Somatization Increases Medical Utilization and Costs Independent of Psychiatric and Medical Comorbidity

Arthur J. Barsky, MD; E. John Orav, PhD; David W. Bates, MD

Context: Somatoform disorders are an important determinant of medical care utilization, but their independent effect on utilization is difficult to determine because somatizing patients frequently have psychiatric and medical comorbidity.

Objectives: To assess the extent of the overlap of somatization with other psychiatric disorders; to compare the medical utilization of somatizing and nonsomatizing patients; and to determine the independent contribution of somatization alone to utilization.

Design: Patients were surveyed with self-report questionnaires assessing somatization and psychiatric disorder. Medical care utilization was obtained from automated encounter data for the year preceding the index visit. Medical morbidity was indexed with a computerized medical record audit.

Setting: Two hospital-affiliated primary care practices.

Participants: Consecutive adults making scheduled visits to their primary care physicians on randomly chosen days. In all, 2668 questionnaires were distributed, and 1914 (71.7%) were returned. Of these, 1546 (80.8%) contained complete data and met eligibility criteria.

Main Outcome Measures: Medical care utilization and costs within our hospital system in the preceding 12 months.

Results: Two hundred ninety-nine patients (20.5%) received a provisional diagnosis of somatization; 42.3% of these patients had no comorbid depressive or anxiety disorder. Somatizing patients, when compared with nonsomatizing patients, had more primary care visits (mean [SE], 4.90 [0.32] vs 3.43 [0.11]; P<.001); more specialty visits (mean [SE], 8.13 [0.59] vs 4.90 [0.21]; P<.001); more emergency department visits (mean [SE], 1.29 [0.15] vs 0.52 [0.036]; P<.001); more hospital admissions (mean [SE], 0.32 [0.051] vs 0.13 [0.014]; P<.001); higher inpatient costs (mean [SE], $3146 [$380] vs $991 [$193]; P<.001); and higher outpatient costs (mean [SE], $3208 [$180] vs $1771 [$91]; P<.001). When these results were adjusted for the presence of comorbid anxiety and depressive disorders, major medical morbidity, and sociodemographic characteristics, patients with somatoform disorder still had more primary care visits (P=.04), more specialist visits (P=.002), more emergency department visits (P<.001), more hospital admissions (P<.001), more ambulatory procedures (P<.001), higher inpatient costs (P<.001), and higher outpatient costs (P<.001). When these findings are extrapolated to the national level, an estimated $236 billion a year in medical care costs are attributable to the incremental effect of somatization alone.

Conclusions: Patients with somatization had approximately twice the outpatient and inpatient medical care utilization and twice the annual medical care costs of nonsomatizing patients. Adjusting the findings for the presence of psychiatric and medical comorbidity had relatively little effect on this association.

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distressed and disabled. Convinced that they are physically ill, somatizing patients characteristically deny any psychosocial influences on their symptoms, resist psychiatric referral, remain unassuaged after receiving normal medical evaluation results, and are often refractory to palliative and supportive medical management.

These patients’ symptoms are far from trivial or minor, however; they result in considerable distress, disability, and dysfunction. Severely somatizing patients have comparable or greater impairment of physical function, worse mental health, and poorer perceived general health than patients with many chronic medical illnesses. Thus, they have high levels of role impairment, have elevated rates of sick leave and restricted activity days, and higher rates of unemployment. Perhaps most surprisingly, medically unexplained symptoms are also more chronic and more refractory to treatment than many symptoms with a demonstrable, organic basis.

Somatization is commonly associated with several psychiatric disorders and may also be difficult to differentiate from concurrent medical illness. Depressive and anxiety disorders are the most common psychiatric conditions found in somatizing patients, though a considerable (but unknown) fraction of somatizers does not have a comorbid psychiatric disorder. Since the extent of this overlap is uncertain, the unique contribution made by somatization to the variance in medical utilization remains unknown. Medical morbidity represents a second potential confound in the association between somatization and medical utilization, since somatization may occur in patients with demonstrable medical disease and some of the somatic symptoms thought to reflect somatization may actually be caused by a medical condition.

This leads to 2 questions: To what extent does somatization occur in the absence of concurrent psychiatric or medical disorder? And to what extent does somatization itself drive medical utilization, independent of and apart from any accompanying psychiatric or medical disorder? This study had 3 objectives: to determine the degree of independence or overlap between somatization and psychiatric disorder and between somatization and major medical morbidity; to compare the medical utilization of somatizing patients with that of nonsomatizers; and to estimate the unique contribution made by somatization to medical utilization.

