

The James Supportive Care Screening: integrating science and practice to meet the NCCN guidelines for distress management at a Comprehensive Cancer Center

Sharla Wells-Di Gregorio^{1*}, Emily K. Porensky¹, Matthew Minotti², Susan Brown³, Janet Snapp³, Robert M. Taylor⁴, Michael D. Adolph⁴, Sherman Everett⁵, Kenneth Lowther⁵, Kelly Callahan⁶, Devita Streva⁶, Vicki Heinke⁶, Debra Leno⁶, Courtney Flower⁶, Anne McVey¹ and Barbara Lee Andersen²

¹Psychiatry, Psychosocial Oncology, Arthur G. James Cancer Hospital and Richard J. Solove Research Institute, Columbus, OH, USA

²Department of Psychology, The Ohio State University, Columbus, OH, USA

³Oncology Nursing, Arthur G. James Cancer Hospital, Columbus, OH, USA

⁴Internal Medicine, Center for Palliative Care, Wexner Medical Center at The Ohio State University Columbus, OH, USA

⁵Pastoral Care, Wexner Medical Center at The Ohio State University, Columbus, OH, USA

⁶Oncology Social Work, Arthur G. James Cancer Hospital, Columbus, OH, USA

*Correspondence to:

Psychiatry, Psychosocial
Oncology, Arthur G. James
Cancer Hospital and Richard J.
Solove Research Institute,
Columbus, OH, USA. E-mail:
sharla.wells@osumc.edu

Abstract

Background: Selecting a measure for oncology distress screening can be challenging. The measure must be brief, but comprehensive, capturing patients' most distressing concerns. The measure must provide meaningful coverage of multiple domains, assess symptom and problem-related distress, and ideally be suited for both clinical and research purposes.

Methods: From March 2006 to August 2012, the James Supportive Care Screening (SCS) was developed and validated in three phases including content validation, factor analysis, and measure validation. Exploratory factor analyses were completed with 596 oncology patients followed by a confirmatory factor analysis with 477 patients.

Results: Six factors were identified and confirmed including (i) emotional concerns; (ii) physical symptoms; (iii) social/practical problems; (iv) spiritual problems; (v) cognitive concerns; and (vi) healthcare decision making/communication issues. Subscale evaluation reveals good to excellent internal consistency, test-retest reliability, and convergent, divergent, and predictive validity. Specificity of individual items was 0.90 and 0.87, respectively, for identifying patients with DSM-IV-TR diagnoses of major depression and generalized anxiety disorder.

Conclusions: Results support use of the James SCS to quickly detect the most frequent and distressing symptoms and concerns of cancer patients. The James SCS is an efficient, reliable, and valid clinical and research outcomes measure.

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Introduction

Individuals living with cancer experience many psychological, physical, social, and spiritual challenges throughout their journey [1]. Unaddressed, these challenges can disrupt cancer treatment [2] and, ultimately, negatively impact survival [3]. In order to promote screening and targeted distress interventions, screening has become a required standard of the American College of Surgeons Commission on Cancer Accreditation [4]. The National Comprehensive Cancer Network (NCCN) has also published Distress Management Guidelines [5], which identify the standard of care as regular screening of the level and nature of distress as well as management of distress according to clinical practice guidelines. One of the primary challenges in implementation of these standards is the selection of an instrument that is brief but comprehensive enough to capture the most distressing needs of cancer survivors and facilitate triage to psychosocial, spiritual, and palliative care providers. The Distress Thermometer (DT) and Problem Checklist [6] represented an early effort to balance brevity with coverage; and although the DT continues to be used, research has brought into question the validity of this method [7,8].

Distress is a multi-dimensional concept. There are a variety of standardized measures to evaluate each area of distress, but administration of multiple questionnaires can be burdensome to patients and time-consuming for staff. Many quality of life instruments include multiple domains (e.g., physical symptoms, emotional well-being, and social functioning), but were developed for research purposes, limiting their clinical utility. These instruments typically lack well-validated cut-offs to recommend clinical intervention, making scoring and interpretation burdensome for busy providers [9]. A measure is needed that reliably captures patients' most distressing concerns in both research and clinical settings.

