patients, because many of them have physical symptoms and excessive questioning can cause distress;[2] the screening should not be so stigmatizing that it cannot be easily used by the medical staff or is unacceptable to patients;[18] and it should be easy to score and evaluate, because screening tests are mainly used by non-mental health professionals.[27]

Several screening tools have been used to detect psychological distress in cancer patients, and they have a mean sensitivity of 0.78 and mean specificity of 0.71.[2] For the sake of brevity and ease, screening tests for adjustment disorders and major depression that ask only one question have been developed for cancer patients, and the Single-item Interview Screening,[23] the Visual Analog Scale (VAS),[23] the Distress Thermometer,[24,26] and the One Question Interview[26] have been used in patients with advanced cancer. However, the Single-item Interview Screening requires some training for use by non-mental-health professionals, because it is part of a structured diagnostic interview, and poor performance of the VAS has been shown as a screening tool for major and minor depression in cancer patients (sensitivity 0.72, specificity 0.50). Our previous study showed sensitivity of 0.84 for the Distress Thermometer and 0.80 for the One Question Interview, which require no training. Sensitivity levels are comparable to that of the Hospital Anxiety and Depression Scale (HADS), but their specificities (Distress Thermometer, 0.61; One Question Interview, 0.61) are poorer.[26] In view of the cost and resources required for assessment and treatment after screening, specificity is as important for screening as sensitivity, however, no sufficiently brief screening tests with both high sensitivity and high specificity for detecting psychiatric problems in cancer patients currently exist.

Most screening tools for psychiatric disorders in cancer patients target adjustment disorders or major depression because of their high prevalence. Some studies of the HADS have reported different cutoffs for screening for adjustment disorders or major depression and for screening for major depression alone.[10,25] However, no studies have reported differences in performance in regard to brief screening for different target problems.

The objective of this study was to develop and validate a high-performance (especially in regard to specificity) brief screening tool for adjustment disorders and/or major depression in cancer patients, and test its performance as a screening test for adjustment disorders and major depression together, for major depression alone, and for major depression with suicidal ideation.

Methods

Subjects

Subjects from three available groups were enrolled in this study. The first group consisted of the cancer patients referred to the Psychiatry Division of the National Cancer Center Hospital and National Cancer Center Hospital East in Japan. Because the Distress Thermometer and the HADS were used in routine clinical practice and the study procedure required very little deviation from standard clinical practice (just adding a single-item questionnaire on emotional distress), informed consent to participate in this study and institutional review board approval were not requested. The second group consisted of patients who were scheduled to undergo stem cell transplantation. All patients of the stem cell transplantation patients were routinely referred to the Psychiatry Division for the psychological screening that is performed before stressful treatment in the National Cancer Center Hospital. Oral consent to participate in this study was obtained from this group before the psychological assessment. The third group consisted of postoperative breast cancer patients. All of the postoperative breast cancer patients at the National Cancer Center Hospital East had been consecutively asked to participate in another study on psychological distress. The data from the screening questionnaire and psychiatric examination were used.

The eligibility criteria were: diagnosis of cancer, age over 18 years, and being informed of the cancer diagnosis before psychiatric consultation. Exclusion criteria were: too physically ill, cognitive impairment, and already under psychiatric treatment for current psychological problems. Patients were also excluded if the interviewing psychiatrist considered the screening procedure to be psychologically harmful to them. After the diagnostic interview, patients diagnosed as having psychiatric disorders other than adjustment disorders or major depression were excluded, because the objective of the screening was to detect adjustment disorders and major depression. Subjects diagnosed with another mental disorder that was associated with adjustment disorders or major depression (i.e., PTSD + major depression) were included.