### METHODS

Consecutive patients attending primary care practices at the Brigham and Women’s Hospital (Boston, Mass) on randomly chosen days completed self-report questionnaires assessing somatization, health-related anxiety, and psychiatric disorder. One third of them also completed a measure of role impairment. Utilization within our hospital system for 12 months prior to the index visit was obtained from the automated medical record, which was also used to extract a global rating of each patient’s aggregate medical morbidity. The study was conducted between July 31, 2000, and June 1, 2002. It was approved by the Brigham and Women’s Hospital Human Research Committee, and all patients gave their signed informed consent. They received $10 for participating.

### SETTING AND SUBJECTS

The study was conducted in 2 primary care practices. One is located within the Brigham and Women’s Hospital, is staffed primarily by house officers, and serves a predominantly inner-city population. The other is a suburban, outpatient satellite staffed primarily by attending physicians and serving a predominantly middle-class population.

All English-speaking patients older than 18 years who had been a patient in that same practice for at least 1 year were eligible. Patients were excluded if they were intoxicated or cognitively unable to complete the questionnaires.

### VARIABLES AND THEIR MEASUREMENT

#### Somatization

Somatization was assessed with 1 categorical and 1 dimensional instrument: the somatiform disorder module of the Patient Health Questionnaire (PHQ) and the Somatic Symptom Inventory (SSI). The PHQ somatiform disorder module is a self-report instrument composed of 15 somatic symptoms, including 10 of the diagnostic symptoms of DSM-IV somatization disorder. The PHQ-15 somatic symptoms are rated 0 (“not bothered”), 1 (“bothered a little”), or 2 (“bothered a lot”) and are scored using a diagnostic algorithm. The PHQ-15 has high internal reliability and convergent and discriminant validity.

To make a definitive diagnosis of a somatoform disorder, a medical evaluation must be performed to determine whether an adequate medical explanation exists for every symptom the patient endorses. Since we omitted this medical evaluation, we were not able to distinguish definitively between medically explained symptoms and somatiform (medically unexplained) symptoms. However, total self-reported PHQ somatic symptom counts have been shown to be highly associated with physician-rated somatoform disorder symptom counts. Therefore, the PHQ symptom count in this study can only be characterized as indicative of a provisional diagnosis of a somatoform disorder. Thus, in this article, patients referred to as somatizers are those with a high likelihood of being formally diagnosed with a somatoform disorder.

The dimensional measure of somatization was the SSI. This questionnaire is composed of 13 symptoms common to both the hypochondriasis subscale of the Minnesota Multiphasic Personality Inventory and the somatization subscale of the Hopkins Symptom Checklist—90. The test-retest reliability, internal consistency, and convergent and external validity of the SSI have been established. The SSI is highly associated with the number of medically unexplained symptoms in the patient’s medical record, physician ratings of patient somatization, and the diagnosis of somatization disorder. Its bivariate correlation with the PHQ somatic symptom count is 0.74. However, like the PHQ, the SSI is a self-report measure and, hence, without an independent medical examination, the possible medical basis of each self-reported symptom cannot be definitively ruled out.

#### Anxiety and Depressive Disorders

Anxiety and depressive disorders were assessed with the PHQ, which contains self-report modules covering the 8 DSM-IV dis-
orders most commonly encountered in primary care practice. In this study, we assessed major depression, subthreshold depressive disorder, panic disorder, and other anxiety disorder. The PHQ provides provisional diagnoses only since it is entirely self-administered and definitive diagnosis requires a structured patient interview. However, the validity of these provisional diagnoses is comparable with that of the physician-administered PRIME-MD (Primary Care Evaluation of Mental Disorders) interview, and the PHQ has been shown to have acceptable criterion and construct validity.50

Role Impairment

The Functional Status Questionnaire is a valid and reliable self-report instrument developed for use in ambulatory medical populations.61,62 We used the 9 items composing the intermediate activities of daily living subscale (eg, doing errands, visiting with friends and relatives, participating in community activities, and working around the house). The Functional Status Questionnaire is scored by computer and provides ratings from 1 to 100 (maximum functional ability).

