

Anxiety Disorders in Primary Care: Prevalence, Impairment, Comorbidity, and Detection

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Background: Anxiety, although as common as depression, has received less attention and is often undetected and undertreated.

Objective: To determine the current prevalence, impairment, and comorbidity of anxiety disorders in primary care and to evaluate a brief measure for detecting these disorders.

Design: Criterion-standard study performed between November 2004 and June 2005.

Setting: 15 U.S. primary care clinics.

Participants: 965 randomly sampled patients from consecutive clinic patients who completed a self-report questionnaire and agreed to a follow-up telephone interview.

Measurements: 7-item anxiety measure (Generalized Anxiety Disorder [GAD]-7 scale) in the clinic, followed by a telephone-administered, structured psychiatric interview by a mental health professional who was blinded to the GAD-7 results. Functional status (Medical Outcomes Study Short Form-20), depressive and somatic symptoms, and self-reported disability days and physician visits were also assessed.

Results: Of the 965 patients, 19.5% (95% CI, 17.0% to 22.1%) had at least 1 anxiety disorder, 8.6% (CI, 6.9% to 10.6%) had posttraumatic stress disorder, 7.6% (CI, 5.9% to 9.4%) had a generalized anxiety disorder, 6.8% (CI, 5.3% to 8.6%) had a panic disorder, and 6.2% (CI, 4.7% to 7.9%) had a social anxiety disorder. Each disorder was associated with substantial impairment that increased significantly ($P < 0.001$) as the number of anxiety disorders increased. Many patients (41%) with an anxiety disorder reported no current treatment. Receiver-operating characteristic curve analysis showed that both the GAD-7 scale and its 2 core items (GAD-2) performed well (area under the curve, 0.80 to 0.91) as screening tools for all 4 anxiety disorders.

Limitation: The study included a nonrandom sample of selected primary care practices.

Conclusions: Anxiety disorders are prevalent, disabling, and often untreated in primary care. A 2-item screening test may enhance detection.

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Anxiety and depression are the 2 most common mental health problems seen in the general medical setting (1–5). Although increasing attention has been paid to anxiety, it still lags far behind depression in terms of research as well as clinical and public health efforts in screening, diagnosis, and treating affected individuals. This is unfortunate given the prevalence of anxiety and its substantial impact on patient functioning, work productivity, and health care costs (6–14). More than 30 million Americans have a lifetime history of anxiety (15), and anxiety disorders cost an estimated \$42 billion dollars per year in the United States alone, counting direct and indirect costs (16).

The 4 most common anxiety disorders (excluding simple phobias that seldom present clinically) are generalized anxiety disorder, panic disorder, social anxiety disorder, and posttraumatic stress disorder (PTSD) (17–23). However, despite the substantial disability associated with each anxiety disorder and the availability of effective treatments, only a minority of patients (15% to 36%) with anxiety are recognized in primary care (24, 25).

In our paper, we analyze results from a large primary care–based anxiety study (26) to answer several questions. First, what is the prevalence of these 4 anxiety disorders, both individually and concurrent with one another? Second, how do these disorders compare in functional impairment, health care use, and comorbid depressive and somatic symptom burden? Third, how effective is a brief anxiety measure in screening for each disorder? Compared

with previous research, our study is particularly well-positioned to ascertain commonalities among anxiety diagnoses that are traditionally considered to be discrete and to determine whether a single measure can be used as a “first step,” common metric. This is especially salient for the busy, complex primary care setting, in which simplifying initial recognition of mental disorders may in fact make wider efforts at recognition more feasible.

METHODS

Patient Sample

The Patient Health Questionnaire (PHQ) anxiety study (26) was conducted to develop a short measure to assess generalized anxiety disorder. Patients were enrolled from a research network of 15 primary care sites (13 family practice and 2 internal medicine sites) located in 12 states

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Context

Anxiety and depression are both common in primary care patients, but much less attention has been paid to anxiety.

Contribution

The authors administered a 7-item anxiety scale (Generalized Anxiety Disorder [GAD]-7) to 965 primary care patients, who also had a structured interview, to detect an anxiety disorder. Of these patients, 19.5% had at least 1 anxiety disorder. Patients with anxiety had worse functional status, more disability days, and more physician visits, but 41% were not being treated for any anxiety disorder. The GAD-7 had high sensitivity and good specificity for detecting a generalized anxiety disorder, panic disorder, social anxiety disorder, and posttraumatic stress disorder.

Implications

Anxiety disorders are common, underrecognized, and undertreated, but they are easy to detect with a brief questionnaire.