A major consideration in screening measure selection is adequate coverage of multiple distress domains. Some instruments focus predominantly on physical symptoms [10–12] or psychological problems [13,14]. Very few focus specifically on social or spiritual distress, despite the clinical significance of these domains [2,15]. The National Consensus Project [16] identifies at least eight domains to improve quality of life including (i) structure and process; (ii) physical; (iii) psychological and psychiatric; (iv) social; (v) spiritual, religious, and existential; (vi) cultural; (viii) care of the imminently dying; and

(viii) ethical and legal aspects of care. Ideally, a screening tool would address the first five domains as well as decision making and advance care planning.

A final consideration is the response format of the measure. A yes/no response format does not enable a provider to make rapid triage decisions regarding symptom management and referral needs. Other measures assess the frequency or severity of the symptoms or problems reported by cancer survivors (European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) [17]), Functional Assessment of Cancer Therapy-General [18]). However, these response formats can be problematic as survivors experience wide variation in their tolerance for symptoms [19–21] regardless of severity or frequency. For instance, some individuals, despite high frequency and severity symptoms, continue to work or perform activities without interruption, whereas others suffer substantially from minor, low frequency symptoms. Understanding an individual's level of distress related to their symptoms and illness-related concerns is fundamental to screening, referral, assessment, and treatment.

This study describes the development and validation of the James Supportive Care Screening (SCS), a patient self-report instrument designed to capture the most common and distressing symptoms and concerns reported by cancer survivors. Our goal was to develop a brief and valid measure that would not need to be supplemented with multiple other measures or disease-specific modules and would provide adequate coverage of five domains of quality of life to be used to measure clinical and research outcomes. Furthermore, the James SCS uses a response format to elicit distress related to symptoms and concerns rather than frequency or severity. This permits ease of use by providers for treatment or referral.

Method and results

From March 2006 through August 2012, development and validation of the James SCS was completed in three phases: (i) content validation (i.e., item generation and refinement, feasibility evaluation); (ii) factor analysis (i.e., item reduction, exploratory factor analysis, and confirmatory factor analysis); and (iii) measure validation (i.e., subscale internal consistency, test–retest reliability, and construct and criterion-related validation).

Phase I – content validation

Item generation and refinement

In 2006, the James Integrated Psychosocial and Spiritual Services Taskforce was formed by the Chief Nursing Officer, chaired by the primary author (SWD). The Taskforce was composed of 37 individuals from chaplaincy, finance, guest services, mental health nursing, nursing administration, social work, palliative care, psychology, and two physician champions. Following NCCN Distress Management Guidelines, the Taskforce was assigned to (i) develop a screening instrument for the James Cancer Hospital based on available supportive

care resources and (ii) develop referral algorithms specific to our institution.

The Taskforce began by completing surveys identifying the most frequent reasons for referral to their subspecialties and the most commonly reported psychosocial and spiritual problems of their patients. Eighty-three items were generated in eight content domains: practical problems, healthcare concerns, concerns about family and friends, health behavior changes, thinking problems, emotional concerns, social concerns, and spiritual concerns. A response format similar to the distress and bother question on the Memorial Symptom Assessment Scale was selected. Patients check *yes* for items that have been a problem during the past week, including today, and check *no* for problems they are not experiencing. For problems checked *yes*, patients also indicate how much the problem has *distressed* or *bothered* them during the past week, including today (*none, mild, moderate, or severe*). This format allows teams to provide immediate treatment or targeted referral recommendations for problems rated as moderately or severely distressing. Patients are also asked, 'What is most distressing to you at this time?' to identify additional problems or concerns that were not included in the 83 original items.

Following item and response format generation, the primary author contacted 30 NCCN member institutions to assess their current distress screening implementation. At that time (2007), only 30% of institutions reported any formal screening process, just slightly higher than Jacobsen's previous findings [22]. Some institutions had discontinued screening as they had included a suicide screening item, but were not equipped to do emergent assessments. Others' efforts had not succeeded because of lack of sufficient 'buy-in'. After ensuring, our assessment process was in line with other institutions moving forward with distress screening, we proceeded with a small pilot of our measure with the James Patient and Family Advisory Panel, a group of volunteer cancer survivors and their family members who provide feedback on patient care initiatives.

