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A chart review, pilot study of two single-item screens to detect cancer patients at risk for cachexia

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ABSTRACT

Objective: Cachexia is a problematic wasting syndrome experienced by some cancer patients that can lead to early death in these patients. The purpose of the present study was to examine the criterion validity and sensitivity and specificity of two single items from a depression scale to rapidly screen patients in ambulatory oncology clinics for cancer-related nutritional risk and cachexia.

Methods: A chart review was conducted of 50 randomly selected patient profiles. Patients' responses to item 5 ("I eat as much as I used to") and item 7 ("I notice I am losing weight") of the Zung Self Rating Depression Scale (ZSDS) were compared against the Scored Patient-Generated Subjective Global Assessment (PG-SGA) as well as to Body Mass Index (BMI) scores and weight at two time periods.

Results: Item 5 of the ZSDS was significantly related to initial weight ($F_{3,45} = 6.06$, $p < 0.001$), weight at 6-month follow-up ($F_{3,27} = 4.16$, $p < 0.05$), BMI score ($F_{3,46} = 2.89$, $p < 0.05$), and nutritional risk on the PG-SGA ($F_{3,45} = 5.80$, $p < 0.01$). Item 7 of the ZSDS was only a significant predictor of nutritional risk as measured by the PG-SGA ($F_{3,46} = 6.01$, $p < 0.01$). When the two items were combined to form a two-item scale, it maintained the individual items' significant relationship to the PG-SGA ($F_{1,48} = 13.99$, $p < 0.001$). Using this as the criterion for identifying nutritionally at-risk patients, the two-item screen yields a sensitivity of 50% and specificity of 88%.

Significance of the research: It is concluded that a single item or a combination of two items can yield a reliable initial screen for identifying patients who might be at nutritional risk for the development of cachexia. Further study is needed in prospective trials to further explore the utility of these items.

KEYWORDS: Cancer, Cachexia, Nutrition, Assessment

INTRODUCTION

It has been apparent for quite a while that cancer disrupts the lives of patients and their families (Weisman & Worden, 1976). There are many side effects, both psychological and physical, that accompany the disease and its therapy that are worrisome. Therefore, an effective and efficient screening program is invaluable for identifying at-risk patients in a triage-like fashion so that early intervention strategies can be employed before the onset of a crisis event (Zabora, 1998). Large batteries of tests and assessment instruments are simply not practical for many oncology settings, due to cost

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and time pressures. With a wide variety of issues to assess and attend to, the use of brief self-report screens are the only way such a large number of people and potential problem areas can be identified.

One of the more dangerous physical side effects faced by cancer patients is the increased potential for nutritional risk and cachexia, which is a complex syndrome typically associated with a combination of factors including decreased food intake and a variety of metabolic dysfunctions (Fearon & Moses, 2002). Indeed, this factor is one of the foremost causes of early death seen in cancer patients (Inui, 1999). Although typically associated with the advanced cancer patient, cachexia may arise in the early stages of tumor growth before there are any other signs of malignancy (Kern & Norton, 1988).

With the need to identify multiple patient difficulties with the least amount of resource depletion, there is a need for using screening instruments for multiple purposes. The idea of utilizing portions of a depression scale such as the Zung Self-Rating Depression Scale (ZSDS) for multiple purposes has been explored by our group in previous studies. For instance, we examined the criterion validity and sensitivity and specificity of a single item to rapidly screen patients in ambulatory oncology clinics for cancer-related fatigue (Kirsh et al., 2001). In an effort to expand the utility of the scale as a screen for other symptoms while simultaneously screening for depression, we were interested in examining the utility of single items, such as the fatigue item, on the scale as a separate screen. The fatigue item from the ZSDS, item 10, reads: "I get tired for no reason" and was found to be highly correlated with much longer, existing measures of fatigue.

Similarly, we tried to address the need for screening to identify the nature of what oncology patients often complain about, saying that their "mind does not seem to be clear." This subjective perception, sometimes referred to as "chemo brain," may be due to situational stressors, psychological disorders, organic factors, or effects of neurotoxic medications. Cognitive decline not only diminishes quality of life, but can also interfere with a patient's ability to make decisions regarding complex treatment issues. This study (Kibiger et al., 2003) investigated the utility of using item 11 ("My mind is as clear as it used to be") of the ZSDS as a cognitive screen. Although the results were mixed, we concluded that although the perception of cognitive impairment is common in cancer patients, there may be problems in interpreting the nature of these complaints, particularly in separating them from their depressive preoccupation.