—The Editors

and administered centrally by Clinvest, Inc., Springfield, Missouri, from November 2004 to June 2005. The Generalized Anxiety Disorder (GAD)-7 scale was developed and validated in 2149 patients. In the original study, 2982 persons were invited to participate; of these, 2740 (92%) completed the 4-page questionnaire and had no or minimal missing data (26). To minimize sampling bias, consecutive patients were approached at each site in clinic sessions until the target quota for that week was achieved. Of the 2740 participants, the first 2149 were used for development and validation of the GAD-7 scale, whereas the last 591 were used to determine the test–retest reliability of the scale. Of the 2149 patients in the validation group, 1654 agreed to a telephone interview, of whom 965 were randomly selected to undergo this interview within 1 week of their clinic visit by 1 of 2 mental health professionals: a clinical psychologist (with a PhD) or a senior psychiatric social worker. Contact information was sent by fax to each interviewer, who shuffled the fax sheets received each day and then drew from the stack several participants to interview that day. The 965 interviewed patients comprise the study population for this paper, and compared with the 1184 participants who did not undergo a mental health professional interview, these were more often women (69% vs. 63%; $P = 0.003$) and had slightly higher GAD-7 anxiety scores (5.7 vs. 5.1; $P = 0.010$) but were similar in age, race, and education. Of note, we only used data from the 1184 participants not undergoing a mental health professional interview to derive the GAD-7 (26). The study was approved by the Sterling Institutional Review Board.

Study Questionnaire

Before seeing their physicians, patients completed a 4-page questionnaire that included the GAD-7 (Appendix Figure, available at www.annals.org). This scale was shown to have good internal and test–retest reliability, as well as convergent, construct, criterion, procedural, and factorial validity for the diagnosis of generalized anxiety disorder (26). Scores on the GAD-7 range from 0 to 21; scores of 5, 10, and 15 represent mild, moderate, and severe anxiety symptoms, respectively. The first 2 items of the GAD-7 represent core anxiety symptoms, and scores on this GAD-2 subscale range from 0 to 6.

The study questionnaire also included questions about age, sex, education, race or ethnicity, and marital status; the Medical Outcomes Study Short Form-20 (SF-20), which measures functional status in 6 domains (27); the 10-item anxiety subscale from the Hopkins Symptom Checklist (28); the PHQ-8 depression scale (29); a 3-item version of the Social Phobia Inventory (Mini-SPIN) (30); the 5-item PHQ panic module (25); and the PHQ-15 somatic symptom scale (31). Also, single-item global assessments of anxiety, depression, and pain based on a scale of 0 (none) to 10 (as bad as you can imagine) were included. Finally, patients reported the number of physician visits and disability days during the previous 3 months.

Structured Psychiatric Interview

The 2 mental health professionals, while blinded to the results of the self-report research questionnaire, conducted structured psychiatric interviews by telephone to establish independent criteria-based diagnoses according to the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV) (32). The interview consisted of the generalized anxiety disorder, social anxiety disorder, and PTSD sections of the Structured Clinical Interview for DSM-IV (SCID) (33). Reinterview by telephone was used because of its feasibility in our multisite study and its demonstrated comparability with face-to-face research interviews (34–36).

The 2 mental health professionals based diagnoses of generalized anxiety disorder and PTSD on the SCID interview. For generalized anxiety disorder, some questions were slightly modified to better assess each DSM-IV criterion. They based a diagnosis of social anxiety disorder on whether the patient met SCID diagnostic criteria and had a Mini-SPIN score of 8 or greater, because this improves the accuracy of social anxiety disorder diagnoses (37). They based a diagnosis of panic disorder on answering “yes” to all 5 questions on the PHQ panic module, a threshold that reflects DSM-IV criteria and has been validated in both clinical (25) and population-based (38) samples.

Statistical Analysis

We estimated sample size with respect to sensitivity of the GAD-7 scale for diagnosing the target disease (generalized anxiety disorder). We needed 60 participants with

