ORIGINAL INVESTIGATION

Disability and Poor Quality of Life Associated With Comorbid Anxiety Disorders and Physical Conditions

Jitender Sareen, BSc, MD, FRCPC; Frank Jacobi, PhD; Brian J. Cox, PhD; Shay-Lee Belik, BSc(Hons); Ian Clara, MA; Murray B. Stein, MD, MPH

Background: Evidence has been emerging that anxiety disorders are associated with several physical health conditions. We used the first community survey, which assessed physical conditions based on physician assessment and included standardized diagnostic assessment of mental disorders by trained health professionals, to examine the relationship between anxiety disorders and physical conditions.

Methods: The German Health Survey (N=4181; response rate, 87.6%; ages 18-65 years) used the Composite International Diagnostic Interview to assess *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* mood, substance use, and anxiety disorders (panic disorder, social phobia, specific phobia, generalized anxiety disorder, agoraphobia, obsessive-compulsive disorder) and a standardized medical interview supplemented by laboratory data to assess a broad range of physical conditions. The Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) was used to measure health-related quality of life. Number of days of role impairment was used to measure past 30-day disability.

Results: After adjusting for sociodemographic factors and other common mental disorders, the presence of an anxiety disorder was significantly associated with thyroid disease, respiratory disease, gastrointestinal disease, arthritis, migraine headaches, and allergic conditions (adjusted odds ratios between 1.39 and 2.12; $P<.05$). Compared with physical disorders alone, the presence of comorbid anxiety disorder with 1 or more physical disorders was associated with poorer physical component scores on the SF-36 (adjusted mean scores for physical condition alone and physical condition with anxiety disorder, 48.50 and 45.86, respectively; $P<.001$) and past 30-day disability due to physical problems (adjusted odds ratio, 1.69; 95% confidence interval, 1.20-2.37).

Conclusion: Anxiety disorders are independently associated with several physical conditions in the community, and this comorbidity is significantly associated with poor quality of life and disability.

Arch Intern Med. 2006;166:2109-2116

THE NEGATIVE IMPACT OF COmorbidity of depression with physical illness has been well documented,[1-4] and evidence has been emerging to show that anxiety disorders are associated with several physical health problems.[5-15] For instance, phobic anxiety symptoms at baseline have been linked to sudden cardiac death.[16-18] Clinical studies of individuals with specific physical illnesses (thyroid disease,[19] cardiac disease,[20-22] cancer,[23] hypertension,[24] diabetes,[4,25] autoimmune diseases,[26,27] peptic ulcer disease,[28] and asthma[13,29-32]) have noted higher than expected levels of anxiety disorders among patients seeking treatment for physical conditions.[33] Similarly, epidemiologic studies[8-10,14,34-38] have found a positive association between the presence of anxiety disorder diagnoses and self-reported physical disorders.

Although evidence is mounting that anxiety disorders are often comorbid with physical disorders, 4 specific limitations of the current literature on this topic exist. First, the association between anxiety disorders and physical disorders found in clinical samples may be limited by sampling biases.[39,40] Second, although epidemiologic samples reduce the likelihood of sampling bias, most of these studies have used self-report diagnosis of physical health conditions.[41,42] Since individuals with anxiety disorders are more likely to report physical symptoms, it is possible that there may be a self-report bias of physical health conditions among individuals with anxiety disorders.[43] Third, most epidemiologic studies have used lay interviewers to diagnose mental disorders rather than trained health professionals. Fourth, findings have been discrepant on the relationship between

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comorbidity of anxiety disorders and physical conditions with disability and quality of life. Some primary care sample studies[44-46] have found that anxiety symptoms and anxiety disorders are associated with excess disability among primary care patients with physical health problems, whereas others have found that the associated disability was either minimal[47] or due to comorbidity with other mental disorders.[48] It remains uncertain whether the comorbidity of anxiety disorders with physical health problems is associated with functional impairments.