Finally, we attempted to examine issues of criterion validity and detection of insomnia utilizing a single item from the ZSDS as a means to rapidly screen cancer patients in ambulatory oncology clinics (Passik et al., 2003). The sleep item reads "I have trouble sleeping through the night" and is rated on a 4-point Likert scale ranging from *none or little of the time* to *most or all of the time*. A sample of oncology patients was administered the ZSDS and further evaluated with the Pittsburgh Sleep Quality Index (PSQI). The sensitivity and specificity of the ZSDS sleep item was investigated utilizing various cutoffs as they predicted results of the PSQI, which were used as a criterion. Results revealed poor sensitivity and specificity of the ZSDS single-item screen for detecting insomnia in cancer patients, and that the relationship between insomnia and depression is more complicated than anticipated. We concluded that the use of this single item, or perhaps any single item, as a means of screening for sleep disturbances in cancer patients may be problematic and a better understanding of insomnia and its measurement are worthwhile areas of study.

The present study was an attempt to gather initial data to determine if two items from the Zung Self-Rating Depression Scale could be used as short screening items for detecting cachexia in cancer patients. Specifically, ZSDS item 5, "I eat as much as I used to," and item 7, "I notice I am losing weight," were chosen for the study. A random chart review was conducted of patients who had completed a variety of screening measures in our cancer network.

METHODS

Participants and Procedure

An *a priori* simplified power analysis was conducted to determine the sample size requirement for the correlational analyses of this study. Assuming an alpha of 0.05, a medium effect size (ES = r = 0.50), and a power of 0.80, 50 total subjects would be required (Cohen, 1992).

A random sample of 50 charts was drawn for review from the population of patients enrolled in 1 of 31 Community Cancer Care Inc. clinics in urban and rural areas throughout Indiana. Any patients undergoing treatment for malignancy were eligible to participate if they were able to read and write English, were over 18 years of age, and did not give evidence of cognitive impairment severe enough to preclude giving informed consent.

Instruments

Demographics

Basic demographic information was gathered on the sample including gender, height, weight, appetite levels, and nausea as well as albumin and lymphocyte levels. In addition, the BMI was calculated for each patient to assess ratios of overall body size as a marker of health risk factors (Bray & Gray, 1988).

Scored Patient-Generated Subjective Global Assessment

The PG-SGA is a combination self-report and clinician-derived scale to assess nutritional risk in patients (Ottery, 1994). It yields a total score that can be used to determine what interventions, if any, a patient may need. Scores on the lower end of the spectrum indicate better functioning and scores above 9 indicate severe nutritional risk.

Zung Self-Rating Depression Scale

The ZSDS (Zung, 1967*a*, 1967*b*) is a 20-item self-report measure of the symptoms of depression. Subjects rate each item regarding how they felt during the preceding week using a 4-point Likert scale, with 4 representing the most unfavorable response. After correcting for items that are reverse-scored, the 20 items are summed to create a total score. Scores are not meant to offer strict diagnostic guidelines but rather denote levels of depressive symptomatology that may be of clinical significance. The ZSDS has been shown to be both valid and reliable, with high internal consistency of 0.84 and test–retest reliability of 0.86 (Tate et al., 1993; Dugan et al., 1998). Gabrys and Peters (1985) reported that the ZSDS had an interrater reliability of 0.89, internal consistency reliability of 0.88 (Cronbach's alpha), mean item-total correlations of 0.85, split-half reliability of 0.94, and showed preliminary evidence of discriminant validity, significantly differentiating between nondepressed and depressed clients ($t = 30.85$, $p < 0.0001$). For purposes of this study, special attention was given to items 5 ("I eat as much as I used to") and 7 ("I notice I am losing weight") as predictors of cachexia.