Table 1. Baseline Characteristics*

Characteristic	No Anxiety Disorder (n = 777)	Generalized Anxiety Disorder (n = 73)	Panic Disorder (n = 66)	Social Anxiety Disorder (n = 60)	Posttraumatic Stress Disorder (n = 83)
Mean age (SD) [range], y	47.7 (15.3) [18–85]	45.7 (13.2) [19–87]	41.9 (13.3) [19–71]	44.4 (12.3) [19–77]	44.7 (15.4) [18–87]
Women, %	65.5	82.2	83.3	80.0	81.9
Race, %					
White	80.8	84.9	84.8	88.3	68.3
Hispanic	8.4	12.3	7.6	10.0	22.0
Black	7.6	2.7	3.0	1.7	8.5
Asian	1.7	0	1.5	0	1.2
Other	1.5	0	3.0	0	0
Education, %					
College graduate	29.5	9.7	13.8	16.7	15.9
Some college education or an associate degree	38.1	36.1	47.7	40.0	40.2
High school graduate	28.0	43.1	30.8	31.7	31.7
Some high school education	3.5	8.3	6.2	10.0	9.8
≤8th-grade education	0.9	2.8	1.5	1.7	2.4
Marital status, %					
Married	66.8	67.1	57.6	65.0	48.2
Widowed	5.8	5.8	4.5	3.3	10.8
Separated or divorced	14.2	13.7	18.1	15.0	21.7
Never married	13.3	13.7	19.7	16.7	19.3
Number of anxiety disorders, %					
1	—	38.4	45.5	31.7	56.6
2	—	34.2	27.3	35.0	24.1
3 or 4	—	27.4	27.3	33.3	19.3
Current treatments, patient-reported, %					
Psychotropic medications	21.3	60.3	65.2	63.3	51.2
Counseling or psychotherapy	5.4	27.4	24.2	21.7	12.2
Median scale score (range)					
GAD-7 anxiety severity (score range, 0–21)	3.0 (0–20)	14.0 (0–21)	12.5 (0–21)	13.0 (0–21)	12.0 (1–21)
PHQ-8 depression severity (score range, 0–27)	3.0 (0–24)	12.5 (1–24)	12.0 (1–24)	12.0 (0–24)	12.0 (2–24)
PHQ-15 somatic symptom severity (score range, 0–30)	6.0 (0–20)	14.0 (4–28)	12.0 (1–28)	13.0 (4–28)	12.0 (2–28)
SCL anxiety severity (score range, 0–40)	1.0 (0–31)	13.0 (0–40)	13.0 (2–40)	12.5 (0–38)	11.0 (0–35)
Global anxiety severity (score range, 0–10)	1.0 (0–10)	7.0 (1–10)	7.0 (0–10)	7.0 (0–10)	6.0 (0–10)
Global depression severity (score range, 0–10)	1.0 (0–10)	7.0 (0–10)	5.5 (0–10)	7.0 (0–10)	6.0 (0–10)
Global pain severity (score range, 0–10)	3.0 (0–10)	6.0 (0–10)	5.0 (0–10)	5.5 (0–10)	5.0 (0–10)

* GAD-7 = Generalized Anxiety Disorder-7 scale; PHQ = Patient Health Questionnaire; SCL = Hopkins Symptom Checklist.

generalized anxiety disorder to ensure that the total width of the 95% CI around a sensitivity proportion of 0.80 was no greater than 0.20. Given that the estimated prevalence of generalized anxiety disorder in the primary care population was 6% (18), we needed a total of 1000 unselected primary care patients to have approximately 60 patients with generalized anxiety disorder.

We determined the prevalence of each of the 4 anxiety disorders and compared them in patient demographic characteristics, functional status, psychiatric comorbidity, disability days, and physician visits. Consistent with previous work (1, 26, 29, 39), we replaced missing values in a scale with the mean value of the remaining items if 25% or fewer items were missing. If more than 25% of items were

missing, the sum score was not computed and was counted as missing. The amount of missing data for any individual variable or scale score was very low (<1%). The 15 sites did not differ in missing data.

In addition to descriptive statistics, we used analysis of covariance to examine associations among each anxiety disorder and the 6 SF-20 functional status scales, self-reported disability days, and physician visits—controlling for demographic variables (sex, age, race, and educational level) and study site. We ran similar models to examine the effect of the number of anxiety disorders. In all models, patients with no anxiety disorder were the reference group. We adjusted pairwise statistical comparisons by using the Bonferroni correction. Because some dependent variables displayed a skewed

Table 2. Relationship among Anxiety Disorders and Medical Outcomes Study Short Form-20 Functional Status Scores, Disability Days, and Physician Visits*

Anxiety Disorder	Mental Health	Social Function	Role Function	General Health	Bodily Pain
None (n = 777)	75.9 (74.6–77.2)	86.1 (84.2–87.9)	77.6 (74.7–80.5)	62.5 (60.6–64.4)	63.9 (62.0–65.8)
Generalized anxiety (n = 73)	42.5 (38.4–46.6)	55.2 (49.3–61.1)	42.6 (33.3–52.0)	39.0 (33.0–45.0)	49.9 (43.9–55.8)
Panic (n = 66)	47.3 (43.2–51.5)	57.3 (51.3–63.4)	48.5 (38.9–58.1)	39.7 (33.5–45.8)	49.9 (43.8–56.1)
Social anxiety (n = 60)	42.9 (38.4–47.3)	58.1 (51.7–64.5)	43.3 (33.2–53.5)	40.0 (33.4–46.6)	50.8 (44.2–57.3)
Posttraumatic stress (n = 83)	49.6 (45.8–53.4)	59.5 (54.1–65.0)	46.2 (37.4–55.0)	39.0 (33.5–44.5)	51.1 (45.4–56.7)

* Data are means (95% CIs) adjusted for sex, age, education, race, and study site.