Medical Morbidity

The Charlson Comorbidity Index was used to assess serious medical comorbidity.63 This valid and reliable measure was developed empirically to index medical conditions that singly or in combination increase the short-term risk of mortality.64,65 Using International Classification of Diseases, 10th Revision (ICD-10) diagnostic codes, a Charlson weight (from 1 to 6) is assigned to each of 17 serious medical diagnoses in the patient’s medical record, and these are then summed to derive a total score reflecting aggregate medical morbidity.

Utilization of Medical Care

Utilization for the 12 months preceding the index visit was obtained from the hospital’s computerized administrative database, which provided all patient service dates, type and location, physician identity, and costs. Outcome measures included primary care visits, specialty visits, mental health visits, emergency department visits, major ambulatory procedures, inpatient admissions, and total inpatient and outpatient costs.

DATA ANALYSIS

Participants and nonparticipant controls were compared on demographic, clinical, cost, and utilization measures using Wilcoxon rank sum tests for continuous measures, χ² tests for multivariate categorical measures (race and marital status), and Fisher exact tests for binary measures. The same measures were used to compare patients who met criteria for somatoform disorder with those who did not, using the same statistical tests. The Wilcoxon test was chosen for continuous measures such as costs and visit counts because of their nonnormal distributions. However, for interpretability, continuous measures were still summarized with means. Medians were not used because the median was zero for many measures (eg, emergency department visits). The independent effect of somatoform disorder on each of our utilization end points was analyzed using linear regression models with utilization or cost as the end point and a binary marker for somatoform disorder as the primary predictor. Initial models were adjusted only for medical comorbidities using Charlson Comorbidity Index scores. Final models were adjusted simultaneously for Charlson Comorbidity Index scores, psychiatric comorbidities, and demographic descriptors. To ensure as complete adjustment as possible for confounders, no stepwise selection or other model-building processes were used. Although our results may therefore be conservative because of colinearity between somatoform disorder and the other covariates in the model, we relied on the power from our large sample size to distinguish the effect of somatoform disorder, as well as justify the inference for linear regression with nonnormal outcomes.

In all, 2668 questionnaires were distributed and 1914 (71.7%) were returned. Of these, 1546 (80.8%) provided complete data, 164 (8.6%) were from ineligible patients, 77 (4.0%) were duplicates, and 127 (6.6%) were incomplete. To assess possible sampling bias, we compared the study population with a random sample of 205 patients drawn from among all other patients attending the same practices on the same days. The study sample did not differ significantly from this random sample of nonparticipants in sociodemographic characteristics, medical morbidity, utilization, or costs, except that the study sample contained fewer Hispanic individuals (14% vs 22%; P = .02) and had fewer primary care visits in the preceding year (mean [SD], 3.8 [4.4] vs 4.3 [4.1]; P = .02).

In the 12 months preceding the index visit, the entire study sample averaged 0.17 (SD, 0.59) hospital admissions; 0.062 (SD, 0.32) outpatient procedures; 0.68 (SD, 1.6) emergency department visits; 0.30 (SD, 2.1) mental health visits; 3.73 (SD, 4.3) primary care visits; and 5.56 (SD, 7.9) specialist visits. The mean (SD) inpatient costs for the entire sample were $1434 ($6625), and outpatient costs were $2066 ($3162).

In the following analyses, somatizing was defined categorically as the presence or absence of a provisional diagnosis of a somatoform disorder, using the PHQ. The same analyses were performed using the SSI score as a continuous measure of somatization, and the findings did not differ to any meaningful degree in any domain. Overall, 299 patients (20.5%) received a provisional PHQ diagnosis of somatoform disorder. These patients were less likely to be married and more likely to be female, less educated, and belong to a racial or ethnic minority (Table 1). Somatizing patients were also sicker medically and had greater impairment of role function than nonsomatizing patients (Table 2).

An analysis of psychiatric comorbidity (Table 3) showed that slightly less than one third of patients with a somatoform disorder had comorbid major depression and an additional one sixth had subthreshold depression; 18.8% had panic disorder. These rates are 3 to 7 times those of nonsomatizers. Of the somatizing patients 42.3% had neither depressive nor anxiety disorder. The extent of overlap among major depression, panic disorder, and somatization is depicted in Figure 1.

The medical care utilization of these groups is presented in Figure 2 and Figure 3. Somatizing patients with comorbid anxiety or depressive disorder had generally higher utilization than patients with anxiety and/or depressive disorder alone (unaccompanied by somatization). These differences assume statistical significance for hospital admissions (P < .001), emergency department visits (P = .20), inpatient costs (P < .001), and outpatient costs (P < .001). Not surprisingly, patients with

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both somatization and comorbid psychiatric disorder had generally higher utilization rates, except for procedures, emergency department visits, and primary care visits.

