Depression and quality of life in cancer patients undergoing chemotherapy: relation between the Zung Self-Rating Depression Scale and Functional Assessment of Cancer Therapy-General

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Objective: Although depression is prevalent among cancer patients, it remains underdiagnosed and undertreated. Quality of life is an important outcome in cancer patients and can be measured by questionnaires such as the Functional Assessment of Cancer Therapy-General version (FACT-G). The purpose of our study was to establish whether or not a group of items in FACT-G could be used as a screening tool for depression as well as for assessing quality of life.

Methods: A total of 62 chemotherapy patients (median age, 62 years [range, 22-81 years]; 55% women) completed Zung Self-Rating Depression Scale (ZSDS) and FACT-G questionnaires. Patients with ZSDS scores of 40 or more underwent clinical interviews for major depression. Pearson's correlation was used to examine the relationship between the ZSDS and FACT-G scores. FACT-G score results were then analyzed to evaluate if subsets of the FACT-G can be used as a screening tool for major depression.

Results: In all, 30 of 62 patients (48%) had ZSDS scores < 40 and were ruled out for major depression, and 30 of the 32 patients with ZSDS scores ≥ 40 participated clinical interviews. Of those who were interviewed, 7 patients (23%) were confirmed to have major depression. Overall, the prevalence of major depression was 7 of 60 patients (12%; 95% CI: 5%-23%). The ZSDS and FACT-G scores had strong correlation ($r = -0.75$). The composite score of six statements in FACT-G were found to have sensitivity of 100% and specificity of 81% in predicting major depression, using a cut-off value of 12 (range, 0-24). The six statements were, I have a lack of energy; I feel sad; I feel nervous; I am able to enjoy life; I am sleeping well; and I am enjoying the things I usually do for fun.

Conclusions: The prevalence of major depression among all participants was 12%. The ZSDS score and FACT-G score had strong correlation; the subsets of FACT-G may be useful as a screening tool for depression.

Depression is a common symptom in cancer patients, often because of the psychological impact of having a life-threatening illness and the side effects of the treatments.[1-3] Many patients manifest transient depressive symptoms during the course of their illness, and some will develop a more prolonged depressive syndrome that will affect their physical, emotional, and social functioning.[4] Depression may hamper the patient's decision making and treatment efficacy, impede recovery, and even increase the risk of mortality,[5-6] which is why efficient and effective screening for depression among cancer patients is essential for improving quality of life and other outcomes of cancer treatment.

The reported incidence of major depression in people with cancer has been estimated at between 3% and 50% depending on disease site, stage, and the assessment methods that are used;[7-10] the estimated overall prevalence is about 20%.[11] Despite the high incidence of depressive symptoms in cancer patients, the iden-

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tification of depression remains a significant clinical and methodological challenge in community-based oncology practices.[12] Time constraints, stoicism on the part of patients, and lack of familiarity with proper depression assessment on the part of staff lead to a high rate of underrecognition of depression in this population and therefore undertreatment of the condition. Findings from several studies have shown that both medical oncologists and oncology nurses can greatly underestimate the severity of depressive symptoms in their patients.[13-16]

The high prevalence and infrequent recognition of depression supports the need for validated screening measures in this population. Investigations of the use of the single-item interview[17] and the single-item, self-report questionnaire (Distress Thermometer[18]) in cancer patients have demonstrated the possibility of identifying clinical depressive disorders in an efficient manner. Self-reporting will also continue to play a different screening role in the evaluation of possible depression. Self-report measures provide gross assessments when direct interviews are not feasible. They can quantify the severity of depressive symptomatology, better assist in monitoring change over time, and can be used in large numbers of patients. Oncologists and oncology nurses can use initial self-report results as a starting point for discussions about depression and psychological distress.[4]

The Zung Self-Rating Depression Scale (ZSDS) is a screening tool for identification of depressed cancer patients.[4] It is a 20-item, self-report questionnaire that takes about 10 minutes to complete. Patients use a 4-point Likert scale to rate each item based on how they felt during the preceding week, with 1 representing the most positive response and 4, the least positive. The sum of the 20 items, after correcting for the 10 items that are reverse-scored, produces a raw score that is converted into a self-rating depression score. Scores on the test range from 20 through 80 (20-49 = normal range; 50-59 = mildly depressed; 60-69 = moderately depressed; and ≥ 70 = severely depressed). A previous study reported the scale as having a sensitivity of 100% and specificity of 56%, using the cut-off of 40.[12]

Functional Assessment of Cancer Therapy-General (FACT-G) is a 33-item, self-administered questionnaire covering the quality-of-life domains of physical, social and family, emotional, and functional well-being.[19] The items are rated on a 5-point Likert scale for how true each statement has been for the patient in the previous 7 days (0 = not at all true, 4 = very true). After accounting for reverse-scored items, questions are summed across the four subscales and added for a total score, with higher scores indicative of greater overall quality of life. The instrument has been shown to be easy to use, brief, reliable, and valid.[20]