† Self-reported number of days in the past 3 months that symptoms interfered with the patient's usual activities.

‡ Self-reported number of physician visits in the past 3 months.

(but unimodal) distribution, we also reran the models using the rank transformation of the dependent variables.

We examined the operating characteristics (sensitivity, specificity, and positive likelihood ratio) for a range of cutoff scores of the GAD-7 and GAD-2 for each anxiety disorder. We conducted receiver-operating characteristic curve analyses to determine the area under the curve (AUC) for each anxiety disorder. We calculated AUCs and performed statistical comparisons (GAD-7 vs. GAD-2) with a nonparametric procedure that accounted for the correlated nature of the data (that is, the AUCs of the GAD-7 and GAD-2 scales were, appropriately, calculated on the same persons) (40).

We performed most statistical analyses by using SPSS, version 14.0 (SPSS, Inc., Chicago, Illinois), and we used SAS software, version 9.1 (SAS Institute, Inc., Cary, North Carolina) to compute CIs and AUCs and to statistically compare the AUCs.

Role of the Funding Source

Data collection was supported by a grant from Pfizer, Inc. All investigators had complete access to the data, and no funding was provided to conduct the analysis. The funding source had no role in the design, conduct, or reporting of the study or in the decision to submit the article for publication.

RESULTS

Patient Characteristics

Table 1 summarizes characteristics of the sample. The mean age of the 965 patients was 47.1 years (SD, 15.5) (range, 18 to 87 years). Sixty-nine percent of the patients were women, 81% were non-Hispanic white, 7% were black, 9% were Hispanic, and 3% were of another race or ethnicity. Sixty-five percent were married; 21% were divorced, separated, or widowed; and 14% were never married. Regarding education, 5% had not completed high school, 29% had a high school degree or equivalent, 39% had some college education or an associate's degree, and 27% were college graduates.

Anxiety Disorder Prevalence, Psychiatric Comorbidity, and Treatment

Posttraumatic stress disorder was present in 83 patients (8.6% [95% CI, 6.9% to 10.6%]), generalized anxiety disorder in 73 patients (7.6% [CI, 5.9% to 9.4%]), panic disorder in 66 patients (6.8% [CI, 5.3% to 8.6%]), and social anxiety disorder in 60 patients (6.2% [CI, 4.7% to 7.9%]). Of the 188 patients (19.5% [CI, 17.0% to 22.1%]) with at least 1 anxiety disorder, 124 had 1 disorder, 42 had 2 disorders, 14 had 3 disorders, and 8 had 4 disorders. The median number of patients enrolled from each of the 15 sites was 54 (range, 34 to 171 patients). The median prevalence of any anxiety disorder by site was 15.8% (range, 7.0% to 32.3%), and the median GAD-7 score was 5.3 (range, 3.6 to 7.2).

On all 3 anxiety severity measures (GAD-7, Hopkins Symptom Checklist-10, and global anxiety), patients with each anxiety disorder had markedly higher scores than patients with no anxiety disorder (Table 1). Anxiety severity scores among the 4 disorders were relatively similar; patients with PTSD had slightly lower scores and less comorbidity than persons with the other disorders. Each anxiety disorder also had moderate levels of depressive (mean PHQ-8 score, 12.0 to 12.5) and somatic (mean PHQ-15 score, 12.0 to 14.0) symptom burdens. This indicates comorbidity with nonanxiety psychiatric disorders as well because a score of 10 to 14 represents moderate severity on both scales and an increased probability of depressive or somatoform disorders (29, 39).

Overall, of the 188 patients with at least 1 anxiety disorder, 78 (42%) reported receiving only psychotropic medications, 8 (4%) reported receiving only counseling or psychotherapy, and 25 (13%) reported receiving both treatments. Notably, 77 patients (41%) were not receiving medications, counseling, or psychotherapy.