Measurements

Addition of the Impact Thermometer to the Distress Thermometer: Distress and Impact Thermometer. The Distress Thermometer is a 1-item screening tool for psychological distress in cancer patients.[24] The advantages of the Distress Thermometer are its brevity, ease, and less stigmatizing format. Asking only one question should be brief enough for cancer patients, and the questionnaire is easy to use and assess by medical professionals. The word "distress" was chosen because it is less stigmatizing and more acceptable to people, and also because it makes it easier for medical professionals to use when inquiring about patients' emotions.[24] Although the Distress Thermometer performed well in our previous study, its performance was inferior to that of the HADS in detecting adjustment disorders and major depression in Japanese cancer patients.[26]

In this study, we developed the Impact Thermometer and added it to the Distress Thermometer to improve specificity without sacrificing brevity and good sensitivity. The Impact Thermometer is a 1-item questionnaire with an 11-point Likert scale that has the same thermometer-like format as the Distress Thermometer. Scores range from 0 to 10, and higher scores indicate less favorable status. We chose the question about the "impact" of distress on daily life activity, because the diagnostic criteria for both adjustment disorders and major depression contain impairment of social functioning as an essential point. Finally, we combined the two self-report questionnaires, which assess "distress" and "impact", respectively, into a single test, the Distress and Impact Thermometer. The advantages of this tool are the brevity of the questionnaire, the ease of assessing the results, and its less-stigmatizing format. This screening test is used by showing the patient a single sheet of paper describing both thermometers. Screening was judged to be positive

only when the scores on both "distress" score and "impact" score were above their cutoff points.

Hospital Anxiety and Depression Scale (HADS). HADS is a widely used screening instrument for anxiety and depression in physically ill patients.[20] It is a self-report questionnaire consisting of 14 items, and subjects rate how they felt during the previous week on a 4-point Likert scale. The HADS consists of an anxiety and depression subscale (0–21 points each), and total scores can range from 0 to 42. Higher scores indicate severer depression and anxiety. The Japanese version of HADS was validated in a cancer population.[25] The HADS had been developed for the use in medically ill patients, and questions about physical symptom are excluded. We used the HADS as a basis for comparison in the evaluation of screening performance of the Distress and Impact Thermometer in this study.

Procedure

Between April 2001 and May 2002, eligible subjects were asked to fill out the Distress and Impact Thermometer. The HADS is routinely used in our clinical practice and was filled out after the Distress and Impact Thermometer. After both screenings, a psychiatrist made a psychiatric diagnosis according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).[9] Demographic and medical variables (age, sex, cancer site, clinical stage, performance status, and pain) were obtained from a patient database and medical charts.[28] Performance status was rated according to the Eastern Cooperative Oncology Group criteria, with patient's physical function rated objectively from 0 (no symptoms) to 4 (bedridden), and pain rated on a four-level scale: absent, mild, tolerable, and intolerable.

Analysis

To assess the criterion validity of the Distress and Impact Thermometer, correlations between "distress" scores and HADS total scores, HADS anxiety subscale scores and HADS depression subscale scores, and between the "impact" scores and HADS total scores, HADS anxiety subscale scores, and HADS depression subscale scores were assessed by using the Spearman Rank Correlation Test.

The sensitivity and specificity of the Distress and Impact Thermometer for detecting adjustment disorders and/or major depression diagnosed by the psychiatrist based on DSM-IV were calculated by receiver operator characteristic (ROC) analysis.

We defined a cutoff point for each of three different problems targeted. The first cutoff point was for detection of adjustment disorders and major depression, and it is useful for detection distress, including mild distress, in many patients. The second cutoff point was for detection of major depression alone, and it is useful for detecting more distressed patients who may require medical treatment. The third cutoff point was for detection of major depression with suicidal ideation, and it is useful for the detection of selected distressed patients who require urgent intervention by a mental health specialist. We selected the point with the lowest misclassification rate (false-positive rate plus false-negative rate) as the optimal cutoff point.

All analyses were performed with SPSS for Windows software.