To address these limitations, we used the German Health Survey (GHS) to examine the relationship between anxiety disorders and physical illness. The GHS is the first survey to assign *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*) mental disorder diagnoses using the highly reliable Composite International Diagnostic Interview and to use physician-based diagnosis of physical health conditions by interview, physical examination, and laboratory assessment.[41,49] In addition, the GHS included a comprehensive assessment of functional status: (1) the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36),[50] which is a highly reliable, widely used measure of health-related quality of life, and (2) past 30-day role impairment due to physical and emotional problems.

We had 2 specific objectives for the current study. First, we examined whether there were unique associations between the presence of an anxiety disorder with particular physical conditions. Second, we examined whether the comorbidity of anxiety and physical health problems was independently associated with poor quality of life and disability even after adjusting for potential confounding factors (eg, overall burden of physical illness).

METHODS

SAMPLE

The GHS was based on a stratified, multistage, cross-sectional, nationally representative sample of individuals, aged 18 to 79 years, from the noninstitutionalized population of Germany.[41,51,52] The survey was approved by the institutional review board of the Robert Koch Institute (Berlin, Germany). A detailed description of the survey design is available elsewhere.[10,41,49]

In summary, all participants provided written informed consent. Data were collected between 1997 and 1999. The GHS had 2 components: the core survey (N=7124; 61.5% response rate) and the mental health supplement (N=4181; 87.6% response rate).[41] The responders and nonresponders did not differ significantly by age, sex, and self-reported health status on the core survey.[41]

MEASURES

Assessment of Physical Conditions

The GHS assessed physical conditions based on a combination of 3 methods: (1) a self-report questionnaire asking about the presence of 44 physical conditions, (2) a standardized computer-assisted medical interview by a general practice physician, and (3) anthropometric blood pressure measurements, as well as collection of blood and urine samples. The current analysis used physical conditions that were diagnosed on the basis of the physician assessment and laboratory results. We included physical conditions only if there was previous empirical evidence of an association between anxiety disorders and the physical condition was prevalent enough to be included on the basis of power.

Medical Morbidity

In the previous literature, 2 specific methods have been used to adjust for the effects of overall burden of physical illness on quality of life and service utilization: (1) a variable that counts the total number of physical conditions[2,15] and (2) the Charlson Comorbidity Index (CCI).[53] The latter measure was developed empirically to reliably index physical conditions that singly or in combination increase the short-term risk of mortality.[54,55] All the chronic conditions assessed in the survey were given a CCI weight (from 1 to 6). A total score was computed by adding all assigned weights for each chronic condition.[56,57] The CCI was significantly associated with lower mean scores on the physical component score (PCS) of the SF-36 ($r=-0.42$; $P<.01$ [2-tailed]) and with 1 or more days of disability compared with no days of disability due to physical health problems (odds ratio [OR], 1.65; 95% confidence interval [CI], 1.08-1.25). The number of physical conditions was also significantly associated with the PCS of the SF-36 ($r=-0.41$; $P<.01$ [2-tailed]) and with 1 or more days of disability compared with no days of disability due to physical health problems (OR, 1.21; 95% CI, 1.12-1.30). Thus, although either the count variable or the CCI explained a substantial proportion of variance in functional outcomes, we chose to use the more widely used CCI to adjust for overall burden of physical illness.

Assessment of Mental Disorders

The Munich Composite International Diagnostic Interview, administered by clinically trained interviewers (psychologists and physicians), was used to make lifetime, past-year, and past-month *DSM-IV* diagnoses.[58,59] Since all quality-of-life and disability variables were from the past month, we used only past-month mental disorder diagnoses. For the current analysis, we categorized a *DSM-IV* anxiety disorder diagnosis based on the presence of any of the following anxiety disorders: panic disorder, agoraphobia, social phobia, simple phobia, generalized anxiety disorder, and obsessive-compulsive disorder. (Posttraumatic stress disorder was not assessed in this survey.) We also categorized a mood disorder diagnosis (major depression, dysthymia, bipolar disorders) and a substance use disorder diagnosis (alcohol and illicit substance abuse or dependence).