Fifteen members of the Advisory Panel completed the measure and were asked for feedback. Reported completion time was 5–7 min. All felt that items adequately covered their major cancer-related concerns and that instructions were clear. No items were deleted as a result of their review. All had a favorable response to the measure with one commenting, 'I wish I had been given this earlier in my cancer journey'.

Feasibility study

In 2008, we conducted a feasibility study to determine if the James SCS could be easily completed in a busy clinical context, to examine measure reliability, and to assess patient concerns about items appearing in their electronic medical record. We administered the SCS in the Center for Palliative Care (CPC) Outpatient Clinic, where patients with a variety of cancer diagnoses are seen, approximately half with advanced disease and multiple symptoms. The CPC has an interdisciplinary team including a psychologist, social worker, chaplain, nurse, and physician to respond to patient needs. Thirty-nine

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consecutive new cancer patients referred to the CPC completed the SCS prior to their provider visit. Average completion time was 7 min. Reliability was strong ($\alpha=0.96$), and all but one patient (a university employee) were supportive of items appearing in their medical record.

Phase II – factor analysis

Item reduction and exploratory factor analysis

Participants: For the exploratory factor analysis (EFA), participants included 596 new and established oncology patients referred to the CPC between January 2010 and December 2011. Fifty-two percent were male; 48% were female. Eighty-five percent were Caucasian; 12% were Black/African American, and 3% represented other minority groups. The participants had completed an average of 13 years ($SD=2.6$) of education. The majority of the participants were married or partnered (54%); 23% were divorced or widowed. The most common cancer diagnoses were head and neck (27%), hematologic (13%), gynecologic (9%), lung (8%), breast (8%), brain (7%), and colorectal (6%). The majority of the patients had recurrent (11%) or metastatic disease (40%), but patients with local disease (21%) and those in disease remission (25%) were also represented. Eighty percent had undergone cancer-related surgery, 32% were currently receiving chemotherapy, and 10% were receiving radiation. This sample is representative of our cancer registry data, which indicate that 53% of the patients at our institution present with stage III or IV disease.

Procedures: Prior to this period (2010–2011), nine items were added to the SCS to reflect the specific needs of neuro-oncology patients (e.g., seizures, vision changes, and forgetfulness/memory). All CPC oncology patients completed the 92-item (83 original plus nine neuro-oncology items) James SCS as part of each clinic visit.

Analyses: The EFA was completed in two steps. First, we eliminated items that were either infrequently occurring (<20%) and/or had minimal average distress ratings (<1.25 where 0 = no distress and 3 = severe distress). Next, we completed an EFA using the program Comprehensive Exploratory Factor Analysis [23]. We used generalized least squares as our factor extraction method and Crawford–Ferguson quartimax as our factor rotation procedure as we expected our factors to be correlated based on our pilot study. We then eliminated additional items if they were redundant with higher loading items on the same factor or had very low loadings (<0.300) on all factors. Power and sample sizes were deemed to be adequate given the high communalities for the majority of our items and the 13:1 participant-to-variable ratio (Table 1, Communalities) [24].

Results: Sixteen items were initially eliminated: three because of low distress ratings, three because of low frequency ratings, eight because of both low frequency and low distress ratings, and two because they were likely to be identified by a physician or nurse on physical exam (i.e., urine leakage, bloating/distension). Although a scree

plot suggested 10 factors based on 10 eigenvalues above 1.0, the 10-factor and 9-factor solutions did not fit conceptually. Therefore, we compared 8-factor, 7-factor, and 6-factor models. Our 8-factor model was based on *a priori* specification of factors: (i) practical problems; (ii) health-care concerns; (iii) concerns about family and friends; (iv) health behavior changes; (v) thinking problems; (vi) emotional concerns; (vii) social concerns; and (viii) spiritual concerns. Fourteen additional items were eliminated based on redundancy, and 17 items were eliminated because of low factor loadings across the 6-factor, 7-factor, and 8-factor models.

The final item pool for EFA included 45 items. The most parsimonious model was the 6-factor model resulting in the following factor structure: (i) emotional concerns; (ii) physical symptoms; (iii) social/practical problems; (iv) spiritual problems; (v) cognitive concerns; and (vi) healthcare decision-making/communication issues. The 6-factor model explained 48% of the variance and demonstrated good fit: root mean square error of approximation = 0.064 (confidence interval = 0.061–0.067), $p < 0.001$ for test of close fit and χ^2 ($df=735$) = 2531.21, $p < 0.001$. Although the items *loss/grief*, *tingling/numbness*, *dry mouth*, *obtaining medications*, and *support* had low factor loadings, we retained these items because of the frequency and/or impact on quality of life of these symptoms/problems. The frequency and average distress ratings for those reporting each problem and factor loadings are presented in Table 1.

