Somatic Symptoms in Patients With Cancer Experiencing Pain or Depression

Prevalence, Disability, and Health Care Use

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Background: The adverse impact of a high somatic symptom burden is well established for primary care and other noncancer populations with chronic medical disorders.

Methods: This study examines the impact of somatic symptom burden on disability and health care use in patients with cancer experiencing pain, depression, or both. We performed secondary analyses of baseline data from 405 patients with cancer enrolled in a telecare management trial for pain or depression. Somatic symptom burden was measured using a 22-item scale. Multivariable models were conducted to determine the association of somatic symptom burden with the Sheehan Disability Scale (SDS) score, the number of self-reported disability days in the past 3 months, and health care use. Models were adjusted for sociodemographic characteristics, medical comorbidity, and depression and pain severity.

Results: Somatic symptoms were highly prevalent, with 15 of the 22 symptoms reported by more than 50% of patients. The somatic symptom burden was similar across different types and phases of cancer. The mean SDS score (scored 0-10 [not at all disabled to unable to carry out any activities]) was 5.4, and the mean number of self-reported disability days in the past 4 weeks was 16.9. In multivariable models, somatic symptom burden was associated with SDS score (P < .001) and the likelihood of at least 14 disability days in the past 4 weeks (odds ratio, 1.51; 95% confidence interval, 1.19-1.92) but not with increased health care use.

Conclusions: The somatic symptom burden is high in patients with cancer who experience pain or depression. Given the strong association with disability and the high prevalence of many types of symptoms, recognizing and managing somatic symptoms may be important in improving quality of life and functional status regardless of type or phase of cancer.

Trial Registration: clinicaltrials.gov Identifier: NCT00313573

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SOMATIC SYMPTOMS HAVE BEEN the subject of numerous studies in the general population and in primary care and specialty clinic settings. Somatic symptoms account for more than half of all general medical visits, lack a definitive medical explanation one-third to half of the time, and are frequently persistent. Physical and psychological factors seem to contribute to somatic symptom reporting, even in patients with chronic medical disorders. These symptoms are associated with substantial functional impairment, disability, and health care use, even after controlling for medical and psychiatric comorbidity. Studies of symptom prevalence in cancer have often focused on patients with advanced cancer or with selected types of cancer seen at tertiary care centers. A literature synthesis of 44 studies involving more than 25 000 patients showed that symptoms manifest in at least 30% of patients with cancer include fatigue (74%), pain (71%), weakness (60%), appetite loss (53%), dry mouth (40%), depressed mood (39%), constipation (37%), insomnia (36%), dyspnea (35%), nausea (31%), and anxiety (30%). Somatic symptoms can have a substantial effect on functional status, quality of life, and even the desire for a hastened death. Somatization (the relationship between psychological distress and somatic symptom reporting) has been the focus of only a few small cancer studies. This is an important gap given that numerous studies in noncancer medical populations demonstrate a high prevalence of poorly or partially explained symptoms, even among symptoms considered to be more disease specific.

The purpose of this study was to examine somatic symptom prevalence, dis-
ability, and health care use in patients with cancer using baseline data from the Indiana Cancer Pain and Depression (INCPAD) trial. In contrast to previous studies, the INCPAD trial drew participants from multiple community-based oncology practices and included a wide range of types and phases of cancer. Although all INCPAD patients had pain, depression, or both, standardized assessment of pain, anxiety, depression, and medical comorbidity facilitated adjustment for these potential confounders. Hypotheses for the secondary analyses in this article are as follows: (1) Somatic symptoms are prevalent in patients with cancer who present with pain, depression, or both. (2) The somatic symptom burden in patients with cancer is associated with greater disability, even after controlling for pain, anxiety, depression, and other relevant covariates. (3) The somatic symptom burden in patients with cancer is associated with greater health care use, even after controlling for pain, anxiety, depression, and other relevant covariates.

**METHODS**

**SETTING AND SAMPLE**

The present study uses baseline data from patients enrolled in the INCPAD trial, which is described in detail elsewhere. Briefly, participants were recruited from 16 oncology outpatient sites throughout urban and rural areas of Indiana to test the effectiveness of telecare management vs usual care for the treatment of depression or cancer-related pain. Between March 1, 2006, and August 31, 2008, patients presenting to oncology practices on selected days were screened for INCPAD study inclusion. Patients were potentially eligible if they had depression or pain of at least moderate severity (ie, a Patient Health Questionnaire [PHQ] 8-item depression scale score of ≥10), or worst pain in the past week of ≥6 on a 0-10 [none to severe] scale. In addition, pain had to be cancer related and persistent despite the use of at least 1 analgesic.