Table 4 describes their medical utilization further. Column 1 presents the unadjusted comparison of patients with and without somatization. The former had 2 to 3 times as many hospitalizations, major outpatient procedures, and emergency department visits per year as those without somatization. They also averaged 1.5 times as many primary care visits and 1.7 times as many specialist visits as nonsomatizers. Their total annual medical care costs were $6354 as opposed to $2762 for nonsomatizers. Because the symptoms of somatization could result

### Table 1. Sociodemographic Characteristics*

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Somatization (n = 299 [21%])</th>
<th>No Somatization (n = 1157 [79%])</th>
<th>P  Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y, mean (SD)</td>
<td>44.1 (16.0)</td>
<td>46.2 (16.7)</td>
<td>.053</td>
</tr>
<tr>
<td>Married</td>
<td>28</td>
<td>41</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Female</td>
<td>81</td>
<td>71</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>White</td>
<td>40</td>
<td>52</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>40</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>18</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>&lt;High school</td>
<td>16</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>22</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>32</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>17</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Graduate school</td>
<td>13</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>

*Data are expressed as percentages unless otherwise indicated.

### Table 2. Medical Morbidity and Role Impairment

<table>
<thead>
<tr>
<th>Medical Morbidity</th>
<th>Somatization (n = 299)</th>
<th>No Somatization (n = 1157)</th>
<th>P  Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No serious morbidity</td>
<td>59</td>
<td>71</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>(Charlson Comorbidity Index score = 0), %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charlson Comorbidity Index score, mean (SD)*</td>
<td>0.82 (1.3)</td>
<td>0.58 (1.3)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Role impairment</td>
<td>Intermediate activities of daily living (1-100)†</td>
<td>65.1 (27.9)</td>
<td>88.4 (20.5)</td>
</tr>
</tbody>
</table>

*Higher scores indicate greater aggregate morbidity.
†100 = maximal functional level.

### Table 3. Psychiatric Comorbidity*

<table>
<thead>
<tr>
<th>Psychiatric Disorder</th>
<th>Somatization (n = 299)</th>
<th>No Somatization (n = 1157)</th>
<th>P  Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major depressive disorder</td>
<td>94/299 (31.4)</td>
<td>69/1157 (6.0)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Other depressive disorder</td>
<td>50/299 (16.7)</td>
<td>75/1157 (6.5)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Panic disorder</td>
<td>54/287 (18.8)</td>
<td>29/1139 (2.5)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Other anxiety disorder</td>
<td>65/290 (22.4)</td>
<td>34/1125 (3.0)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Any anxiety or depressive disorder</td>
<td>172/298 (57.7)</td>
<td>164/1150 (14.3)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Values are expressed as numbers/total number (percentage) of patients unless otherwise indicated.
from medical disease, we repeated this analysis after adjusting the data for the Charlson Comorbidity Index score (Table 4, column 2). The differences between the 2 groups decreased only slightly, and the pattern remained consistent. It therefore appears that the utilization differences between the 2 groups were not powerfully confounded by differences in medical comorbidity. Finally, the multivariate regression analysis was repeated while taking into account the contributions of psychiatric comorbidity, as well as medical and sociodemographic characteristics (Table 4, column 3). Somatization continued to be a highly significant predictor of utilization; it was associated with hospitalizations ($P<.001$), ambulatory procedures ($P<.001$), emergency department visits ($P<.001$), primary care visits ($P=.04$), specialty visits ($P=.002$), inpatient costs ($P<.001$), and outpatient costs ($P<.001$). It was not related to mental health utilization. Therefore, despite the considerable overlap between somatization and depression and between somatization and anxiety disorder, somatization appears to contribute more to the variance in utilization than the other psychiatric and sociodemographic characteristics.

Although these data cannot be used to estimate with any precision the aggregate costs of somatization to society at large, they do hint at the order of magnitude of the problem. The adjusted, annual, total medical care cost for these somatizing patients at our institution was $5678 per patient. This is $2734 higher than that for the remaining nonsomatizing patients. This represents 16.0% of the total medical care costs of our entire sample. Thus, for every 1000 primary care patients in our setting, $561 446 of their total annual medical care costs of $3 505 446 is attributable to the incremental effect of somatization alone. The total health care expenditures in the United States were approximately $1.6 trillion in 2002. Extrapolating from our data, an estimated $256 billion a year (16.0% of this total) is then attributable to the incremental effect of somatization.