Functional Impairment, Disability Days, and Physician Visits, by Type of Disorder

As shown in Table 2, each anxiety disorder was strongly associated with impaired functioning on all 6 SF-20 scales and with self-reported disability days. Differences among patients with each anxiety disorder and those

Table 2—Continued

Physical Function	Disability Days†	Physician Visits‡
79.3 (77.5–81.0)	5.7 (4.5–6.8)	1.6 (1.4–1.8)
62.7 (57.2–68.3)	18.1 (14.5–21.7)	2.9 (2.2–3.6)
64.0 (58.3–69.6)	17.7 (14.0–21.4)	2.4 (1.8–3.0)
61.1 (55.1–67.1)	15.9 (12.1–19.7)	2.5 (1.9–3.2)
58.1 (53.0–63.3)	12.5 (9.3–15.8)	2.5 (1.9–3.1)

with no anxiety disorder were most marked for the SF-20 domains that previous studies have shown are most strongly related to mental disorders—that is, mental health, followed by social, overall general health, and role functioning, with a lesser relationship to pain and physical functioning (41). All pairwise comparisons between each disorder and patients with no anxiety disorder were highly significant ($P < 0.001$) for each SF-20 scale and for disability days and were moderately significant ($P < 0.011$) for physician visits. Results were similar when models were rerun using the rank transformation of dependent variables, except that physician visits no longer differed between patients with no anxiety disorders and those with generalized anxiety disorder ($P = 0.052$) or those with social anxiety disorder ($P = 0.32$). Finally, 32% to 43% of patients with anxiety disorders (compared with only 4% of patients with no anxiety disorders) indicated that their anxiety symptoms had made it “very or extremely difficult” to do their work, to take care of things at home, or to get along with other people.

Number of Anxiety Disorders

The Figure illustrates the relationship between the increasing number of anxiety disorders and worsening functional status. Decrements in SF-20 scores are shown in terms of effect size, which is the difference in mean SF-20 scores, expressed as the number of SDs, between each anxiety disorder subgroup and the reference group (patients with no anxiety disorders). Effect sizes of 0.5 and 0.8 are typically considered to be moderate and large between-group differences, respectively (42).

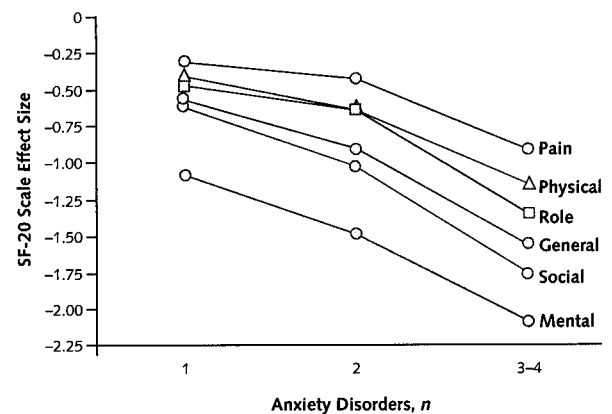
Self-reported disability days in the past 3 months were 5.7 days (CI, 4.5 to 6.8 days) for those with no anxiety disorder, 11.2 days (CI, 8.4 to 13.9 days) for those with 1 anxiety disorder, 13.2 days (CI, 8.4 to 17.9 days) for those with 2 anxiety disorders, and 30.6 days (CI, 18.0 to 43.3 days) for those with 3 to 4 anxiety disorders. The numbers of self-reported physician visits in the past 3 months were 1.6 visits (CI, 1.4 to 1.8 visits) for those with no anxiety disorder, 1.9 visits (CI, 1.4 to 2.5 visits) for those with 1 anxiety disorder, 3.2 visits (CI, 2.3 to 4.0 visits) for those

with 2 anxiety disorders, and 4.1 visits (CI, 2.3 to 5.9 visits) for those with 3 to 4 anxiety disorders.

Operating Characteristics of the GAD-7 and GAD-2 Scales

Table 3 summarizes the sensitivity, specificity, and positive likelihood ratio of the GAD-7 and GAD-2 scales at various cut-points for each anxiety disorder. Although the operating characteristics were, not surprisingly, best for generalized anxiety disorder, both scales also had reasonably good performance as screening measures for the other 3 anxiety disorders. As we expected, sensitivity declined and specificity increased in a continuous fashion as the cut-point increased. At a GAD-7 cut-point of 8 or greater, sensitivity and specificity approached or exceeded 0.75 for all disorders and the positive likelihood ratio exceeded 3.0. The likelihood ratio is similar to that of most measures used to screen for depression in primary care (43, 44). On the GAD-2, a cut-point of 3 or greater may be preferable to a cut-point of 2 given the low specificity (and, therefore, a high false-positive rate) for the latter.

Figure. Association between the number of anxiety disorders and decline in functional status as determined by analysis of covariance models adjusted for sex, age, race, education, and study site.