Patients were excluded if they (1) did not speak English, (2) had moderately severe cognitive impairment, (3) had schizophrenia or other psychosis, (4) had a disability claim currently being adjudicated for pain, (5) had depression directly precipitated by a cancer therapy for which depression is a well-known adverse effect (eg, interferon or corticosteroids) and in whom short treatment duration and tolerable depression severity justify withholding antidepressant therapy; (6) were pregnant, or (7) were in hospice care.

**MEASURES**

The primary independent variable is the number and severity of somatic symptoms as measured using a 22-item somatic symptom burden scale. This scale consists of 14 symptoms from the PHQ-15 somatic scale (all items except sexual dysfunction) plus 8 symptoms from the Memorial Symptom Assessment Scale and the M.D. Anderson Symptom Inventory. The PHQ-15 and the M.D. Anderson Symptom Inventory have been shown to have good internal reliability (Cronbach α = .80 and .82, respectively), as did the composite 22-item scale used in this study (Cronbach α = .76). Respondents are asked to rate on a scale from 0 to 2 the degree to which each symptom has bothered them in the past 4 weeks (from “not bothered at all” to “bothered a little” to “bothered a lot”). Increasing scores on this 0- to 44-point scale can reflect a greater number or greater severity of symptoms; thus, higher scores reflect a greater somatic symptom burden.

The dependent variables are disability and health care use. Disability was assessed using 2 measures. One was the 3-item Sheehan Disability Scale (SDS), which asks respondents to what extent on a scale from 0 to 10 their health has interfered with their work, family life, and social life in the past month. The SDS score is the mean of the 3 items, and higher scores reflect greater disability. Previous research has shown high correlations among the 3 items of the SDS, resulting in strong internal reliability consistency in previous research (Cronbach α = .89) and in our own sample (α = .82), as well as good construct validity and responsiveness.

A second measure was the number of days in the past 4 weeks that respondents reported they either had to stay in bed or reduce their usual activities by at least 50% due to physical health or emotional problems. Health care use was assessed by asking study participants about their use of 3 types of health care in the 90 days preceding study enrollment: outpatient visits, hospital days, emergency department (ED) visits, mental health visits, and visits to a complementary and alternative medicine provider.

The principal covariates were pain and depression. Pain severity was measured using the 4-item Brief Pain Inventory (BPI) severity scale (Cronbach α = .79). Respondents rated their average, worst, least, and current pain in the past week on a scale from 0 (“no pain”) to 10 (“pain as bad as you can imagine”), and the mean of the 4 items was determined, with higher scores reflecting more severe pain. Depression severity was assessed using the 20-item Hopkins Symptom Checklist (HSCL-20) depression scale (α = .89). Respondents rated how much they were distressed in the past month by each of the items on a scale from 0 (“not at all”) to 4 (“extremely”), and the mean of the 20 items was determined, with higher scores reflecting more severe depression.

Several additional covariates were used in the analyses. Anxiety was assessed using the 7-item Generalized Anxiety Disorder (GAD-7) scale (α = .86), a validated scale that assesses anxiety severity and the likelihood of the 4 most common clinical anxiety disorders: generalized anxiety disorder, panic disorder, social anxiety disorder, and posttraumatic stress disorder. Respondents are asked to indicate how often in the past 2 weeks they had been bothered by each symptom on a scale from 0 (“not at all”) to 3 (“nearly every day”). The individual GAD-7 item scores are summed, and higher scores on this 0 to 21 scale indicate greater anxiety. Medical comorbidity was assessed using a checklist of 8 common categories of medical disorders: heart disease, pulmonary disease, diabetes mellitus, hypertension, neurologic conditions, arthritis, liver disease, and renal disease. Sociodemographic variables included age, sex, race, education, employment, and income. The socioeconomic disadvantage index assigns 1 point each for low education (less than high school), unemployment, and low income (“not enough to make ends meet”). Higher scores on this 0 to 3 scale represent worse socioeconomic conditions. Cancer type and phase were abstracted from oncology records. Cancer phase was categorized as newly diagnosed, maintenance therapy only, disease free, recurrent cancer, and progressive cancer.

**STATISTICAL ANALYSIS**

Scoring of the somatic symptom burden scale was described in the “Measures” subsection. The other measures (PHQ-8, SDS, BPI, HSCL-20, GAD-7, and disability days) were scored by algorithms recommended by the developers. Because items were infrequently missing (<5% on all scales), a missing item was assigned a score of 0. Also, because this article used baseline data obtained by direct interview of all 405 participants, all bivariate analyses and multivariable models included data from 403 to 405 participants.
For hypothesis 1, we reported prevalence rates (including 95% confidence intervals [CIs]) for each of the 22 somatic symptoms. We also assessed bivariate associations of the somatic symptom burden score with sociodemographic characteristics, type and phase of cancer, depression, anxiety, and measures of disability and health care use to identify potential confounders and adjust for them in multivariable models (hypotheses 2 and 3). Variables that were significant in bivariate relationships at $P > 0.20$ were not entered into subsequent multivariable modeling.