Assessment of Health-Related Quality of Life

The German version[40,60] of the well-validated[61-63] SF-36 was used.[50,64,65] Eight health concepts were assessed within the past 30 days: physical functioning, social functioning, role limitations due to physical problems, bodily pain, mental health, role limitations due to emotional problems, vitality, and general health. Principal components analysis has identified 2 dimensions of the SF-36: the PCS and the mental component score (MCS).[66]

Assessment of Disability

Similar to previous surveys,[62,63] past 30-day disability was examined by the self-reported number of days of being unable to carry out usual daily activities. Parallel questions were asked for number of days of disability due to physical problems and emotional problems or use of alcohol or other drugs. Respondents were asked how many days in the prior 30 days they were totally unable to do the things they normally did. Responses

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ranged from 0 to 30 days. Because of the skewed nature of the responses, with most people in the community reporting 0 days of disability, a dichotomous variable was created: 0 days vs 1 or more days of disability.

Sociodemographic Factors

Sex, age, education, and marital status were entered as covariates in the analysis. Age was treated as a continuous measure in the analysis. Education was dichotomized into either completed high school or any higher education based on the format of the German educational system. Marital status was trichotomized into (1) never married, (2) married or common-law spouse, or (3) divorced, separated, or widowed.

Analytic Strategy

In all analyses, the appropriate statistical weight was used to ensure that the data were representative of the population. Standard errors were calculated using the Taylor Series Linearization method in the SUDAAN program (Research Triangle Park, NC) based on stratification information provided specifically for calculating design-based standard errors. To account for multiple comparisons, we present a more conservative $P<.01$, in addition to the $P<.05$ significance level.

We used multiple logistic regression to determine associations between anxiety disorders and individual physical conditions. Covariates in the analysis included sociodemographic factors, presence of a mood disorder, and presence of a substance use disorder. Next, using age-of-onset data available for both anxiety disorders and physical conditions, we examined the temporal order of onset of comorbid cases.

We also examined the association of comorbidity of anxiety disorders and physical health conditions with functional status: SF-36 scores and past 30-day disability. This analysis was limited to physical conditions that were significantly associated with anxiety disorders. In all regressions described herein, we included the following covariates: sociodemographic factors, mood disorder, substance use disorder, and CCI scores. Multiple linear regression was used to examine the association of comorbidity of anxiety disorders and physical illness with the PCS and MCS of the SF-36. Finally, multiple logistic regression was used to determine whether comorbidity of an anxiety disorder and a physical health condition was associated with an increased likelihood of past 30-day disability (due to emotional problems and physical conditions).

RESULTS

Table 1 provides the characteristics of the sample and all the independent variables and dependent variables. An anxiety disorder diagnosis was significantly associated with a mood disorder (OR,9.64; 95% CI, 7.44-12.49) and substance use disorder (OR,3.04; 95% CI, 2.01-4.59) diagnosis, supporting the need to adjust for the latter variables in all analyses.

Table 2 indicates that in the most stringent models, adjusting for sociodemographics and other common mental disorders, we found that the presence of an anxiety disorder was associated with respiratory diseases, gastrointestinal diseases, arthritic conditions, allergic conditions, thyroid diseases, migraine headaches, and any past-month physical condition. **Table 3** indicates that across all physical conditions, most comorbid cases had the onset of the anxiety disorder before the physical conditions.