Results

There were 934 patients who were referred to the Psychiatry Division during the study period, 90 who were referred to the Psychiatry Division for pre-transplantation assessment, and 48 who participated in the breast cancer study in the study period. The referral group contained patients diagnosed with delirium or psychiatric disorders other than adjustment disorders or major depression, and they accounted for about 35% of the patients in our previous report.[28] Patients suspected of delirium or other psychiatric disorders before screening were not asked to participate in the study. A total of 355 patients, 231 from the referral group, 76 from the pre-transplantation group, and 48 from the breast cancer study group, were asked to fill out the screening tools. Thirty-seven (35 from the referral group and 2 from the breast cancer study group) were excluded because they were diagnosed with psychiatric disorders other than adjustment disorders or major depression. Their diagnoses were generalized anxiety disorder in 8 patients, sleep disturbance in 7, panic disorder in 3, delirium in 3, somatoform disorder in 3, schizophrenia in 2, organic mood disorder

in 2, post-traumatic stress disorder in 2, bipolar disorder in 2, and others in 5. Twenty-three did not complete either the Distress and Impact Thermometer or the HADS. Twenty-two did not complete the HADS (12 could not decide the answer to at least one question, 3 could not complete it because of loss of energy, 1 could not fill out the questionnaire because of severe pain, 1 refused to answer the questionnaire, and 5 did not complete it for unknown reasons), and 7 did not complete the Distress and Impact Thermometer (2 because of loss of energy, 1 could not fill out the questionnaire because of physical restriction by severe pain, and 4 did not complete it for unknown reasons). Ultimately, a total of 295 subjects (173 from the referral group, 76 from the pre-transplantation group, and 46 from the breast cancer study group) were the subjects of the analysis.

Table 1 shows the subjects' characteristics. The most frequent primary cancer site was breast, and female sex was predominant. Leukemia and malignant lymphoma were also common, because peripheral blood stem cell transplantation recipients were routinely referred to the Psychiatry Division for psychiatric screening before transplantation.

The Spearman coefficient was 0.70 ($P < 0.01$) for the correlation between the "distress" score and HADS total score, 0.65 ($P < 0.01$) for the correlation with the HADS anxiety score, and 0.65 ($P < 0.01$) for the correlation with the HADS depression score. The Spearman coefficient was 0.71 ($P < 0.01$) for the correlation between the "impact" score and HADS total score, 0.65 ($P < 0.01$) for the correlation with HADS anxiety score, and 0.68 ($P < 0.01$) for the correlation with the HADS depression score.

Table 1
Patient Characteristics ($n = 295$)

Characteristics	*n*	(%)
Age (mean ± SD, range) 51.5 ± 12.4 y (18–81)		
Sex		
Female	164	(55.6)
Cancer site		
Breast	82	(27.8)
Leukemia	45	(15.3)
Malignant lymphoma	28	(9.5)
Lung	27	(9.2)
Clinical stage		
Metastatic, recurrent	121	(41.0)
Pain		
Absent	151	(51.2)
Mild–intolerable	144	(48.8)
Performance status[a]		
0–1	249	(84.4)
2–4	46	(15.6)
Psychiatric diagnosis		
No diagnosis	156	(52.9)
Adjustment disorders	86	(29.2)
Major depression	53	(18.0)
Major depression with suicidal ideation	18	(6.1)

[a]Performance status was defined by Eastern Cooperative Oncology Group criteria.

The cutoff point, sensitivity, and specificity values of the Distress and Impact Thermometer for detection of adjustment disorders and major depression are shown in Table 2. Scores on the Distress and Impact Thermometer at or above the optimal cutoff point of 4 on "distress" score and 3 on "impact" score had a sensitivity of 0.82 (95% CI 0.76–0.88) and a specificity of 0.82 (95% CI 0.76–0.88). The cutoff point, sensitivity, and specificity for detection of major depression alone are shown in Table 3. Scores at or above the optimal cutoff point of 5 on "distress" score and 4 on "impact" score had a sensitivity of 0.89 (95% CI 0.80–0.97) and a specificity of 0.70 (95% CI 0.64–0.76). The cutoff point, sensitivity, and specificity for detection of major depression with suicidal ideation are shown in Table 4. Scores at or above the optimal cutoff point of 5 on "distress" score and 5 on "impact" score had a sensitivity of 0.94 (95% CI 0.83–1.05) and a specificity of 0.67 (95% CI 0.61–0.72). The optimal cutoff point of the HADS for detecting adjustment disorders and/or major depression was 15. The sensitivity of the HADS was 0.76 (95% CI 0.69–0.83) and its specificity was 0.86 (95% CI 0.81–0.91). The optimal cutoff point for detection of major depression alone was 17, and the sensitivity of the HADS was 0.77 (95% CI 0.66–0.88), and its specificity was 0.74 (95% CI 0.68–0.80). The optimal cutoff point for detection of major depression with suicidal ideation was 20, and the sensitivity of the HADS was 0.78 (95% CI 0.59–0.97), and its specificity was 0.75 (95% CI 0.70–0.80). (Table 5).