Confirmatory factor analysis

Participants: A confirmatory factor analysis evaluated the stability of the factor structure using data from 477 new and established CPC patients who had a second clinic visit between January 2010 and December 2011. The sample characteristics are therefore the same as the original EFA.

Procedures: Patients completed the SCS at a second clinic visit, on average, 25 days ($SD=90$) after the initial visit. We used maximum likelihood as our factor extraction method and a target matrix for our rotation method with the highest loading factors from the EFA specified.

Results: The 6-factor model again demonstrated good fit: root mean square error of approximation = 0.061 (confidence interval = 0.058–0.064), $p < 0.001$ for test of close fit and chi-square ($df=735$) = 2031.82, $p < 0.001$ and explained 48% of the variance. Four items demonstrated some instability with *diarrhea*, *constipation*, and *dry mouth* items demonstrating lower loadings on the Physical Symptoms scale (0.25, 0.25, and 0.16, respectively) and the *recent loss/grief* loading (0.26) on the social/practical problems factor.

Phase III – measure validation

We evaluated the measure's internal consistency reliability, test–retest reliability, convergent and divergent validity, and criterion-related validity.

Table 1. Factor loadings and communalities based on exploratory factor analysis

Item	% Endorsed	Average		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Communalities
		distress								
Factor 1: emotional concerns										
Uncertainty	37.6	1.50	0.928	0.006	0.120	0.002	0.005	0.101		0.849
Fears	32.6	1.55	0.923	0.051	0.043	0.004	0.012	0.068		0.817
Feeling down	39.1	1.58	0.826	0.055	0.108	0.008	0.066	0.116		0.816
(or depressed) ^a	39.4	<i>(1.64)</i>								
Worry	47.1	1.69	0.716	0.024	0.139	0.001	0.087	0.058		0.685
(or anxiety) ^a	41.8	<i>(1.68)</i>								
Crying	28.4	1.49	0.658	0.080	0.050	0.028	0.128	0.067		0.582
Fear of death/fear of dying	22.7	1.61	0.647	0.009	0.065	0.166	0.046	0.049		0.488
Anger	29.5	1.51	0.617	0.033	0.135	0.035	0.093	0.014		0.551
Loss of hope/hopelessness	14.3	1.22	0.580	0.034	0.054	0.213	0.029	0.125		0.547
Coping with change in functioning	38.9	1.59	0.539	0.209	0.067	0.019	0.097	0.016		0.574
Loss of interest in usual activities	32.0	1.63	0.529	0.235	0.070	0.070	0.120	0.042		0.615
Feeling like a burden to others	34.9	1.60	0.461	0.138	0.238	0.013	0.062	0.118		0.590
Appearance/body image concerns	31.9	1.57	0.392	0.169	0.158	0.040	0.053	0.023		0.362
Recent loss/grief	15.6	1.40	0.283	0.021	0.128	0.175	0.076	0.017		0.266
Factor 2: physical symptoms										
Nausea	31.8	1.47	0.002	0.870	0.120	0.003	0.015	0.068		0.715
Vomiting	18.6	1.34	0.001	0.749	0.032	0.012	0.129	0.006		0.516
Fatigue/lack of energy	61.9	1.85	0.040	0.581	0.039	0.069	0.266	0.053		0.589
Lack of appetite	35.7	1.50	0.215	0.565	0.057	0.061	0.043	0.027		0.468
Weakness	43.1	1.62	0.057	0.533	0.146	0.076	0.163	0.048		0.570
Hot flashes	23.2	1.54	0.042	0.512	0.104	0.014	0.094	0.087		0.323
(or night sweats) ^a	27.9	<i>(1.54)</i>								
Feeling drowsy	36.7	1.53	0.040	0.500	0.013	0.059	0.240	0.028		0.406
Weight loss	29.7	1.47	0.211	0.435	0.035	0.123	0.099	0.121		0.307
Cramping	25.7	1.63	0.061	0.425	0.042	0.146	0.058	0.070		0.272
Pain	65.6	2.23	0.134	0.397	0.166	0.022	0.001	0.034		0.295
Diarrhea	14.1	1.25	0.183	0.394	0.074	0.020	0.032	0.122		0.163
Shortness of breath	31.0	1.51	0.029	0.342	0.144	0.026	0.135	0.087		0.242