Table 1. Independent and Dependent Variables Included in the Analysis

Variable	Total No. (%) of Participants (N = 4181)*
Sex	
Male	1913 (50.3)
Female	2268 (49.7)
Age, y	
18-25	517 (12.0)
26-35	949 (24.9)
36-45	992 (23.5)
46-55	863 (18.8)
56-65	856 (20.8)
Education	
High school or less	2314 (61.0)
Some college or more	1790 (39.0)
Marital status	
Married	2617 (64.1)
Single	493 (11.0)
Divorced, widowed, or separated	991 (24.9)
Past-month mood disorder (depression, dysthymia, bipolar disorder)	292 (6.3)
Past-month substance use disorder (alcohol and other drug abuse or dependence)	129 (2.9)
Past-month any anxiety disorder	429 (8.4)
Panic disorder with or without agoraphobia	99 (1.9)
Agoraphobia	68 (1.3)
Simple phobia	249 (4.7)
Social phobia	58 (1.2)
Generalized anxiety disorder	56 (1.2)
Obsessive-compulsive disorder	26 (0.4)
Past-month any physical condition	2610 (60.8)
Hypertension	488 (11.0)
Cardiac diseases (myocardial infarction, congestive heart failure)	106 (2.4)
Respiratory diseases (asthma, chronic bronchitis)	234 (5.8)
Gastrointestinal conditions (gastritis, ulcer)	142 (3.3)
Diabetes (with or without insulin treatment)	114 (2.7)
Arthritic conditions (wear and tear type, inflammatory diseases of the joints)	1094 (25.3)
Allergies (hay fever, allergic eczema, allergic hives, neurodermatitis, food allergy, allergic conjunctivitis)	536 (12.8)
Migraine headaches	343 (7.1)
Thyroid diseases	408 (9.1)
Past-month ≥1 day of disability	
Disability due to physical problems	626 (14.2)
Disability due to emotional problems or substance use	222 (4.7)
Medical Outcomes Study 36-Item Short-Form Health Survey score, weighted mean (SE)	
Mental component score	50.50 (0.14)
Physical component score	49.19 (0.14)
Charlson Comorbidity Index score (measure of overall physical disease burden), weighted mean (SE)	0.64 (0.02)

*Data are presented as number (unweighted percentage) of study participants unless otherwise indicated.

Figure 1 shows the relationship among the presence of an anxiety disorder, a physical condition, and the combination of both with the MCS and PCS of the SF-36. Importantly, the presence of a combination of anxiety disorders with any physical condition was associated with a lower mean PCS score than presence of any physical condition alone (ie, without an anxiety disor-

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Table 2. Multiple Logistic Regression Analyses Examining the Comorbidity of Past-Month Physical Conditions With Past-Month Anxiety Disorders

Physical Conditions	Anxiety Disorder, %*		Adjusted OR (95% CI)†	Adjusted OR (95% CI)‡
	Physical Condition Absent	Physical Condition Present		
Hypertension (n = 488)	8.4	8.9§	1.22 (0.84-1.77)	1.34 (0.90-1.99)
Cardiac diseases (n = 106)	8.3	13.0	1.97 (1.02-3.82)‖	1.79 (0.85-3.79)
Respiratory diseases (n = 234)	8.0	15.2	2.09 (1.42-3.07)¶	1.71 (1.13-2.57)¶
Gastrointestinal diseases (n = 142)	8.1	18.8	2.58 (1.61-4.14)¶	2.10 (1.24-3.54)¶
Diabetes (n = 114)	8.4	10.6	1.64 (0.84-3.20)	1.44 (0.72-2.88)
Arthritic conditions (n = 1094)	7.7	10.7	1.68 (1.29-2.19)¶	1.66 (1.24-2.21)¶
Allergic conditions (n = 536)	7.9	12.0	1.42 (1.05-1.93)‖	1.39 (1.00-1.95)‖
Migraine headaches (n = 343)	7.5	20.3	2.58 (1.88-3.54)¶	2.12 (1.51-2.98)¶
Thyroid diseases (n = 408)	7.8	14.8	1.61 (1.17-2.21)¶	1.59 (1.13-2.24)¶
Any past-month physical condition (n = 2610)	5.6	10.3	1.92 (1.45-2.53)¶	1.70 (1.27-2.27)¶

Abbreviations: CI, confidence interval; OR, odds ratio.
*Past-month anxiety disorder (social phobia, panic disorder, agoraphobia, generalized anxiety disorder, simple phobia, obsessive-compulsive disorder).
†Adjusted ORs controlling for sociodemographic factors (age, sex, marital status, and education).
‡Adjusted ORs controlling for sociodemographic factors, presence of past-month mood disorder, and any past-month substance abuse or dependence.
§Among people with hypertension, 8.9% met criteria for an anxiety disorder.
‖$P<.05$.
¶$P<.01$.