For hypothesis 2, multiple linear regression analysis was used to test associations of somatic symptom burden, pain, depression, and other covariates with the SDS score. Similarly, we used logistic regression analysis to test associations of these variables with the number of self-reported disability days. Herein, disability days were dichotomized as 14 days or more (coded as 1) versus less than or equal to 14 days (coded as 0) in the past 4 weeks. For hypothesis 3, multivariable logistic regression models were used to evaluate associations of somatic symptom burden, pain, depression, and other covariates with ED visits (any vs none) and mental health care visits (any vs none).

For the 3 continuous variables in the final models, we report variable estimates or odds ratios (ORs) in terms of meaningful units of change, including 10 years for age, 0.5 U for HSCL-20 depression score (possible range, 0-4), 1 U for BPI pain severity score (possible range, 0-10), 5 U for GAD-7 anxiety score (possible range, 0-21), and 5 U for somatic symptom score (possible range, 0-44). The unit changes used for the 4 scale scores were derived from previous research.34,42,44,47 Data analysis was performed using a software program (SAS version 9.1.2; SAS Institute Inc, Cary, North Carolina).

### RESULTS

#### STUDY SAMPLE

The 405 study participants had a mean age of 58.8 years (age range, 23-96 years); 79.5% were white, 67.9% were women, and 49.1% were married. The mean number of comorbid medical diseases was 2.1. Educational level varied, with 21.5% having less than a high school education, 39.5% having only a high school education, and 39.0% having college credits or a college degree. The most frequently reported employment status was being unable to work due to disability (43.6%), followed by retired (29.0%), employed (20.0%), and other (7.4%). Income was reported as making just enough to make ends meet (47.6%), not comfortable (27.5%), or being comfortable (24.8%). There were 96 participants (23.7%) with pain only, 131 (32.3%) with depression only, and 178 (44.0%) with pain and depression. For the total sample, the mean HSCL-20 depression severity score (possible range, 0-4 [least to worst]) was 1.5, and the mean BPI pain severity score (possible range, 0-10 [least to worst]) was 4.7, both representing mild to moderate levels of symptom severity.32 The type of cancer was breast in 118 participants (29.1%), lung in 81 (20.0%), gastrointestinal in 70 (17.3%), lymphoma or hematologic in 53 (13.1%), genitourinary in 41 (10.1%), and other in 42 (10.4%). The phase of cancer was new onset in 150 (37.0%), maintenance or disease free in 172 (42.9%), and recurrent or progressive in 83 (20.5%).

Participants had a mean (SD) somatic symptom burden score (possible range, 0-44 [least to worst]) of 18.3 (6.6), with a median of 18, an interquartile range (25th-75th percentile) of 14 to 23, and a 90th percentile score of 27. They had a mean (SD) PHQ-14 subscale score (possible range, 0-28 [least to worst]) of 12.2 (4.3), with a median of 12, an interquartile range of 9 to 15, and a 90th percentile score of 18. These PHQ-14 scores are indicative of a moderate somatic symptom burden in noncancer medical populations.34

The mean SDS score (possible range, 0-10 [least to worst]) was 5.4, and the mean number of self-reported disability days in the past 4 weeks was 16.9, including 5.7 bed days and 11.2 days where there was a 50% or greater reduction in usual activities. Thus, participants reported 60% of their past 28 days as full or partial disability days. The number of participants who reported 14 or more disability days in the past 4 weeks was 238 (58.8%).

Self-reported health care use in the 3 months preceding study enrollment was high. The proportion of patients who reported 3 to 5, 6 to 10, and more than 10 outpatient visits was 32%, 28%, and 26%, respectively. More than one-third of the patients (38%) reported at least 1 hospitalization, and the proportion of the entire sample reporting 3 to 5, 6 to 10, and more than 10 hospital days was 10%, 12%, and 8%, respectively. An ED visit was reported by 33% of the patients ($n=134$), with 17% reporting 2 or more ED visits. A mental health visit was reported by 18% of the patients ($n=72$), with 12% reporting 2 more such visits. Finally, few patients (4.7%) reported any visits to a complementary and alternative medicine provider.