Sleep difficulty	49.0	1.87	0.177	0.332	0.210	0.018	0.129	0.123		0.361
Constipation	33.1	1.49	0.093	0.314	0.009	0.038	0.002	0.115		0.178
Tingling/numbness	42.3	1.64	0.018	0.247	0.092	0.215	0.189	0.181		0.243
Dry mouth	42.3	1.59	0.072	0.227	0.006	0.094	0.123	0.103		0.179
Factor 3: social/practical problems										
Housing problems	14.9	1.58	0.011	0.041	0.828	0.039	0.062	0.011		0.650
Concerns about my living situation	19.4	1.47	0.139	0.062	0.717	0.032	0.061	0.021		0.655
Financial problems	43.6	1.97	0.010	0.071	0.681	0.029	0.046	0.008		0.532
Insurance problems	23.5	1.69	0.105	0.075	0.635	0.056	0.034	0.132		0.447
Transportation problems	22.8	1.57	0.012	0.092	0.350	0.066	0.056	0.231		0.309
Problems obtaining medications ^b	19.0	1.59	0.142	0.025	0.297	0.022	0.089	0.354 ^b		0.324
(Lack of) support	14.4	1.37	0.125	0.034	0.278	0.260	0.041	0.181		0.396
Factor 4: spiritual concerns										
Concerns about relationship with higher being	13.8	1.32	0.071	0.022	0.023	1.025	0.000	0.010		0.990
Concerns with personal spiritual practices	11.2	1.28	0.043	0.031	0.008	0.843	0.068	0.022		0.778
Concerns about meaning/purpose of life	15.2	1.32	0.254	0.016	0.095	0.676	0.107	0.015		0.665
Factor 5: cognitive concerns										
Forgetfulness/memory problems	40.9	1.37	0.010	0.040	0.017	0.022	0.898	0.011		0.796
Difficulty concentrating	38.3	1.39	0.044	0.085	0.010	0.028	0.830	0.017		0.805
Mental confusion	24.2	1.24	0.066	0.060	0.032	0.042	0.778	0.097		0.679
Factor 6: health care decision-making/communication										
Health care decision-making concerns	15.9	1.32	0.044	0.005	0.009	0.036	0.061	0.833		0.733
Long-term healthcare planning concerns	19.8	1.55	0.042	0.088	0.182	0.068	0.123	0.565		0.529
Problems communicating with medical team	14.5	1.30	0.004	0.090	0.042	0.138	0.034	0.541		0.412

Eight items did not load on any factor, but were retained in a yes/no format with the final 45 items because of their significance for our patients and the availability of services at our institution.

^aTo reduce response burden, items in italics and parentheses were excluded from the factor analyses and are combined with the non-italicized word in a single item in the final measure

^bItem was retained on the social/practical problems factor, where it loaded in the 7-factor and 8-factor models and the confirmatory factor analysis.

Participants

The participants included the same sample ($n = 596$) as the EFA, with two exceptions. For convergent and divergent validity correlations (Table 3), only new patients who had the first appointment at the CPC between 2010 and 2011 ($n = 294$) were included, as all patients complete the additional measures described in the succeeding text at their first visit. These subsample's descriptives did not

differ significantly from the EFA sample. To evaluate test-retest reliability, we included only new patients who also had a second CPC visit between 2010 and 2011 ($n = 240$).

Procedures

As a standard component of the new patient visit, patients complete a standardized psychodiagnostic evaluation, the SCS, and the following clinic measures:

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Brief Pain Inventory

The Brief Pain Inventory (BPI) is a self-report measure that asks participants to rate the duration, severity, location, and interference of their pain with daily function [25]. We used patients' ratings of their worst pain in the past 24 h (0 = *no pain* to 10 = *as bad as you can imagine*).