In this sample, we found that somatizing patients have approximately twice the outpatient and inpatient utilization of nonsomatizers and approximately twice the annual health care costs. Mental health care was the only form of utilization that was not significantly elevated in the somatoform group. Our findings are compatible with a large literature demonstrating that somatizing patients are frequently encountered in medical practice, use disproportionately large amounts of medical (but not mental health) services, and have elevated levels of role impairment.10,13,19,21,22,25,28 The prevalence of provisional somatoform disorder in this study is compatible with previous reports that 19% to 24% of primary care pa-

**COMMENT**

![Figure 3](http://archpsyc.jamanetwork.com/content/52/26/5678/F1.large.jpg)

*Figure 3. The effects of somatization and psychiatric disorder on cost, reported as adjusted effect estimates (from linear regression) and standard errors. Psychiatric disorders include major depression, minor depression, and anxiety and panic disorders.*

<table>
<thead>
<tr>
<th>Utilization/Cost Measure</th>
<th>Unadjusted Effect of Somatization</th>
<th>Effect of Somatization Adjusted for Medical Comorbidity†</th>
<th>Effect of Somatization, Fully Adjusted‡</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present (SE)</td>
<td>Absent (SE)</td>
<td>Present (SE)</td>
</tr>
<tr>
<td>Hospital admissions, No.</td>
<td>0.32 (0.051)</td>
<td>0.13 (0.014)</td>
<td>0.30 (0.033)</td>
</tr>
<tr>
<td>Ambulatory procedures, No.</td>
<td>0.17 (0.02)</td>
<td>0.03 (0.009)</td>
<td>0.16 (0.018)</td>
</tr>
<tr>
<td>Emergency department visits, No.</td>
<td>1.29 (0.15)</td>
<td>0.52 (0.036)</td>
<td>1.25 (0.093)</td>
</tr>
<tr>
<td>Mental health visits, No.</td>
<td>0.65 (0.17)</td>
<td>0.21 (0.050)</td>
<td>0.63 (0.12)</td>
</tr>
<tr>
<td>Primary care visits, No.</td>
<td>4.90 (0.32)</td>
<td>3.43 (0.11)</td>
<td>4.55 (0.23)</td>
</tr>
<tr>
<td>Specialist visits, No.</td>
<td>8.13 (0.55)</td>
<td>4.90 (0.21)</td>
<td>7.52 (0.42)</td>
</tr>
<tr>
<td>Inpatient costs, $</td>
<td>3146 (380)</td>
<td>991 (193)</td>
<td>2903 (374)</td>
</tr>
<tr>
<td>Outpatient costs, $</td>
<td>3208 (180)</td>
<td>1771 (91)</td>
<td>3003 (171)</td>
</tr>
</tbody>
</table>

*Effects are shown as adjusted or unadjusted mean (SE). P values are from a Wilcoxon test for unadjusted results and from linear regression for adjusted results.
†Medical comorbidity assessed with Charlson Comorbidity Index.63
‡Adjusted for Charlson Comorbidity Index comorbidity scores, major depression, minor depression, anxiety, panic, race (white vs black vs Hispanic vs other), married, sex, education (5 categories), quartiles of age, number of depressive symptoms, anxiety symptoms, and panic symptoms.

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tients meet criteria for abridged somatization disorder. Because of the limitations of our study design and the generalizability of our findings, we can only speculate about the cumulative medical care costs of somatization at the national level. However, extrapolating our findings to the United States at large, we estimate that the total incremental cost of somatization is in the neighborhood of $256 billion per year. Although this is only a crude estimate, it serves to point out the magnitude of the effect. In comparison, the annual costs of diabetes mellitus in 2002 were estimated to be $132 billion. The existing literature does not appear to contain any precise figures on the aggregate cost of somatization; 1 observer estimated the expenditures for patients with a somatoform disorder and hypochondriasis to be 20% of total medical expenditures, and another speculated that 10% of all medical care is provided to patients with no serious organic disease.