#### PREVALENCE OF INDIVIDUAL SOMATIC SYMPTOMS

Somatic symptoms were prevalent in all patients with cancer presenting with pain, depression, or both (Table 1). Almost all the patients reported feeling tired (97.5%), and most were bothered a lot by this symptom (78.8%). The 5 most commonly reported symptoms were feeling tired (fatigue), difficulty sleeping, pain in the limbs or joints, back pain, and difficulty remembering things. Of the 22 symptoms inquired about, 15 were reported by more than 50% of patients, and 14 were reported as very bothersome by at least 20% of patients. We also examined the proportion of patients reporting a symptom as very bothersome (ie, they felt that they were “bothered a lot” by the symptom). For example, 319 of the 395 individuals (80.8%) reporting fatigue felt that they were bothered a lot by fatigue, whereas only 82 (20.8%) of the 229 individuals reporting headaches were bothered a lot by their headaches. Excluding the 2 symptoms infrequently endorsed (menstrual problems and fainting spells), patients were most likely to rate fatigue, sleep complaints, pain in the limbs or back, and dry mouth as very bothersome (>60% of patients reporting these symptoms felt that they were bothered a lot) and least likely to rate headaches, dizziness, nausea, vomiting, palpitations and chest pain as very bothersome (<40% of patients reporting these symptoms felt that they were bothered a lot).
BIVARIATE CORRELATES OF SOMATIC SYMPTOM BURDEN

The somatic symptom burden was associated with education, employment status, income, and an ED or mental health visit in the past 3 months but not with sex, race, or marital status (Table 2). Regarding continuous variables, the somatic symptom burden was strongly correlated with HSCL-20 depression severity (0.61) and GAD-7 anxiety severity (0.50), moderately correlated with the SDS score (0.45) and self-reported disability days (0.38), and weakly correlated with medical comorbidity (0.22) and age (−0.17). All these correlations were significant at P < .001. The somatic symptom burden was not significantly correlated with either outpatient visits (0.05) or hospital days (0.06) in the past 3 months.

Mean (SD) somatic symptom burden scores by cancer type and phase are given in Table 3. There were no significant differences by cancer type (P = .22) or cancer phase (P = .28), indicating a similar somatic symptom burden across different types and phases of cancer.

SOMATIC SYMPTOM BURDEN AND DISABILITY

Table 4 provides multivariable regression results for disability. For every 5-U increase in somatic symptom burden, the SDS score increased (worsened) by 0.42 points. Depression was the only other significant predictor: for every 0.5-U increase in depression (on the 0 to 4 HSCL-20 scale), the SDS score increased (worsened) by 0.90 points. These changes in SDS score (which has an SD of 2.86) associated with somatic symptom burden and depression in the multivariable model are equivalent to effect sizes (ie, change divided by the SD) of 0.15 and 0.31, respectively. Effect sizes of 0.2 and 0.5 are commonly considered small and moderate changes in health status. An effect size of 0.2 would correspond to an SDS change of 0.75, which, in turn, would be approximately a 9-point change on the somatic symptom burden scale.

Disability days were also independently associated with somatic symptom burden and depression. For every 5-U increase in somatic symptom burden, the probability of having at least 14 disability days in the past 28 days increased by 50% (OR, 1.51; 95% CI, 1.19-1.92). The only other significant variable was depression: for every 0.5-U increase in HSCL-20 depression scores, the probability of having at least 14 disability days increased by 60% (OR, 1.60; 95% CI, 1.24-2.07).

SOMATIC SYMPTOM BURDEN AND HEALTH CARE USE

Because bivariate analyses showed no association of somatic symptom burden with outpatient visits or hospital days, multivariable modeling was conducted only for ED and mental health visits (too few patients reported complementary and alternative medicine visits to model this variable). One or more ED visits in the past 3 months were reported by 134 participants (33.1%), and 1 or more mental health visits were reported by 72 (17.8%). Multivariable logistic regression models entering the same independent variables given in Table 4 showed that only greater socioeconomic disadvantage was associated with a higher likelihood of ED visits (OR, 1.55; 95% CI, 1.20-1.99) and that only race (black/other vs white: 1.90; 1.01-3.50) was associated with mental health visits (OR, 2.26; 95% CI, 1.13-4.53).