Table 3. Temporal Sequence of Onset of Anxiety Disorders and Physical Conditions Among Those With Comorbidity

Physical Condition	Comorbid Cases Where Anxiety Disorder Preceded Physical Condition, % (95% CI)
Hypertension	72.0 (63.5-79.1)
Cardiac diseases	69.7 (55.2-81.1)
Respiratory diseases	61.8 (52.4-70.4)
Gastrointestinal diseases	58.8 (52.5-64.9)
Diabetes	73.6 (53.7-87.7)
Arthritic conditions	73.4 (67.2-78.8)
Allergic conditions	61.8 (56.2-67.1)
Migraine headaches	63.7 (56.4-70.4)
Thyroid diseases	64.3 (56.8-71.3)

Abbreviation: CI, confidence interval.

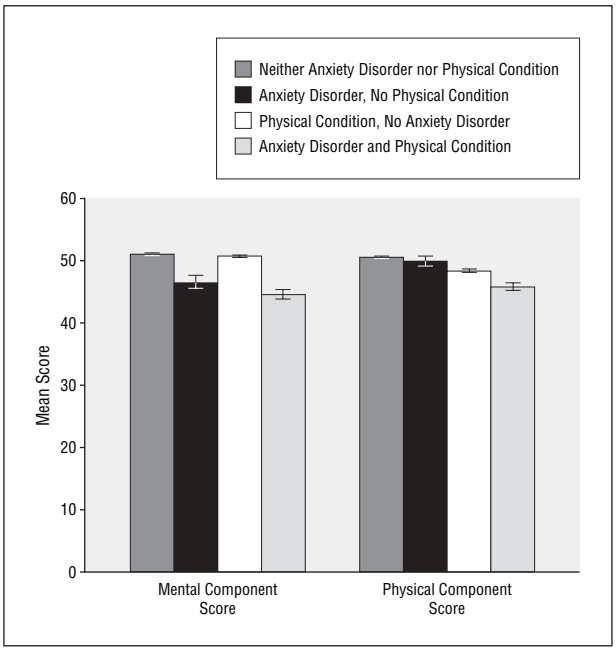

Figure 1. The association of anxiety disorders and physical conditions with health-related quality of life. The adjusted mean scores (mental component score and physical component score) and standard errors (error bars) from multiple linear regression analyses, adjusted for age, sex, marital status, education, presence of mood disorder, presence of substance abuse or dependence, and Charlson Comorbidity Index scores, are presented. The anxiety disorder and physical condition group had significantly lower mental component and physical component scores compared with the neither anxiety disorder nor physical condition group and the physical condition group alone.

der). This finding remained statistically significant in multiple linear regression models that adjusted for sociodemographic factors, presence of mental disorders, and overall physical disease burden (as indexed by the CCI).

Table 4 indicates that for each physical condition the mean PCS score was significantly lower for those who had an anxiety disorder in addition to the physical condition. Further adjustment for mental disorders and overall physical disease burden attenuated the association for thyroid disease, arthritic conditions, and gastrointestinal disease but remained statistically significant for respiratory disease, allergies, and migraine headaches.

Figure 2 illustrates the relationship between anxiety disorders and physical conditions with 1 or more days of disability. Compared with the presence of a physical condition alone, we found that the combination of an anxiety disorder and a physical condition was associated with 1 or more days of disability due to physical illness, even after adjusting for sociodemographic factors, mood disorders, substance use disorders, and CCI scores.

Table 5 provides the proportion of respondents with 1 or more days of disability due to physical health problems for each of the physical conditions with and without anxiety disorders. Compared with respondents without anxiety disorders, the presence of an anxiety disorder was associated with 1 or more days of disability across all physical conditions. In multiple logistic regression

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Table 4. Association of Comorbidity of Past-Month Anxiety Disorders and Past-Month Physical Conditions on the Physical Component Score of the 36-Item Short-Form Health Survey*