Statistical Analyses

A series of descriptive statistics, chi squares, one-way ANOVAs with Bonferroni *post hoc* analyses, and sensitivity and specificity statistics were calculated. Specificity refers to a statistic designed to elucidate the number of correctly classified subjects without cachexia, via subthreshold scores on the ZSDS items 5 or 7, divided by the total number of subjects without fatigue (as measured by the PG-SGA) multiplied by 100. Thus, the statistic offers the percentage of cases wherein the ZSDS items correctly identified people who are not at nutritional risk (i.e., its ability to identify true negatives). Sensitivity refers to a statistic calculated by the number of correctly classified subjects with cachexia, via high scores on the ZSDS items, divided by the total number of true subjects with nutritional risk or cachexia (as measured by the PG-SGA) multiplied by 100. Thus, the statistic yields the percentage of cases wherein the ZSDS items correctly identified people who are cachcectic (i.e., its ability to identify true positives).

RESULTS

To protect the privacy of patients chosen for the chart review study, and due to the preliminary nature of the work, only limited demographic data were gathered by a research assistant. However, based on our prior work with this population (Dugan et al., 1998; Kirsh et al., 2001; Kibiger et al., 2003; Passik et al., 2003), we know that our patients typically fall into an average range of 59–63 years old, are married (67–70%), are largely Caucasian (~90%), and usually have breast (19–36%), lung (10–23%), or colon (10–13%) cancer. The present sample was comprised of 33 women (66%) and 17 men (34%). Average weight for the group was 165.53 lbs. ($SD = 38.63$) and average height was 65.38 in. ($SD = 3.60$). These measurements yielded an average BMI score of 27.04 ($SD = 5.38$, range = 14–48). According to the accepted BMI guidelines (Bray & Gray, 1988), this means that 4% ($n = 2$) of the sample was underweight, 36% ($n = 18$) were normal, 40% ($n = 20$) were overweight, 16% ($n = 8$) were obese, and 4% ($n = 2$) fell into the extremely obese category. Patients' charts were also examined 6 months later and weights were found to average 164.73 lbs. ($SD = 38.75$) where data was available ($n = 32$). Albumin and lymphocyte levels were also recorded. Patients had an average albumin score of 3.62 ($SD = 0.45$) and lymphocyte levels of 1.39 ($SD = 0.60$).

Patients were also routinely asked a number of questions pertaining to their health and nutrition and these responses were noted. When asked about their current eating habits, 12% ($n = 6$) reported eating very little solid food and 24% ($n = 12$) reported eating solid foods but in smaller quantities, whereas the remainder (70%, $n = 35$) reported no changes in food consumption. Twenty percent

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($n = 10$) reported having no appetite and the remainder (80%, $n = 40$) reported normal appetite. The patients were also asked about a number of symptoms that might affect their eating behaviors. Patients reported a number of symptoms including feelings of quickly becoming satiated (8%, $n = 4$), changes in perception of taste (6%, $n = 3$), dry mouth (6%, $n = 3$), nausea (4%, $n = 2$), diarrhea (4%, $n = 2$), vomiting (2%, $n = 1$), constipation (2%, $n = 1$), difficulty swallowing (2%, $n = 1$), pain (2%, $n = 1$), and mouth sores (2%, $n = 1$).

Although not the main focus of this study, the total score on the ZSDS was examined. Patients had a mean score of 32.5 ($SD = 7.24$) with a range from 22 to 52. Only two of the patients (4%) scored above the threshold for depression on the ZSDS. When examining the relationship of the ZSDS to the PG-SGA, however, there was a significant relationship ($r = 0.63$, $p < 0.01$), indicating that a greater presence of depressive symptomatology was associated with greater nutritional risk. Also, as expected, item 5 ($r = 0.62$, $p < 0.01$) and item 7 ($r = 0.58$, $p < 0.01$) were significantly related to the ZSDS as a whole.

Item 5: "I Eat as Much as I Used to."