A few studies have examined the correlation between the scores of quality-of-life and depression questionnaires.[21-23] In one study, researchers administered the Hospital Anxiety and Depression Scale (HADS) and European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30, version 3.0) to 120 patients with advanced cancer and found significant associations between emotional functioning on EORTC QLQ-C30 and HADS-D (depression; $r = -0.553$; $P < .0005$).[23]

Some questions that have been raised about the relationship between ZSDS and FACT-G have not been adequately addressed. For example, to what extent does the FACT-G assess depression? Does ZSDS add to any information on depression compared with that gained by administering the FACT-G? In a practice in which the FACT-G is used to assess and monitor quality of life in cancer patients, it would be useful to know whether the questionnaire can be used as a screening tool for depression. In that context, the aims of this study were to: investigate the prevalence of major depression in our practice's population of outpatients receiving chemotherapy; determine the correlation between the ZSRD and FACT-G scores, and examine whether the FACT-G can be used as a screening tool for major depression in addition to its intended use for quality-of-life assessment.

Methods

Patients

All of the patients in this study were treated at the Albert Einstein Medical Center, a community-based teaching hospital in Philadelphia, Pennsylvania. They were randomly selected from cancer patients who received chemotherapy at the center between March 2005 and May 2006, based on the following inclusion criteria: histologically confirmed malignancy, older than 18 years of age, and ability to communicate with health-care professionals. Patients were excluded if there was a significant cognitive impairment or if they failed to complete both questionnaires. Informed consent was obtained. This study was approved by the center's internal review board.

Measures

Depression. To screen for depression, we used the ZSDS, a 20-item, self-administered questionnaire. For each item, the patient had to assign a score between 1 and 4, resulting in a total score of between 20 and 80. Higher scores indicated more severe depression. As already noted in this paper, previous findings have shown that the sensitivity of the ZSDS for major

depression was 100%, using cut-off value of 40. Therefore, we ruled out major depression if a patient scored less than 40.

To confirm the diagnosis of major depression, we used the Mini-International Neuropsychiatric Interview (MINI), a brief, structured diagnostic interview designed as an alternative to the Semi-Structured Clinical Interview for DSM-IV Disorders (SCID) and the Composite International Diagnostic Interview (CIDI). The MINI contains a core set of diagnostic questions and focuses only on the time frames that are useful in making decisions in clinical settings. We used the clinician-rated version that assesses major depressive episodes in this study.[24]

As a criterion standard for major depression, we used DSM-IV, which requires at least five of the following nine symptoms: depressed mood, loss of interest/pleasure, change in sleep, change in appetite or weight, change in psychomotor activity, loss of energy, trouble concentrating, thoughts of worthlessness or guilt, and thoughts about death or suicide.

Quality of life. FACT-G is 33-item, self-administered questionnaire to assess the quality of life. Each item receives a score between 0 to 4, resulting in a total score of between 0 and 132. Higher scores indicate a better quality of life. The FACT-G includes six items related to emotional well-being domain—I feel sad; I am satisfied with how I am coping with my illness; I am losing hope in the fight against my illness; I feel nervous; I worry about dying; and I worry that my condition will get worse. It also has several items that might assess the symptoms of major depression such as, I have a lack of energy; I am sleeping well, I am able to enjoy life; and I am enjoying the things I usually do for fun.

Procedures. Patients who were undergoing chemotherapy at our cancer center were invited to participate in the study. After we received their informed consent, they completed the ZSDS and FACT-G questionnaires during the same visit. Patients with ZSDS scores of 40 or more underwent clinical interviews during a subsequent visit with a physician who used the MINI to evaluate for major depression.

Statistical analysis. A series of descriptive statistics, Pearson correlations, and sensitivity and specificity statistics were performed. We calculated the prevalence of major depression in our study population. The association between the FACT-G score and ZSDS score were evaluated by Pearson correlations. We analyzed FACT-G score results to evaluate if single item or composite of items from the FACT-G could be used as a screening tool for major depression by assessing its sensitivity and specificity for major depression. The data were analyzed using STATA software (Version 9. College Station, TX: StataCorp, 2005].

TABLE 1 Demographic and cancer-related characteristics of population (N = 62)

	n (%)
Age, years	
< 39	6 (10)
40–49	5 (8)
50–59	16 (26)
60–69	15 (24)
≥70	20 (32)
Sex	
Men	34 (55)
Women	28 (45)
Ethinicity	
African American	41 (66)
White, non-hispanic	17 (27)
Hispanic	3 (5)
Asian	1 (2)
Cancer type	
Lung	13 (21)
Breast	12 (19)
Colorectal	9 (15)
Lymphoma	6 (10)
Ovarian	4 (6)
Liver	3 (5)
Other	15 (24)

Results

In all, 65 patients signed the informed consent. Of those patients, 3 were excluded because they did not complete the FACT-G or ZSDS, leaving a total of 62 patients who were included in this analysis. The median age of the patients was 62 years (range, 22-81 years), 34 patients (55%) were women, and 41 (66%) were African American (Table 1). Lung cancer was most common type of cancer, followed by breast cancer, colon cancer, and lymphoma. A total of 11 patients had a history of depression, of whom 7 were taking an antidepressant at the time of the study.