Center for Epidemiologic Studies Depression Scale

The Center for Epidemiologic Studies Depression Scale [14] has been used in numerous studies with cancer patients to evaluate the level of depressive symptoms [26,27]. The 20-item measure includes a balance of cognitive, emotional, and neuro-vegetative symptoms that can help reduce false positive screenings for depression in a medically ill sample [28]. Internal consistency (Cronbach's alpha) was 0.90.

Distress Thermometer

The DT is a widely-used visual analog scale developed by the NCCN [6]. The single-item tool asks participants to rate global distress in the past week on a 0 to 10-point scale, with anchors at 0 (*no distress*) and 10 (*extreme distress*).

DSM-IV criteria for major depression and generalized anxiety

Major depressive disorder (MDD) and generalized anxiety disorder (GAD) were assessed with a structured psychodiagnostic interview conducted using Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, fourth edition criteria [29]. Interviews were conducted by a clinical psychologist, two PhD level post-doctoral fellows in psycho-oncology, and a licensed independent social worker. To address overlap of physical and psychological symptoms in advanced cancer patients, we used computer-based Endicott criteria for verifying depression diagnoses [30].

Insomnia Severity Index

Insomnia was evaluated with a sum of three items from the Insomnia Severity Index (ISI) [31]. The participants rated the severity of their (i) difficulty falling asleep; (ii) difficulties staying asleep; and (iii) problems waking up too early (*none* to *very severe*). Internal consistency for this study was $\alpha = 0.82$.

State-Trait Anxiety Inventory-State Version

The State-Trait Anxiety Inventory-State version was used to assess state anxiety [32]. Internal consistency for this study was $\alpha = 0.94$.

Results

Internal consistency and test-retest reliability: Table 2 presents subscale inter-correlations as well as internal consistency and test-retest reliability. Cronbach's alpha was acceptable to excellent for all subscales. The subscales demonstrated moderate to large intercorrelations, but were not redundant. From the initial to second visit ($M = 25$ days; $SD = 90$), full scale test-retest reliability was 0.73.

Convergent and divergent validity: Table 3 presents correlations between the James SCS and the standard clinic measures. The Emotional Concerns subscale was strongly correlated with the Center for Epidemiologic Studies Depression Scale and the STAI, demonstrating convergent validity, but weakly correlated with the ISI and the BPI, demonstrating divergent validity. The Physical Symptoms subscale was significantly correlated with each measure highlighting the broad impact of physical symptoms. However, as anticipated, pain was most strongly correlated with the BPI and was least correlated with the ISI, whereas sleep difficulties demonstrated the opposite pattern.

Table 4 presents the sensitivity and specificity of individual SCS items in identifying patients who met criteria for MDD and GAD. We utilize these items for item-based (vs subscale-based) referrals in practice, which we have found easier for busy clinical staff. For these analyses, we dichotomized SCS item distress (*none or mild* vs *moderate or severe*). For the *feeling down* item, specificity in identifying MDD was 90% for patients reporting moderate-to-severe distress, indicating that referral on the basis of this item and cut-off is likely to identify patients in need of psychological treatment for depression. The uncertainty question also demonstrated excellent specificity (87%) in identifying patients with GAD. In contrast, for the recommended cut-off score of 4 or more on the DT, specificity was just 45% for both MDD and GAD.

Criterion-related validity: We computed a hierarchical linear regression with SCS subscales entered as independent variables and DT total distress as the dependent variable (Table 5). The overall model predicting DT

Table 2. Subscale descriptives, inter-correlations, internal consistency, and test-retest reliability

Subscale	No. of items	M (SD)	Intercorrelations						Internal consistency reliability		Test-retest reliability (T1 × T2)
			1	2	3	4	5	6	T1	T2	
1. Emotional concerns	13	8.38 (8.55)	—	0.61	0.56	0.47	0.57	0.43	0.92	0.90	0.73
2. Physical symptoms	16	12.76 (8.04)	—	0.47	0.30	0.49	0.37	0.83	0.83	0.83	0.66
3. Social/practical problems	7	3.35 (4.02)	—	0.38	0.39	0.50	0.78	0.78	0.78	0.78	0.62
4. Spiritual concerns	3	0.74 (1.78)	—	0.27	0.30	0.87	0.88	0.87	0.88	0.88	0.44
5. Cognitive concerns	3	1.90 (2.20)	—	0.38	0.87	0.85	0.58	0.87	0.85	0.85	0.58
6. Healthcare decision-making/communication	3	0.90 (1.71)	—	0.70	0.70	0.36	0.70	0.70	0.70	0.70	0.36

Total SCS $M = 27.47$, $SD = 20.43$. All p 's < 0.001 for intercorrelations. Cronbach's alpha reported for internal consistency reliability. T1 = initial visit. T2 = second visit. Full-scale Cronbach's alpha = 0.93.