The decrement in the Medical Outcomes Study Short Form-20 (SF-20) scores is shown as the difference between each group (i.e., those with 1 anxiety disorder [$n = 124$], 2 anxiety disorders [$n = 42$], or 3 to 4 anxiety disorders [$n = 22$]) and the reference group (i.e., those with no anxiety disorder [$n = 777$]). Effect size is the difference in group means divided by the SD for the entire sample. For each SF-20 scale, the overall F test is significant ($P < 0.001$) for declining function with an increasing number of anxiety disorders. In pairwise comparisons using the Bonferroni correction, all groups with anxiety disorders differed markedly ($P < 0.001$) from patients with no anxiety disorders for each SF-20 scale except pain ($P < 0.039$). Likewise, patients with 3 to 4 anxiety disorders differed ($P < 0.050$) from those with 1 anxiety disorder for all scales. When models were rerun using the rank transformation of SF-20 scales, results remained highly significant ($P < 0.001$) for 5 of the scales and significant ($P < 0.025$) for the sixth scale (bodily pain) when comparing persons with 1, 2, or 3 to 4 anxiety disorders with those with no anxiety disorder and results remained significant ($P < 0.014$) for all scales except mental health and bodily pain when comparing the group with 3 to 4 anxiety disorders with the group with 1 anxiety disorder.

Table 3. Sensitivity, Specificity, and Positive Likelihood Ratio of the Generalized Anxiety Disorder (GAD)-7 and (GAD)-2 Scales*

Cut-Point	Generalized Anxiety Disorder (n = 73 [7.6%])	Panic Disorder (n = 66 [6.8%])	Social Anxiety Disorder (n = 60 [6.2%])	Posttraumatic Stress Disorder (n = 83 [8.6%])	Any Anxiety Disorder (n = 188 [19.5%])
GAD-7 score					
≥5					
Sensitivity (95% CI)	0.97 (0.90–1.0)	0.94 (0.85–0.98)	0.88 (0.77–0.95)	0.90 (0.82–0.96)	0.90 (0.85–0.94)
Specificity (95% CI)	0.57 (0.53–0.60)	0.56 (0.53–0.59)	0.55 (0.52–0.59)	0.57 (0.53–0.60)	0.63 (0.60–0.66)
Positive LR (95% CI)	2.2 (2.1–2.4)	2.1 (1.9–2.4)	2.0 (1.8–2.2)	2.1 (1.9–2.3)	2.4 (2.2–2.7)
≥6					
Sensitivity (95% CI)	0.95 (0.87–0.98)	0.88 (0.78–0.95)	0.87 (0.75–0.94)	0.86 (0.76–0.92)	0.85 (0.79–0.90)
Specificity (95% CI)	0.65 (0.61–0.67)	0.64 (0.60–0.67)	0.63 (0.60–0.66)	0.64 (0.61–0.68)	0.71 (0.68–0.74)
Positive LR (95% CI)	2.7 (2.4–3.0)	2.4 (2.1–2.7)	2.4 (2.1–2.7)	2.4 (2.1–2.7)	2.9 (2.6–3.3)
≥7					
Sensitivity (95% CI)	0.95 (0.87–0.98)	0.83 (0.72–0.91)	0.85 (0.73–0.92)	0.78 (0.68–0.87)	0.80 (0.74–0.86)
Specificity (95% CI)	0.70 (0.67–0.73)	0.69 (0.66–0.72)	0.69 (0.66–0.72)	0.70 (0.66–0.73)	0.76 (0.73–0.79)
Positive LR (95% CI)	3.2 (2.8–3.6)	2.7 (2.3–3.1)	2.7 (2.4–3.1)	2.6 (2.2–3.0)	3.4 (2.9–3.9)
≥8					
Sensitivity (95% CI)	0.92 (0.83–0.97)	0.82 (0.70–0.90)	0.78 (0.66–0.88)	0.76 (0.65–0.85)	0.77 (0.70–0.82)
Specificity (95% CI)	0.76 (0.73–0.79)	0.75 (0.72–0.78)	0.74 (0.71–0.77)	0.75 (0.72–0.78)	0.82 (0.80–0.85)
Positive LR (95% CI)	3.8 (3.4–4.4)	3.3 (2.8–3.8)	3.0 (2.6–3.6)	3.1 (2.6–3.6)	4.4 (3.7–5.2)
≥9					
Sensitivity (95% CI)	0.90 (0.81–0.96)	0.79 (0.67–0.88)	0.77 (0.64–0.87)	0.74 (0.63–0.83)	0.73 (0.66–0.80)
Specificity (95% CI)	0.79 (0.76–0.82)	0.78 (0.75–0.80)	0.77 (0.74–0.80)	0.78 (0.75–0.81)	0.85 (0.83–0.88)
Positive LR (95% CI)	4.3 (3.7–5.0)	3.5 (3.0–4.2)	3.4 (2.8–4.0)	3.4 (2.8–4.0)	5.0 (4.1–6.0)
≥10					
Sensitivity (95% CI)	0.89 (0.80–0.95)	0.74 (0.62–0.84)	0.72 (0.59–0.83)	0.66 (0.55–0.76)	0.68 (0.60–0.74)
Specificity (95% CI)	0.82 (0.80–0.85)	0.81 (0.78–0.83)	0.80 (0.77–0.83)	0.81 (0.78–0.84)	0.88 (0.85–0.90)
Positive LR (95% CI)	5.1 (4.3–6.0)	3.9 (3.2–4.7)	3.6 (2.9–4.5)	3.5 (2.8–4.3)	5.5 (4.5–6.8)
GAD-2 score					
≥2					
Sensitivity (95% CI)	0.95 (0.87–0.98)	0.91 (0.81–0.97)	0.85 (0.73–0.93)	0.86 (0.76–0.92)	0.86 (0.80–0.90)
Specificity (95% CI)	0.64 (0.61–0.67)	0.63 (0.60–0.66)	0.62 (0.59–0.65)	0.64 (0.60–0.67)	0.70 (0.67–0.74)
Positive LR (95% CI)	2.6 (2.4–2.9)	2.5 (2.2–2.8)	2.3 (2.0–2.6)	2.4 (2.1–2.7)	2.9 (2.5–3.3)
≥3					
Sensitivity (95% CI)	0.86 (0.76–0.93)	0.76 (0.64–0.85)	0.70 (0.57–0.81)	0.59 (0.48–0.70)	0.65 (0.57–0.71)
Specificity (95% CI)	0.83 (0.80–0.85)	0.81 (0.79–0.84)	0.81 (0.78–0.83)	0.81 (0.78–0.84)	0.88 (0.85–0.90)
Positive LR (95% CI)	5.0 (4.2–5.9)	4.1 (3.4–4.9)	3.6 (2.9–4.5)	3.1 (2.5–3.9)	5.2 (4.2–6.5)