Discussion

We developed the Impact Thermometer and combined it with the Distress Thermometer to obtain a brief screening tool for adjustment disorders and major depression, and we assessed validity and screening performance of

Table 2
Cutoff Point, Sensitivity, and Specificity of Distress and Impact Thermometer to Detect Adjustment Disorders and Major Depression

	"Distress" Score						
"Impact" Score	0/1	1/2	2/3	3/4	4/5	5/6	
0/1	0.93	0.93	0.92	0.89	0.85	0.65	(sensitivity)
	0.56	0.60	0.65	0.72	0.77	0.85	(specificity)
1/2	0.90	0.90	0.90	0.86	0.83	0.65	(sensitivity)
	0.69	0.69	0.71	0.76	0.79	0.85	(specificity)
2/3	0.84	0.84	0.84	0.82	0.80	0.63	(sensitivity)
	0.79	0.79	0.79	0.82	0.84	0.88	(specificity)
3/4	0.75	0.75	0.75	0.73	0.72	0.58	(sensitivity)
	0.87	0.87	0.87	0.87	0.88	0.90	(specificity)
4/5	0.67	0.67	0.67	0.67	0.66	0.56	(sensitivity)
	0.89	0.89	0.89	0.89	0.89	0.91	(specificity)
5/6	0.50	0.50	0.50	0.50	0.49	0.44	(sensitivity)
	0.95	0.95	0.95	0.95	0.95	0.95	(specificity)

Boxed figures indicate sensitivity and specificity at the optimal cutoff point.

the Distress and Impact Thermometer for different target psychiatric problems in cancer patients. Sensitivity and specificity for detection of adjustment disorders and/or major depression were 0.82 (95% CI 0.76–0.88) and 0.82 (95% CI 0.76–0.88), respectively, and comparable to the HADS values (sensitivity 0.76 [95% CI 0.69–0.83], specificity 0.86 [95% CI 0.81–0.91]). This screening performance is better than that of the original Distress Thermometer (sensitivity 0.84, specificity 0.61). In previous studies assessing screening tests for the detection of adjustment disorders and/or major depression in cancer patients, the sensitivity and specificity of the HADS ranged from 0.75 to 0.92 and from 0.65 to 0.75, respectively,[10,22,25] and the values for the Beck Depression Inventory Short Form were 0.79 and 0.71.[23] Comparison with these results suggests that the Distress and Impact Thermometer performed well in detecting adjustment disorders and/or major depression.

The sensitivity and specificity of the Distress and Impact Thermometer for detection of major depression alone were 0.89 (95% CI 0.80–0.97) and 0.70 (95% CI 0.64–0.76), respectively, and also were comparable to the HADS values (sensitivity 0.77 [95% CI 0.66–0.88]; specificity 0.74 [95% CI 0.68–0.80]). In previous studies assessing screening tests for detection of major depression in cancer patients, the sensitivity and specificity of the HADS were 0.70–0.82 and 0.74–0.96, respectively,[10,25] and the values for the Carroll Depression Rating Scale were 0.87 and 0.62.[21] Comparison with these results also suggested good performance of the Distress and Impact Thermometer in detecting major depression in cancer patients.