Table 3. Pearson correlations between validation measures and SCS subscales plus individual items

	CES-D	STAI	ISI	BPI	Correlation with DT
Emotional concerns	0.75***	0.70***	0.26*	0.24***	0.63***
Feeling down	0.71***	0.60***	0.29**	0.18*	—
Uncertainty	0.57***	0.58***	0.23*	0.08	—
Physical symptoms	0.66***	0.44***	0.44***	0.38***	0.57***
Pain	0.32***	0.26**	0.24**	0.61***	—
Sleep difficulty	0.39***	0.29***	0.65***	0.25***	—
Social/practical problems	0.43***	0.48***	0.26**	0.17**	0.46***
Spiritual concerns	0.38***	0.38***	0.19	0.08	0.32***
Cognitive concerns	0.56***	0.51***	0.33**	0.13*	0.36***
Healthcare decision-making/communication	0.29***	0.35***	0.20*	0.13	0.32***

BPI, Brief Pain Inventory; ISI, Insomnia Severity Index; JSCS, James Supportive Care Screening; DT, Distress Thermometer; STAI, State-Trait Anxiety Inventory-State Version; CES-D, Center for Epidemiologic Studies Depression.

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

Table 4. Percentages for sensitivity and specificity of SCS items

SCA item	DSM-IV MDD			DSM-IV GAD		
	Sensitivity	Specificity	Chi-square	Sensitivity	Specificity	Chi-square
Feeling down \geq moderate distress	51.2	90.1	41.0***	—	—	—
Uncertainty \geq moderate distress	—	—	—	41.4	86.9	21.1***
Distress thermometer ≥ 4	75.6	45.1	8.5**	77.3	45.4	10.8**

MDD, major depressive disorder; GAD, generalized anxiety disorder; JSCS, James Supportive Care Screening.

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

distress was significant, $F(6, 391) = 52.30$, $p < 0.001$, accounting for 46% of distress variance. Emotional concerns, physical symptoms, and social/practical problems were all significant predictors of DT ratings. Although bivariate correlations with DT ratings were statistically significant, the spiritual concerns, cognitive concerns, and healthcare decision-making/communication subscales did not contribute significantly to the model.

Discussion

The James SCS measure demonstrates excellent psychometric properties including a replicable factor structure representing six domains of quality of life, strong internal

consistency and test-retest reliability, good convergent and divergent validity, robust specificity for referrals for depression and anxiety, and good criterion-related validity. The measure represents domains consistent with the comprehensive approach to screening recommended by the Institute of Medicine [1] and, when combined with targeted referrals, would allow cancer programs to meet the NCCN screening guidelines [5], the American College of Surgeons Accreditation Standards [4], and the American Society of Clinical Oncology Quality Oncology Practice Initiative indicators for quality psychosocial care [33,34].

The six subscales represent five of the eight domains of quality of life [16]. Without screening, it is likely that many of these symptoms and problems are unassessed or unaddressed. Research has described oncology providers' difficulties in identifying patients' psychological care needs. For instance, oncologists in one study recognized the presence of severe distress in only 11 of 30 severely distressed patients [35], and another reported only 13% concordance between oncologist and patient ratings for individuals with moderate-to-severe depressive symptoms [36]. Nurses also tend to underestimate depressive symptoms [37]. A screening instrument such as the SCS should enhance the recognition, and if utilized well, response to critical areas of distress associated with cancer mortality, such as depression, anxiety, and insomnia [3,38,39].