Of the 62 patients, 30 had a ZSDS score of less than 40 and they were ruled out for major depression. Among the 32 patients with a ZSDS score of 40 or more, 30 participated the MINI, and 7 were confirmed as having major depression. The prevalence of major depression overall, therefore was 7 patients of a total of 60, or 12% (95% CI: 5%-23%). Among 11 patients with a history of depression, only 1 was found to have major depression and was on an antidepressant at the time of this study. Six patients were newly diagnosed with major depression, and

the primary oncologists for these patients were notified of the diagnosis.

The median ZSDS score was 40 (range, 21-61), and the median FACT-G score was 75 (range, 42-105). The ZSDS and FACT-G scores had strong negative correlation (r = -0.75; $P < .0001$), which meant that patients with higher ZSDS scores had lower FACT-G scores (Figure 1).

In our study, the sensitivity and specificity of ZSDS using a cut-off of 40 were 100% and 57%, respectively, which was similar to the previously cited study.[12] We performed serial analysis to find whether the single-item or the composite of items in FACT-G can be used to screen depression. First, we evaluated the score on each FACT-G item between patients with depression and without depression. We identified six items that were differentially scored between two groups: I have a lack of energy; I feel sad; I feel nervous; I am able to enjoy life; I am sleeping well; and I am enjoying the things I usually do for fun. The sum of the scores on these six items (6-item, composite score) was found to have a sensitivity of 100% and a specificity of 81% in predicting major depression, using a cut-off value of 12 (range, 0-24).

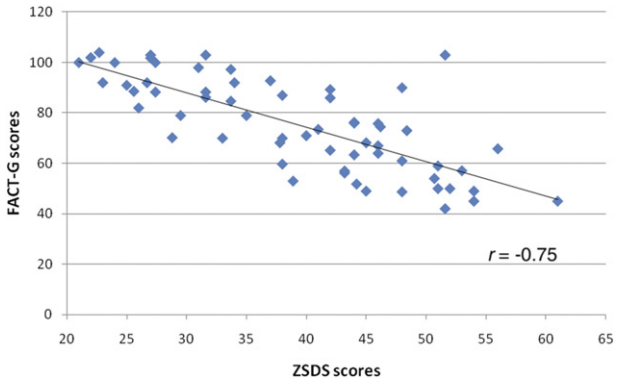

FIGURE 1 The relationship between ZSDS scores and FACT-G scores. The median ZSDS score was 40 (range, 21-61), and the median FACT-G score was 75 (range, 42-105). The ZSDS and FACT-G scores had strong negative correlation ($r = -0.75$; $P < .0001$), which meant that patients with higher ZSDS scores had lower FACT-G scores.

Discussion

The prevalence of major depression among the patients in this study was 12%, which is consistent with other studies.[11] Sharpe et al. reported and 8% prevalence of major depression among 5,613 outpatients using the HADS as a screening tool and the SCID as a confirmatory test.[25] That study population was slightly different from our study population. Only 31% of patients were receiving active treatment for their cancers, which might explain the lower prevalence of major depression relative to our study. In our study, two patients with ZSDS scores of 40 or more did not undergo clinical interviews; therefore, we had to exclude them when we estimated the prevalence of major depression. If those two patients had allowed clinical interviews and were found to have major depression, the prevalence of major depression in our population would have been higher than 12%.

We found that 10 of 11 patients who reported a history of depression did not have major depression at the time of our study. Among the seven patients who were taking antidepressants, only one met the criteria for major depression, suggesting that treatment of the other six was successful.

As far as we know, this is the first study to examine the relationship between the ZSDS scores and the FACT-G scores. It was found that the ZSDS scores and the FACT-G scores had a strong negative correlation, which was also shown in other studies examining the relationship between HADS-D and EORTC-QLQ30.[23] The most likely explanation for this finding is the negative impact of depression on quality of life among cancer patients, which was shown in multiple studies.[26-28]

We investigated the extent to which the FACT-G could assess the depression. In addition to the six questions in the emotional well-being domain, there were four additional questions—two in the physical well-being domain, two in the functional well-being domain—which may help assess depression. After serial analyses, we found that the 6-item composite score had 100% sensitivity and 81% specificity for major depression.

Our study had several limitations. First, we included a relatively small number of patients with a range of cancer types. Second, we could make any causal conclusion between depression and quality of life from our study because it was a cross-sectional correlation study. Third, to confirm the diagnosis of major depression we used MINI, which is brief and efficient. However, there are other semistructured clinical interviews that might offer more detail, and therefore, yield greater accuracy of diagnosis.

Despite these limitations, our study showed that there is strong correlation between the ZSDS scores and the FACT-G scores, and the six items in the FACT-G may be useful as a screening tool for depression in addition to quality-of-life assessment although this needs to be confirmed in a larger study.

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