Table 3
Cutoff Point, Sensitivity, and Specificity of Distress and Impact Thermometer to Detect Major Depression Alone

	"Distress" Score						
"Impact" Score	0/1	1/2	2/3	3/4	4/5	5/6	
0/1	0.94	0.94	0.92	0.91	0.91	0.75	(sensitivity)
	0.39	0.41	0.45	0.51	0.56	0.69	(specificity)
1/2	0.92	0.92	0.92	0.91	0.91	0.75	(sensitivity)
	0.48	0.48	0.50	0.55	0.59	0.69	(specificity)
2/3	0.90	0.91	0.91	0.91	0.91	0.75	(sensitivity)
	0.58	0.58	0.58	0.61	0.64	0.72	(specificity)
3/4	0.89	0.89	0.89	0.89	0.89	0.74	(sensitivity)
	0.68	0.68	0.68	0.69	0.70	0.76	(specificity)
4/5	0.83	0.83	0.83	0.83	0.83	0.72	(sensitivity)
	0.73	0.73	0.73	0.73	0.73	0.78	(specificity)
5/6	0.64	0.64	0.64	0.64	0.64	0.55	(sensitivity)
	0.82	0.82	0.82	0.82	0.83	0.83	(specificity)

Boxed figures indicates sensitivity and specificity at the optimal cutoff point.

Table 4
Cutoff Point, Sensitivity, and Specificity of Distress and Impact Thermometer to Detect Major Depression with Suicidal Ideation

	"Distress" Score						
"Impact" Score	0/1	1/2	2/3	3/4	4/5	5/6	
0/1	1.00	1.00	1.00	1.00	1.00	0.89	(sensitivity)
	0.35	0.37	0.40	0.47	0.51	0.64	(specificity)
1/2	1.00	1.00	1.00	1.00	1.00	0.89	(sensitivity)
	0.44	0.44	0.45	0.49	0.53	0.65	(specificity)
2/3	1.00	1.00	1.00	1.00	1.00	0.89	(sensitivity)
	0.52	0.52	0.53	0.55	0.57	0.67	(specificity)
3/4	0.94	0.94	0.94	0.94	0.94	0.83	(sensitivity)
	0.61	0.61	0.61	0.62	0.63	0.70	(specificity)
4/5	0.94	0.94	0.94	0.94	0.94	0.83	(sensitivity)
	0.66	0.66	0.66	0.66	0.67	0.72	(specificity)
5/6	0.72	0.72	0.72	0.72	0.72	0.67	(sensitivity)
	0.77	0.77	0.77	0.77	0.77	0.79	(specificity)

Boxed figures indicates sensitivity and specificity at the optimal cutoff point.

There have been no reports on screening for major depression with suicidal ideation, but a sensitivity of 0.94 and a specificity of 0.67 should be acceptable. If it is considered especially crucial not to underrecognize depression with suicidal ideation, using cutoff points with 100% sensitivity (5 for Distress and 3 for Impact, sensitivity 1.00 and specificity 0.57) is recommended. The cutoff point of the HADS for detection of major depression with suicidal ideation with 100% sensitivity was 11, and its specificity was 0.45.

Because a review of previous reports showed that simply screening for psychiatric problems and feeding back the results to the clinicians does not improve clinicians' recognition or intervention rate, a useful screening program should be combined with the appropriate resources of an institutional mental health specialist.[29] The specificity of screening is important in view of the cost of intervention. Calculations for screening procedures in a fictitious target population in which 25% had adjustment disorders and major depression show that mental health specialists would assess 21 patients who required intervention and 29.3 who did not (false-positive patients) of every 100 patients routinely screened by the Distress Thermometer (sensitivity 0.84, specificity 0.61 to detect both adjustment disorders and major depression), whereas they would assess 20.5 patients who required intervention and 13.5 false-positive patients by the Distress and Impact Thermometer (sensitivity 0.82, specificity 0.82).