* Scores for GAD-7 and GAD-2 range from 0 to 21 and from 0 to 6, respectively. LR = likelihood ratio.

Table 4 shows the AUC for each anxiety disorder for the GAD-7 and GAD-2 scales. While the AUC is greatest (0.91) for generalized anxiety disorder, it is also good for the other 3 anxiety disorders (0.80 to 0.85). Except for PTSD, the AUC is similar and does not statistically differ for the 7-item and 2-item measures. Even for PTSD, the

statistically significant difference is clinically small (0.826 vs. 0.802).

DISCUSSION

Our study contributes several new insights to what is already known about anxiety disorders in primary care.

Table 4. Comparison of Generalized Anxiety Disorder (GAD)-7 and GAD-2 Scales by Receiver-Operating Characteristic Curve Analysis*

Anxiety Disorder	AUC (95% CI)		Comparison of GAD-7 and GAD-2 AUC†	
	GAD-7	GAD-2	Chi-Square	P Value
Generalized anxiety disorder	0.905 (0.872–0.938)	0.908 (0.876–0.940)	0.19	0.66
Panic disorder	0.847 (0.802–0.891)	0.848 (0.805–0.891)	0.002	0.89
Social anxiety disorder	0.833 (0.780–0.886)	0.827 (0.773–0.881)	0.04	0.52
Posttraumatic stress disorder	0.826 (0.787–0.866)	0.802 (0.759–0.844)	4.7	0.030
Any anxiety disorder	0.864 (0.835–0.892)	0.853 (0.823–0.883)	2.2	0.140

* AUC = area under the curve.

† Comparisons were made by using a nonparametric approach, taking into account the correlated nature of data (40).

First, 4 of the most common anxiety disorders are more alike with each other than different in terms of functional impairment, disability, and comorbidity as well as with depressive and somatic symptoms. Second, one third of patients with an anxiety disorder had 1 or more additional anxiety disorders, and the number of disorders was strongly associated with impairment and health care use. Third, an ultra-brief 2-item measure is a useful screening tool for all 4 anxiety disorders.

The comorbidity that anxiety disorders share with one another, as well as with depressive and somatic symptoms, is noteworthy. This 3-way relationship among anxiety, depression, and somatic symptoms is well established (45–49). Anxiety disorders also frequently occur in patients with chronic medical disorders and increase the disability of such patients (50–52). Recognizing the potentially treatable anxiety or depressive disorders that are highly concurrent with somatic symptoms or medical comorbid conditions is therefore important.