	Adjusted for Sociodemographic Factors†			Adjusted for Sociodemographic Factors, Mental Disorders, and Medical Morbidity‡		
Physical Conditions	Physical Condition Only (n = 2295)	Anxiety Disorder and Physical Condition (n = 315)	*P* Value	Physical Condition Only (n = 2295)	Anxiety Disorder and Physical Condition (n = 315)	*P* Value
Respiratory diseases	45.94 (0.72)	40.05 (1.42)	<.001	48.99 (0.75)	44.43 (1.49)	.005
Gastrointestinal diseases	46.19 (1.15)	42.22 (2.06)	.09	49.63 (1.07)	46.75 (2.17)	.22
Arthritic conditions	44.39 (0.37)	42.02 (0.91)	.02	45.94 (0.41)	44.33 (0.90)	.08
Allergic conditions	48.35 (0.44)	44.11 (1.02)	<.001	48.61 (0.42)	45.88 (0.97)	.01
Migraine headaches	46.43 (0.61)	41.23 (1.08)	<.001	46.87 (0.57)	43.63 (1.15)	.01
Thyroid diseases	49.08 (0.55)	45.83 (1.08)	.007	49.43 (0.50)	47.86 (1.05)	.18
Any past-month physical condition	47.83 (0.21)	44.19 (0.62)	<.001	48.50 (0.20)	45.86 (0.61)	<.001

*Effects are shown as adjusted means (SEs) from a multiple linear regression analysis.
†Adjusted for sociodemographic factors only (age, sex, marital status, and education).
‡Adjusted for sociodemographic factors, presence of past-month mood disorder, past-month substance abuse or dependence and Charlson Comorbidity Index scores.

models that adjusted for sociodemographics, other mental disorders, and CCI scores, the presence of an anxiety disorder was associated with disability for arthritic conditions and for 1 or more physical health problems.

COMMENT

This is the first study, to the best of our knowledge, to systematically evaluate the association between anxiety disorders and physical conditions in a large epidemiologic sample that included standardized physician-based diagnosis of physical health conditions. The current study has 3 important novel findings. First, our results demonstrated that the presence of an anxiety disorder was uniquely associated with a broad range of physician-diagnosed physical conditions. Second, the retrospective age-of-onset data suggest that the anxiety disorder preceded the onset of physical conditions among respondents with comorbidity. Third, the comorbidity of anxiety disorders with physical conditions was associated with increased likelihood of poor quality of life and disability compared with a physical condition alone. These findings extend previous work in clinical and community samples that noted an association between anxiety disorders and physical illnesses but also demonstrate the unique association of this comorbidity with poor quality of life and disability. Although there have been increased efforts to recognize and treat depression in the medically ill, our findings underscore the need to create similar programs to recognize and treat anxiety disorders in the medically ill.

In contrast to previous studies, this study was not limited by sampling biases found in treatment-seeking samples and less limited by recall biases of community surveys that have used self-report measures to assess physical illnesses. Particular strengths of the study were the use of well-established reliable measures of quality of life and disability, use of past-month variables that had the low probability of recall errors, use of clinical interviewers in the assessment of mental disorders compared with previous epidemiologic studies that used lay interviewers, and adjustment for other common mental disorders (especially depression).

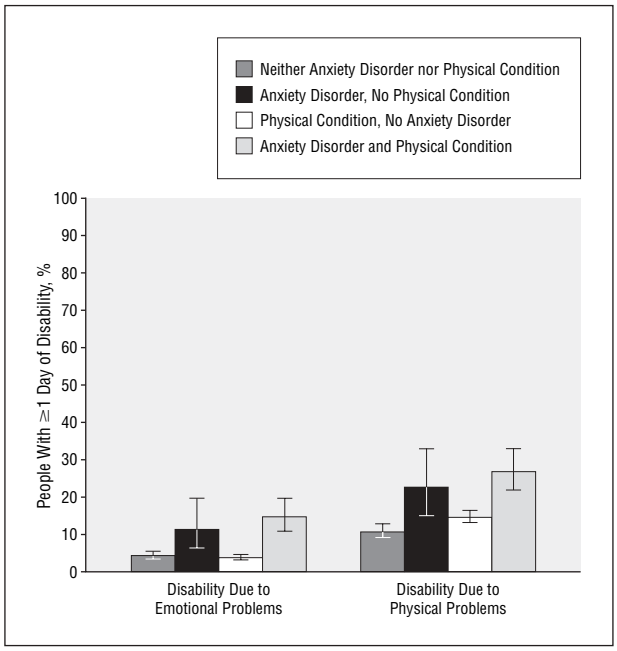

Figure 2. The relationship of anxiety disorders and physical conditions with past 30-day disability. Multiple logistic regression analysis, adjusting for age, sex, marital status, education, presence of mood disorder, presence of substance abuse or dependence, and Charlson Comorbidity Index scores, revealed that the anxiety disorder and physical condition group had significantly increased associations with disability due to emotional problems and physical conditions compared with the neither anxiety disorder nor physical condition group and the physical condition alone group. Error bars indicate standard errors.