Table 1. Somatic Symptom Prevalence and Severity in 405 Patients With Cancer and Comorbid Pain, Depression, or Both

<table>
<thead>
<tr>
<th>Somatic Symptom</th>
<th>Patient-Reported Symptom</th>
<th>Bothered a Little</th>
<th>Bothered a Lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling tired or having low energy</td>
<td>395 (97.5) 96.0-99.0</td>
<td>76 (18.8) 15.0-22.6</td>
<td>319 (78.8) 74.8-82.8</td>
</tr>
<tr>
<td>Trouble falling or staying asleep</td>
<td>319 (78.8) 74.8-82.8</td>
<td>91 (22.5) 18.4-26.5</td>
<td>228 (56.3) 51.5-61.1</td>
</tr>
<tr>
<td>Pain in arms, legs, or joints</td>
<td>316 (78.0) 74.0-82.1</td>
<td>85 (21.0) 17.0-25.0</td>
<td>231 (57.0) 52.2-61.9</td>
</tr>
<tr>
<td>Back pain</td>
<td>303 (74.8) 70.6-79.0</td>
<td>111 (27.4) 23.1-31.8</td>
<td>192 (47.4) 42.6-52.3</td>
</tr>
<tr>
<td>Problems with remembering things</td>
<td>292 (72.1) 67.7-76.5</td>
<td>152 (37.5) 32.8-42.3</td>
<td>140 (34.6) 29.9-39.2</td>
</tr>
<tr>
<td>Having a dry mouth</td>
<td>283 (69.9) 65.4-74.4</td>
<td>105 (25.9) 21.7-30.2</td>
<td>178 (44.0) 39.1-48.8</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>262 (64.7) 60.0-68.3</td>
<td>129 (31.9) 27.3-36.4</td>
<td>133 (32.8) 28.3-37.4</td>
</tr>
<tr>
<td>Gas or indigestion</td>
<td>246 (60.7) 56.0-65.5</td>
<td>130 (32.1) 27.6-36.7</td>
<td>116 (28.6) 24.2-33.0</td>
</tr>
<tr>
<td>Feeling drowsy or sleeping too much</td>
<td>246 (60.7) 56.0-65.5</td>
<td>113 (27.9) 23.5-32.3</td>
<td>133 (32.8) 28.3-37.4</td>
</tr>
<tr>
<td>Numbness or tingling</td>
<td>242 (59.8) 55.0-64.5</td>
<td>123 (30.4) 25.9-34.9</td>
<td>119 (29.4) 24.9-33.8</td>
</tr>
<tr>
<td>Lack of appetite</td>
<td>229 (56.5) 51.7-61.4</td>
<td>106 (26.2) 21.9-30.5</td>
<td>123 (30.4) 25.9-34.9</td>
</tr>
<tr>
<td>Headaches</td>
<td>229 (56.5) 51.7-61.4</td>
<td>147 (36.3) 31.6-41.0</td>
<td>82 (20.2) 16.3-24.2</td>
</tr>
<tr>
<td>Dizziness</td>
<td>225 (55.6) 50.7-60.4</td>
<td>159 (39.3) 34.5-44.0</td>
<td>66 (16.3) 12.7-19.9</td>
</tr>
<tr>
<td>Stomach pain</td>
<td>221 (54.6) 49.7-59.4</td>
<td>124 (30.6) 26.1-35.1</td>
<td>97 (24.0) 19.8-28.1</td>
</tr>
<tr>
<td>Nausea</td>
<td>208 (51.4) 46.5-56.2</td>
<td>133 (32.8) 28.3-37.4</td>
<td>75 (18.5) 14.7-22.3</td>
</tr>
<tr>
<td>Constipation</td>
<td>192 (47.4) 42.6-52.3</td>
<td>96 (23.7) 19.6-27.8</td>
<td>96 (23.7) 19.6-27.8</td>
</tr>
<tr>
<td>Feeling your heart pound or race</td>
<td>182 (44.9) 40.1-49.8</td>
<td>132 (32.6) 28.0-37.2</td>
<td>50 (12.3) 9.2-15.6</td>
</tr>
<tr>
<td>Diarrhea or loose bowels</td>
<td>175 (43.2) 38.4-48.0</td>
<td>99 (24.4) 20.3-28.6</td>
<td>76 (18.8) 15.0-22.6</td>
</tr>
<tr>
<td>Chest pain</td>
<td>138 (34.1) 29.5-38.7</td>
<td>89 (22.0) 18.0-26.0</td>
<td>49 (12.1) 8.9-15.3</td>
</tr>
<tr>
<td>Vomiting</td>
<td>108 (26.7) 22.4-31.0</td>
<td>75 (18.5) 14.7-22.3</td>
<td>33 (8.1) 5.5-10.8</td>
</tr>
<tr>
<td>Menstrual cramps or problems</td>
<td>16 (5.9) 4.4-9.4</td>
<td>19 (4.7) 2.6-6.8</td>
<td>9 (2.2) 0.8-3.7</td>
</tr>
</tbody>
</table>

Abbreviation: CI, confidence interval.