Two of 5 patients with anxiety disorders in our study reported that they were not receiving psychotropic medications, counseling, or psychotherapy. Of the 111 patients reporting some type of treatment, most ($n = 103$) were taking medications, whereas far fewer ($n = 33$) were receiving counseling or psychotherapy. While some patients may warrant watchful waiting rather than active treatment either because of mild impairment or patient preferences, the average impairment associated with the 4 anxiety disorders in our sample was substantial. Undertreatment of anxiety disorders has been previously demonstrated, as well as the predominant use of pharmacotherapy (4, 17, 53–57). While antidepressants are certainly effective for all 4 anxiety disorders, evidence-based psychotherapies, such as cognitive–behavioral therapy, are equally or more effective, are considered first-line treatment in some (but not all) clinical guidelines, and should strongly be considered if initial treatment with medications proves inadequate (17). The comorbidity with depression is not a major problem since antidepressants and cognitive–behavioral therapy are efficacious for both depressive and anxiety disorders (58). In addition, these treatments may also be beneficial in some somatoform disorders and somatic syndromes that accompany anxiety and depressive disorders (59–61) and result in substantial health care costs (62).

To date, no single measure for evaluating the presence and severity of multiple anxiety disorders is widely used in clinical practice. A score of 8 or greater on the GAD-7 scale represents a reasonable cut-point for identifying possible cases in which further questioning to determine the presence and type of anxiety disorder may be warranted. The first 2 items (GAD-2) representing core anxiety symptoms can be useful when an ultra-brief screening tool is desired, and a cut-point of 3 or greater on this measure may be reasonable. Notably, an ultra-brief screening tool (PHQ-2) that uses the 2 core symptoms for depressive disorders—depressed mood and anhedonia—has proven

valid for screening for major depression (63, 64), which is concordant with other studies (65).

Since the GAD-7 includes some (but not all) of the DSM-IV symptoms for generalized anxiety disorder, we are not surprised that its operating characteristics are highest for generalized anxiety disorder. The GAD-7 and the ultra-brief GAD-2 have good operating characteristics for the 3 other anxiety disorders for which the measures were not initially designed. The operating characteristics of the 2-item and 7-item versions were remarkably similar, suggesting that both may be equally effective for screening purposes. One approach would be to use the GAD-2 when screening for anxiety disorders in clinical practice, followed by the other 5 items of the GAD-7 for patients with positive results on screening. This is because the longer measure provides a broader score range (0 to 21 vs. 0 to 6) to grade symptom severity and, consequently, may be particularly useful in monitoring response to treatment. However, the relative responsiveness of the GAD-7 and GAD-2 would need to be demonstrated in clinical trials or other longitudinal studies.

Our study has several limitations. First, we studied a nonrandom sample of patients from selected primary care clinics. Prevalence of anxiety disorders may have been overestimated because frequent clinic attendees could be overrepresented and, secondly, the 965 patients analyzed had slightly higher anxiety scores than patients who were not undergoing a mental health professional interview. Nonetheless, the prevalence of anxiety disorders in our sample was within the range reported in previous primary care studies. Also, our patients were demographically similar to those seen in U.S. primary care practices nationwide (66). Finally, the operating characteristics of the GAD-7 and GAD-2, as well as the associations between anxiety disorders and functional impairment, are probably not influenced by modest oversampling of patients with anxiety disorders. Second, we obtained outcomes, such as disability days and physician visits, exclusively by patient self-report, although self-report for these outcomes is reasonably reliable (67, 68). Third, we did not have information on comorbid medical illnesses or on the number and types of medications that could independently affect impairment. Previous research has shown, however, that the disability associated with anxiety and depressive disorders equals or exceeds that of many chronic medical disorders (6, 69, 70).

Clinicians and researchers should no longer look for depression or anxiety alone. Considering the frequency with which depression and anxiety co-occur, a search for one condition should always be accompanied by an assessment of the other. The validation of brief (GAD-7 and PHQ-9) and ultra-brief (GAD-2 and PHQ-2) measures considerably enhances the efficiency of screening for and monitoring anxiety and depression. These tools provide an opportunity to improve the mental health of primary care populations by identifying patients who may benefit from pharmacologic or psychotherapeutic treatment.

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Appendix Figure. The Generalized Anxiety Disorder (GAD)-7 scale.

Over the <u>last 2 weeks</u> , how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
Feeling nervous, anxious, or on edge	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Not being able to stop or control worrying	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Worrying too much about different things	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Having trouble relaxing	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Being so restless that it is hard to sit still	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Becoming easily annoyed or irritable	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Feeling afraid as if something awful might happen	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
Total Score _____ =	Add	_____	+	_____
	Columns	_____	+	_____

The first 2 items constitute the GAD-2 subscale. GAD-7 © 2006 Pfizer Inc. All rights reserved. Used with permission.