Based on the significant correlations with the HADS scores, we concluded that the Distress and Impact Thermometer have acceptable criterion validity. Both the "distress" score and "impact" score correlated with the HADS anxiety score, depression score, and total score, and no dominance was found in the correlations with anxiety or depression. This suggests that the Distress and Impact Thermometer is not helpful in discriminating between anxiety disorders

Table 5
Cutoff Point, Sensitivity, and Specificity of the HADS to Detect Adjustment Disorders and Major Depression

Adjustment Disorder and Major Depression			Major Depression			Major Depression with Suicidal Ideation		
Cutoff	Sensitivity	Specificity	Cutoff	Sensitivity	Specificity	Cutoff	Sensitivity	Specificity
11/12	0.83	0.73	13/14	0.79	0.61	16/17	0.78	0.67
12/13	0.80	0.79	14/15	0.79	0.65	17/18	0.78	0.71
13/14	0.77	0.81	15/16	0.77	0.69	18/19	0.78	0.73
14/15	0.76	0.86	16/17	0.77	0.74	19/20	0.78	0.75
15/16	0.71	0.89	17/18	0.74	0.77	20/21	0.72	0.77
16/17	0.65	0.92	18/19	0.72	0.79	21/22	0.67	0.79
17/18	0.60	0.93	19/20	0.70	0.81	22/23	0.67	0.83

Boxed figures indicates sensitivity and specificity at the optimal cutoff point.

and depressive disorders, possibly because the words "distress" and "impact" include both anxiety and depression in their meaning.

We calculated separate cutoff points for each of the three psychiatric problems targeted. If mental health specialists wish to intervene in all clinically distressed patients, they should use the cutoff points for detection of both adjustment disorders and major depression. When it is important not to miss any cases, the cutoff points can be changed. Because the Impact Thermometer sacrifices sensitivity to improve specificity in the Distress and Impact Thermometer, the "impact" cutoff point can be reduced to the lowest score (cutoff point of 4 for "distress" and 1 for "impact") to improve sensitivity while slightly sacrificing specificity (sensitivity 0.89, specificity 0.72). On the other hand, the cutoff point for major depression alone or major depression with suicidal ideation may be more useful if the target is more distressed patients or patients who require urgent medical treatment. Because mental disorders identified by screening require subsequent assessment and intervention, screening for more distressed patients alone may be more useful in institutions with limited mental health resources. This study provides information that would allow the cutoff point to be changed according to circumstances and the goal.

This study has several limitations. The first limitation regards psychiatric diagnosis. Although we used clinical diagnosis based on the DSM-IV as a "gold standard," clinical diagnosis is a less robust method than a structured diagnostic interview. We could not assess the interrater reliability of the DSM-IV diagnosis, and the psychiatrists were not blind to the screening results. These problems in regard to diagnosis will affect the generalizability of this study. The second limitation regards patient sampling. About 60% of the subjects were in the group referred to the psychiatrists because overt psychiatric disorders had been recognized by oncologists. The possible differences in patterns of symptoms and responses to screening tools between patients recognized and not recognized as having psychological problems may have resulted in spectrum bias. This may have falsely improved the screening performance of both the Distress Thermometer and the HADS. However, because this bias should have equally affected both the Distress and Impact Thermometer and the HADS, the comparison between the performance of the Distress and Impact Thermometer and the HADS may not have been greatly influenced. Another limitation is the small sample of patients with metastasis or recurrence. There were 121 (41%) patients with metastasis or recurrence, but most of them ($n = 89$) were in the referral group. This limitation in regard to sampling may affect generalizability of this study when this screening tool is used in patients with progressive disease. The final limitation is the psychiatric disorders included. We included only adjustment disorders and major depression, because these are common in cancer patients, and other psychiatric disorders manifested by anxiety or depression, i.e., anxiety disorders or dysthymia, could have been included.

To ensure that adjustment disorders and major depression do not remain unrecognized or untreated, all cancer patients should be routinely screened at appropriate intervals and not just when there are clinical indications of depression. The Distress and Impact Thermometer is a brief screening tool with good performance and seems to be useful for this purpose. Developing an intervention program in combination with a screening test that can be administered by the oncologist may contribute to lessening the psychological distress of cancer patients.

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