Menstrual symptoms were asked about only in women 50 years and younger (n=168).
expression, or both. Pain and depression are 2 of the most common and potentially treatable symptoms in patients with cancer. Pain is present in 14% to 100% of patients with cancer, depending on the setting, and the prevalence of major depressive disorder is 10% to 25%, with a similar range for clinically depressive symptoms. However, the reporting of most somatic symptoms is increased in the presence of depression. Thus, somatic symptom burden is likely to be higher in the present study sample than in a general cancer population not selected specifically for the presence of pain or depression.

An important question is whether this study was adequately powered to detect significant associations. We examined bivariate associations between somatic symptom burden and other variables to limit the number of variables entered into the models. As a result, we modeled 2 measures of health care use that were associated with somatic symptom burden in bivariate analyses and 2 distinct measures of disability. Bivariate screening also limited the number of independent variables entered into the models to 10. Because approximately 10 events for each independent variable in a multivariable model are typically desired, this would correspond to 100 events for these models. Three of the 4 models had a binary outcome, and the number of patients with at least 14 disability days was 238, at least 1 ED visit was 134, or at least 1 mental health visit was 72. Thus, a 10:1 independent variable to outcome event ratio was achieved for 2 of these 3 models. Finally, somatic symptom burden was significantly associated with disability but not with the 2 measures of health care use that we modeled. However, in the health care use models, the absolute differences in mean somatic symptom burden between ED users and nonusers (19.8 vs 17.6 on the 44-point scale) and between mental health users and nonusers (20.3 vs 17.9) were small. Thus, the relationship between somatic symptom burden and health care use in this sample seemed to be clinically and statistically insignificant.

The prevalence of symptoms was high: 15 of the 22 symptoms assessed were reported at rates greater than 50%, and 14 of the symptoms were each reported as very bothersome by more than 20% of patients. The fact that fatigue, sleep concerns, memory impairment, and musculoskeletal pain were the most common symptoms may be partly due to the fact all of the patients were enrolled for pain or depression: the first 3 symptoms are core criteria in diagnosing depression, and musculoskeletal pain accounts for more than two-thirds of pain concerns in clinical and population samples. However, these symptoms have also proved to be among the most common in previous studies of symptom prevalence in patients with cancer. Also, many symptoms that are neither pain concerns nor core criteria for depressive disorders were common in this sample.

In addition to symptom prevalence being high, a substantial percentage of patients noted that they were bothered a lot by their symptoms, regardless of type of symptom. In a palliative care study, more than half of the somatic symptoms were rated as moderate to severe, yet two-thirds of severe symptoms were not volunteered by patients but rather were identified by systematic assessment. In the present study, the proportion of symptoms
rated as severe was higher for some symptoms than for others. When patients report multiple symptoms, the assessment of severity coupled with patient preferences and concerns are important considerations in making treatment decisions.

The somatic symptom burden was similar not only across various types of cancer but also across different phases of cancer. Why did patients with cancer who were disease free or simply undergoing maintenance therapy report similar levels of somatic symptoms as those with newly diagnosed cancer or recurrent or progressive cancer? One important reason is that the patients in this study already had pain, depression, or both, factors themselves associated with a high somatic symptom burden. Also, in contrast to patients with cancer undergoing active treatment, those who are disease free or doing well on maintenance therapy but who are still willing to enroll in a clinical trial may be more likely to be a selected group with long-term symptoms or problems.

The study patients experienced substantial disability, reporting almost 17 of the past 28 days (60.7%) as either bed days or days in which they had to reduce their usual activities by at least 50%. The somatic symptom burden was associated with a disability scale score and the number of self-reported disability days. Moreover, somatic symptoms had an independent effect on disability even after adjusting for depression and pain severity, sociodemographic characteristics, and medical comorbidity. Indeed, multivariable models revealed that certain factors, such as age, medical comorbidity, and adverse socioeconomic disadvantage, were not associated with disability when controlling for somatic symptom burden and depression. The strong association between the number and severity of somatic symptoms and functional impairment is well estab-