A series of analyses were conducted to explore the utility of item 5 to identify patients with problems of cachexia. Chi square analyses were not significant between item 5 and gender or activity level, and one-way ANOVAs were not significant between the item and either albumin or lymphocyte levels. The relationship was significant, however, between item 5 and initial weight ($F_{3,45} = 6.06$, $p < 0.001$), with *post hoc* analyses indicating a significant difference between those answering "none of the time" (mean weight = 140.07 lbs.) and those answering "some of the time" (mean weight = 195.83 lbs.; mean difference = 55.77 lbs., $p < 0.05$). Similarly, item 5 was significantly related to weight at 6-month follow-up ($F_{3,27} = 4.16$, $p < 0.05$), with *post hoc* analyses showing differences remaining between the "none of the time" response (mean weight = 126.52 lbs) and those answering "some of the time" (mean weight = 186.46 lbs.; mean difference = 59.94, $p < 0.05$). Item 5 was also predictive of BMI score ($F_{3,46} = 2.89$, $p < 0.05$) and nutritional risk on the PG-SGA ($F_{3,45} = 5.80$, $p < 0.01$). *Post hoc* analyses indicated differences in the PG-SGA between the "none of the time" response (mean PG-SGA = 4.2) and the "most of the time" response (mean PF-SGA = 0.74; mean difference = 3.46, $p < 0.05$). Using item 5 as a screen yields a sensitivity of 33% and specificity of 97%.

Item 7: "I Notice I Am Losing Weight."

The same group of analyses was repeated to examine the utility of item 7 for identifying patients with cachexia. Chi square analyses were not significant between item 7 and gender or overall activity level. Likewise, a series of one-way ANOVAs were not significant between item 7 and initial weight, weight at 6 months follow-up, BMI, albumin levels, or lymphocyte levels. However, item 7 was a significant predictor of nutritional risk as measured by the PG-SGA ($F_{3,46} = 6.01$, $p < 0.01$). Subsequent *post hoc* analyses identified the significant difference occurring between those reporting "a good part of the time" (mean PG-SGA = 5.75) and those reporting "none of the time" (mean PG-SGA = 1.36) to item 7 (mean difference = 4.39, $p < 0.05$). Using item 7 as a screen yields a sensitivity of 40% and specificity of 81%.

Combination of Items

It was also of interest to determine if the two items could be combined to create a short 2-item screen. For purposes of exploration, scores of 2–5 were chosen as indicating no problems whereas scores of 6–8 (indicating a "good part of the time" or more on both items) were deemed to indicate cachexia or nutritional risk. According to this scale, we would predict eight of the patients (16%) to have cachexia and the remainder to be normal (84%, $n = 42$). Using this scale, chi square analyses found no relationships to gender, and ANOVAs were not related to weight, albumin, or lymphocytes. The two-item scale, however, maintained the individual items' significant relationship to the PG-SGA ($F_{1,48} = 13.99$, $p < 0.001$). Using this as the criterion for identifying nutritionally at-risk patients, the two-item screen yields a sensitivity of 50% and specificity of 88%.

DISCUSSION

Developing quick and useful screens for identifying patients at nutritional risk for developing cachexia is an important and worthwhile endeavor. We conducted a promising, albeit preliminary, chart review study that offers some evidence that developing just such a quick screening tool is feasible. This offers the possibility of identifying a larger number of patients at risk, and at the very least will help to create more attention and awareness around this compelling aspect of symptom management. It is our hope that further studies will help to solidify the use of single- or even two-item screens that can be easily implemented into even the busiest of clinics.

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Our results indicated that item 5 of the ZSDS ("I eat as much as I used to") was significantly related to a large number of variables associated with nutritional risk and cachexia, including scores on the PG-SGA, BMI, and weight at both time periods measured. Item 7 ("I notice I am losing weight") was less robust overall but added to the overall value of the predictive power of examining the nutritional risk factors assessed by the PG-SGA when combined with item 5. Therefore, it may offer some unique information and can perhaps help to identify a larger cohort of patients at risk. However, it must also be noted that although the combined items' specificity was rather impressive, overall sensitivity was somewhat poor.

Certainly, the present study is not without its limitations. Chart reviews must be carefully examined and conclusions must always be of a tentative nature due to the possibility of errors or omissions in charting. In addition, the sample is drawn from a Midwestern sample that may not be indicative of cachexia and weight issues in cancer patients across the nation at large. It must be noted that the BMI scores placed 60% of the sample in the overweight, obese, or extremely obese categories. Finally, although adequate for this purpose, studies with larger sample sizes and of a prospective nature are needed to either replicate or refute these findings.

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