The overlap between somatization and anxiety and depressive disorders was substantial but by no means complete. Fifty-eight percent of somatizing patients had an anxiety or depressive disorder. More surprising was the finding that neither depressive nor anxiety disorder was closely associated with utilization when somatization was included in the model (though panic disorder was significantly associated with hospitalization rates and in-patient costs); somatization alone contributed more to the variance in utilization than anxiety and depressive disorders. The multivariate method we used suggests that much of the influence that depressive and anxiety disorders exert on utilization is moderated through their effect on somatization. That is, anxiety and depressive disorders lead to increased utilization primarily because of their effect on somatic symptoms. These findings are compatible with previous work. Kroenke et al found that somatization had an independent and additive effect on the frequency of clinic and emergency department visits, beyond the effect of comorbid depressive and anxiety disorders. Kroenke et al also reported that somatization was more closely associated with outpatient visits than depression and anxiety. And Miranda reported that having a diagnosable psychiatric disorder, apart from its relationship to somatization, was not associated with increased medical utilization. Studies of the treatment of depression in primary care settings reveal uncertainty regarding the impact of an improvement in depression on the utilization of medical care. Thus, improvements in the recognition and treatment of depression in primary care do not necessarily reduce utilization and health care costs. Our findings may partially explain this if somatization rather than depression per se is the more important driver of utilization.

Although somatizing patients as a group were medically sicker than nonsomatizers, this higher level of medical morbidity alone did not explain their increased medical utilization. The effect of medical morbidity on utilization only surpassed that of somatoform disorder in the more severely medically ill. Indeed, at lower levels of medical morbidity (Charlson Comorbidity Index scores <2), the effect size of somatoform disorder is comparable in magnitude with that of medical morbidity. Age had relatively little effect on utilization. Again, this may be explained by the multivariate method. Once medical morbidity has been taken into account, age alone makes little additional contribution to the variance in utilization. In other words, age apparently affects utilization primarily because longevity is accompanied by increasing medical morbidity. We also found that women had higher costs and more specialist visits and that racial and ethnic minorities used emergency services more often. Both of these findings have been widely reported before.

This study has a number of limitations. First, there are questions of sampling bias and generalizability. A substantial fraction of the patients who were approached did not return completed questionnaires. We did find, however, that the study sample was quite comparable with a random sample of all the other clinic attendees who did not participate in the study. In addition, the findings from an academic teaching hospital may not generalize to community settings; for example, patients at our hospital may have more psychiatric and medical comorbidity than those in community practices. Furthermore, the generalizability of our findings is limited by geographic and site-specific characteristics such as insurance coverage, physician expertise and training, and institutional practice guidelines and conventions.

Second, as mentioned earlier, somatization was assessed with a self-report questionnaire and not with an individual medical evaluation to rule out a medical basis for each somatic symptom. We did index each patient’s aggregate medical morbidity with the Charlson Comorbidity Index, but this only partially addresses the problem since it emphasizes severe, life-threatening diseases more than chronic and less serious (yet very symptomatic) diseases. Thus, the possibility always remains that some of the somatic symptoms attributed to somatization could in fact have had a medical basis and that this partially explains our findings. The relationship between somatization and medical illness is especially complex because the 2 may tend to co-occur and medical illness not infrequently precipitates somatoform disorder.

Third, while we measured utilization within our hospital system, patients also sought care outside our hospital at the same time, and it is possible (even likely) that somatizing patients did so more than nonsomatizers. Previous work suggests that high users of care underestimate their use of services more than low users (ie, higher levels of medical care utilization are associated with underreporting). Thus, our utilization and cost estimates may be conservative.

Finally, the retrospective design does not permit conclusions about cause and effect relationships. Thus, our data are subject to the possible (though less likely) interpretation that higher utilization leads to more somatization, rather than vice versa.

Taken together, the findings emerging from this limited study underscore the importance of somatization as a driving force in medical care utilization. They point to the importance of medically unexplained symptoms in and of themselves as sources of utilization and disability and suggest that somatization symptoms are not simply nonspecific markers of other psychiatric or medical conditions. To the degree that our cost extrapolations are accurate, the costs of somatization may even exceed those

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of better characterized medical conditions such as diabetes mellitus. Clearly, more investigation is needed to better understand these somatizing patients and then to develop better treatments. Ultimately, if somatizing patients could be identified prospectively, it would be possible to intervene earlier in the course of their illness to improve their symptoms, decrease their maladaptive medical utilization, and reduce the costs of their care.

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REFERENCES

46. Hartz AJ, Noyes R, Bentler SE, Damiano PC, Willard JC, Momany ET, Unex-