### Table 3. Mean (SD) Somatic Symptom Burden Scores by Type and Phase of Cancer

<table>
<thead>
<tr>
<th>Type of Cancer</th>
<th>Newly Diagnosed</th>
<th>Disease Free or Maintenance Therapy</th>
<th>Recurrent or Progressive</th>
<th>All Phases a</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast (n=32)</td>
<td>17.81 (6.62)</td>
<td>18.24 (6.91)</td>
<td>17.63 (7.40)</td>
<td>18.03 (6.86)</td>
</tr>
<tr>
<td>Lung (n=52)</td>
<td>17.65 (6.81)</td>
<td>(n=19)</td>
<td>16.40 (5.40)</td>
<td>14.89 (6.56)</td>
</tr>
<tr>
<td>Gastrointestinal (n=27)</td>
<td>18.15 (5.52)</td>
<td>(n=21)</td>
<td>20.23 (4.71)</td>
<td>18.20 (5.69)</td>
</tr>
<tr>
<td>Lymphoma/hematologic (n=10)</td>
<td>15.90 (7.39)</td>
<td>(n=32)</td>
<td>17.28 (5.70)</td>
<td>18.43 (7.17)</td>
</tr>
<tr>
<td>Genitourinary (n=15)</td>
<td>19.00 (5.83)</td>
<td>(n=11)</td>
<td>13.33 (5.99)</td>
<td>16.59 (6.83)</td>
</tr>
<tr>
<td>Other (n=14)</td>
<td>24.29 (7.06)</td>
<td>(n=22)</td>
<td>16.67 (3.20)</td>
<td>20.33 (6.29)</td>
</tr>
<tr>
<td>All types a</td>
<td>18.41 (6.72)</td>
<td>(N=150)</td>
<td>18.68 (6.70)</td>
<td>17.29 (6.18)</td>
</tr>
</tbody>
</table>

*There were no significant differences in mean somatic symptom burden scores by type (P = .22) or phase (P = .28) of cancer. For these statistical comparisons, phases were pooled to compare mean symptom burden scores across cancer types, and cancer types were pooled to compare mean symptom burden scores across phases of cancer.

### Table 4. Multivariable Correlates of Disability in Patients With Cancer and Comorbid Pain, Depression, or Both a

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sheehan Disability Scale</th>
<th>&gt;14 Disability Days in the Past 4 wk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β Value</td>
<td>t Value</td>
</tr>
<tr>
<td>Categorical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (female vs male)</td>
<td>-0.21</td>
<td>-0.80</td>
</tr>
<tr>
<td>Black/others vs white race</td>
<td>0.46</td>
<td>1.49</td>
</tr>
<tr>
<td>Marital status (married vs other)</td>
<td>-0.04</td>
<td>-0.15</td>
</tr>
<tr>
<td>Continuous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression: HSCL-20 score, per 0.5 U on 0-4 scale</td>
<td>0.90 b</td>
<td>6.99</td>
</tr>
<tr>
<td>Somatic symptom score, per 5 U on 0-44 scale</td>
<td>0.42 b</td>
<td>3.48</td>
</tr>
<tr>
<td>Age, per 10 y</td>
<td>0.19</td>
<td>1.53</td>
</tr>
<tr>
<td>Socioeconomic disadvantage index, per 1 U on 0-3 scale</td>
<td>0.20</td>
<td>1.49</td>
</tr>
<tr>
<td>Pain severity: BPI score, per 1 U on 0-10 scale</td>
<td>0.07</td>
<td>1.33</td>
</tr>
<tr>
<td>Medical comorbidity, per 1 U on 0-9 scale</td>
<td>-0.01</td>
<td>-0.07</td>
</tr>
<tr>
<td>Anxiety: GAD-7 scale score, per 5 U on 0-21 scale</td>
<td>-0.11</td>
<td>-0.77</td>
</tr>
</tbody>
</table>

Abbreviations: BPI, Brief Pain Inventory; CI, confidence interval; GAD-7, 7-item Generalized Anxiety Disorder; HSCL-20, 20-item Hopkins Symptom Checklist.

a Multiple linear regression for the Sheehan Disability Scale: P < .001, R² = 0.33. Multiple logistic regression for disability days (>14 vs <14 days in the past 4 weeks): χ² = 96.31, P < .001, R² = 0.21.

b P < .001.
lished in primary care patients and other populations with chronic medical disorders.5,34

In contrast to its association with disability, somatic symptom burden was not associated with health care use. This differs from some studies5,7,55,56 in which patients with a high somatic symptom burden use a disproportionate amount of health care services. One reason for a lack of association in the present study may be that baseline health care use was already high in this sample: 80% of patients had cancer under active treatment, either newly diagnosed or recurrent/progressive. In unselected primary care populations where many patients have low annual visit rates, the subgroup with multiple somatic symptoms may distinguish itself by higher health care use. Also, somatic symptom burden might be related to excess health care use in a different sample of patients with cancer, for example, a sample in which more patients are disease free or undergoing maintenance therapy only or in which fewer patients experience pain or depression. However, neither pain severity nor depression was associated with health care use in the multivariable models.