In the past 10 years, a number of similar, comprehensive instruments have been developed for distress screening. For example, the Psychosocial Screening Instrument for Cancer [40] focuses more heavily on social support and quality of life perceptions, anxiety, and depression. A factor analysis and established cut-offs for referral have not yet been published for this measure. Other more comprehensive

Table 5. Hierarchical linear regression for James Supportive Care Screening subscales predicting NCCN distress thermometer scores

Variable	B	SE B	β	ΔR^2
Step 1				0.39**
Emotional concerns	0.22	0.01	0.62***	
Step 2				0.05***
Emotional concerns	0.14	0.02	0.47***	
Physical symptoms	0.10	0.02	0.27***	
Step 3				0.02*
Emotional concerns	0.14	0.02	0.41***	
Physical symptoms	0.09	0.02	0.24***	
Social/practical problems	0.12	0.04	0.16**	
Spiritual concerns	-0.05	0.07	-0.03	
Cognitive concerns	-0.01	0.06	-0.01	
Healthcare decision-making/communication	-0.03	0.08	-0.02	

NCCN, National Comprehensive Cancer Network.

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

measures include the Cancer Support Community's Cancer-SupportSourceSM web-based instrument (www.cancersupportcommunity.org) and the City of Hope touch-screen instrument [41], which are available for purchase. However, to date, data have not been published on the psychometric properties of these instruments. Carlson and colleagues [42] provide a thorough review of measures available to screen for distress and unmet needs. The James SCS may satisfy their recommendation to supplement 'standardized distress screening tools with needs assessment tools' by integrating distress screening into needs assessment, allowing for a more targeted approach to distress management.

The SCS is currently being utilized as a clinical and research measure in ambulatory thoracic oncology, neuro-oncology, and palliative care, and will be utilized in the future in our Survivorship Clinics. Problems or concerns rated as moderate to severe are addressed immediately in the clinic or a referral is made in collaboration with the patient. Informational resources are provided for items rated as mildly distressing. Although the subscales demonstrate adequate internal consistency, we do caution that some of the items loaded inconsistently in the factor analyses (i.e., *tingling/numbness*, *dry mouth*, and *recent loss/grief*). We have retained these items on our final measure because of their significance for patients. Although these items did not substantially reduce subscale reliability, future SCS users should be aware of these fluctuations in factor alliance. Future users should also be aware that the factor structure may change with samples with more limited symptom presentation.

The high specificity of the *feeling down* (90%) and *uncertainty* (87%) items for DSM-IV diagnosed major depression, and generalized anxiety is comparable with, if not better than, the specificity of other lengthier screening measures frequently employed in oncology settings. For example, a meta-analysis of studies using the Hospital Anxiety and Depression Scale with cancer patients reported a specificity of 81% for a diagnosis of depression. Similarly, a specificity of 81% was reported for the 9-item Patient Health Questionnaire with cancer outpatients [43]. According to our results, a DT rating of 4 or more does have good sensitivity (76%) for depression, but the specificity was only 45%, which is consistent with other studies demonstrating that patients referred for psychological services using the DT often are under-

identified [7] or do not meet diagnostic criteria for a psychological disorder [8]. This, in addition to our finding that distress is, in fact, a multi-dimensional construct representing psychological, physical and social/practical problems, highlights the importance of assessing both the level and the nature of distress as part of the screening process as recommended by the NCCN [5]. Because cancer treatment centers often have limited psychosocial services available, triaging the right patients to the right service (i.e., specificity) is essential.

The James SCS is a brief, but comprehensive measure of the most common and distressing concerns of cancer patients. The instrument is easy and efficient to use for patients and providers and can be used for both research and clinical purposes. This study utilized a large sample representing the most common types of cancer with equivalent representation of men and women. Future development of the James SCS will involve further development of the spirituality, cognitive, and healthcare decision-making/communication subscales to improve the internal consistency and test-retest reliability of these subscales. Future studies of the SCS would benefit from translations of the instrument to other languages and application to more diverse samples than is available in this Midwestern community.

With a recent focus of medical centers on becoming Accountable Care Organizations, reducing unnecessary 30-day hospital readmissions is a central focus. Implementation of a valid and reliable screening measure such as the James SCS can contribute to decreased readmissions by connecting patients with complex care needs to targeted resources. Our next step with the James SCS involves examining the impact of electronic screening and referral on patient distress-related outcomes and investigation of factors affecting the utilization of supportive care resources.

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Conflict of interest

The authors have declared that there is no conflict of interest.

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