Two other types of research regarding somatic symptoms should be mentioned in the context of this study. The first is the extensive literature on somatization. Whereas somatization has traditionally referred to the reporting of multiple somatic symptoms that lack an adequate medical explanation and are related instead to psychological factors, recent research suggests that an interaction between medical and psychological factors (rather than an “either/or” dichotomy) contributes to the experiencing and reporting of somatic symptoms.2,37,58 Indeed, even symptoms considered to be disease specific (eg, chest pain in cardiac disease, dyspnea in pulmonary disorders, and pain in arthritis) may be accounted for as much by comorbid depression and anxiety as by the physiologic severity of the underlying medical disorder.6 Similarly, an interplay of medical and psychological factors has been found for symptoms reported by patients with other chronic medical disorders.3,34

A second type of research relevant to this study is that of symptom clusters in patients with cancer. A symptom cluster is typically defined as 2 or more concurrent symptoms.59,60 The present study findings indicate that patients with cancer pain or depression were experiencing multiple additional symptoms, or symptom clusters. Analytic strategies, such as factor analysis and cluster analysis, have been used to define which symptoms commonly co-occur in patients with cancer.60,62 We did not apply such analytic strategies to these data for 2 reasons. First, this study sample was unique in that patients had to report pain or depression, and almost half reported both symptoms at study enrollment. Second, this study sample was otherwise heterogeneous for cancer type and phase and symptoms. Because the particular symptoms being experienced were likely to vary by cancer type or phase (eg, acute treatment effects vs late effects), it is likely that we would have found multiple different symptom clusters, each with their own set of specific symptoms.

This study has several limitations. First, the associations between somatic symptom burden and disability cannot yet be assumed to be causal owing to the cross-sectional nature of the analyses. Conceptually, however, it makes sense that at least part of the directionality is a higher somatic symptom burden producing greater disability rather than the converse (ie, disability exclusively leading to higher symptom reporting). Alternatively, an unmeasured confounder could explain some of the associations. Second, we enrolled patients with a wide range of cancer types and phases, which increases the generalizability of the findings but also decreases our ability to draw firm conclusions about any one type or phase of cancer. Further studies of somatic symptoms in larger numbers of patients with single types or phases of cancer will be useful to verify, amplify, or modify these findings. Third, all the patients in this sample had pain, depression, or both, which could have inflated somatic symptom prevalence and disability. However, previous studies11,14,15,18,19 in less selected cancer populations have also documented a high prevalence of somatic symptoms. Moreover, somatic symptom burden remained associated with disability in the multivariable models even after controlling for depression and pain severity. Fourth, all the measures, including disability, were self-reported. Although other studies document the functional and work consequences of cancer, these findings would be further substantiated by independent measures of disability.

This study strengthens the case for improving the recognition and treatment of somatic symptoms in patients with cancer. If only 1 or a few symptoms predominate, symptom-specific evaluation and treatments may be warranted, understanding that evidence-based treatments are better established for some symptoms (eg, pain, depression, and nausea/vomiting) than for others (eg, fatigue, dry mouth, dizziness, and cognitive concerns). If symptoms are more numerous, persistent, or less amenable to specific treatments, more general strategies should be considered as well, such as treating comorbid depression and anxiety, assessing the patient’s precancer history of symptom reporting and somatization, identifying health-related anxiety and concerns, and considering nonpharmacologic interventions, such as cognitive behavior therapy, exercise, symptom self-management, and other behavioral treatments.63-68 One might also need to be careful of repeated evaluations for cancer-related or occult causes of persistent symptoms, particularly in stable, disease-free patients and in patients with multiple symptoms, persistent symptoms with recent negative workups, or a history suggesting somatization or somatoform disorders preceding their cancer diagnosis. In summary, the high prevalence of these symptoms coupled with their comorbid disability and adverse effect on qual-
ity of life makes optimized management well aligned with the Institute of Medicine report on improving the cancer care of the whole patient.69

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Author Contributions: Drs Kroenke and Tu and Mr Wu had full access to all of the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Kroenke, Theobald, Tu, and Carpenter. Acquisition of data: Kroenke and Theobald. Analysis and interpretation of data: Kroenke, Zhong, Wu, Tu, and Carpenter. Drafting of the manuscript: Kroenke, Zhong, and Carpenter. Critical revision of the manuscript for important intellectual content: Kroenke, Theobald, Wu, Tu, and Carpenter. Statistical analysis: Wu and Tu. Obtained funding: Kroenke. Administrative, technical, and material support: Kroenke, Zhong, Theobald, and Carpenter. Study supervision: Theobald and Tu.

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REFERENCES