Consistent with previous work, we found an association between the presence of an anxiety disorder and gastrointestinal diseases,[67] respiratory diseases,[12,34,68] allergic conditions,[9,69] migraine headaches,[15] thyroid diseases,[19] and arthritic conditions.[15,70] These findings underscore the importance of recognition of comorbidity of anxiety

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Table 5. Multiple Logistic Regression Analyses Estimating the Association of Comorbidity of Past-Month Anxiety Disorders and Past-Month Physical Conditions With Disability Due to Physical Problems in the German Health Survey Among the 4181 Study Participants

	≥1 Disability Day, No. (%)			
Physical Conditions	Physical Condition Only (n = 2295)	Anxiety Disorder and Physical Condition (n = 315)	Adjusted OR (95% CI)*	Adjusted OR (95% CI)†
Respiratory diseases	34 (16.1)	13 (30.9)	2.22 (0.98-5.01)	1.73 (0.76-3.98)
Gastrointestinal diseases	23 (19.8)	10 (33.9)	1.92 (0.72-5.08)	1.60 (0.60-4.24)
Arthritic conditions	159 (16.0)	42 (29.2)	1.94 (1.25-3.03)‡	1.66 (1.06-2.61)§
Allergic conditions	80 (16.0)	19 (25.6)	1.75 (0.90-3.43)	1.44 (0.72-2.89)
Migraine headaches	67 (24.7)	21 (31.9)	1.33 (0.70-2.55)	1.04 (0.53-2.02)
Thyroid diseases	45 (12.8)	20 (26.3)	2.27 (1.17-4.40)‡	1.84 (0.92-3.69)
Any past-month physical condition	354 (14.8)	82 (26.9)	1.99 (1.44-2.73)‡	1.69 (1.20-2.37)‡

Abbreviations: CI, confidence interval; OR, odds ratio.
*Adjusted ORs controlling for sociodemographic factors (age, sex, marital status, and education).
†Adjusted ORs controlling for sociodemographic factors, presence of past-month mood disorder, presence of past-month substance abuse or dependence and Charlson Comorbidity Index scores.
‡$P<.01$.
§$P<.05$.

disorders among people who present with these physical health problems.

Dissimilar from previous work,[34,71] the association between cardiac disease and anxiety disorders was no longer statistically significant after adjusting for comorbid depression and substance use disorders. We believe that this finding can be attributed to the low prevalence of cardiac disease (2.4%) in the current analysis, which excluded people older than 65 years. We did not find an association of anxiety disorders with hypertension and diabetes. The literature has produced inconsistent findings with regard to these associations.[7,24,25,72] The difference in findings between studies is likely attributable to differences in the methods of assessment of anxiety disorders and physical health problems and the types of samples examined.

The mechanisms of association between anxiety disorders and physical conditions remain unknown, although several possibilities should be considered. First, a direct causal relationship between physical health and anxiety disorders may exist. For example, the presence of a physical illness, especially a life-threatening illness, may lead to the onset of increased anxiety and worry that reaches anxiety disorder proportions. Second, the presence of an anxiety disorder may increase the likelihood of physical illness through biological mechanisms (eg, changes in the hypothalamic-pituitary axis system or alterations in autonomic nervous system activity). Psychological mechanisms, such as anxiety sensitivity (fear of body symptoms),[73,74] may be important in both maintenance of the anxiety disorder and the physical health problem. Third, an indirect mechanism might explain the relationship, in which a third variable may lead to comorbidity. For example, the presence of anxiety disorder may lead to a substance use disorder (eg, alcohol or other drug or nicotine use) that in turn leads to a physical health problem. The presence of a physical illness may lead to the use of a medication that has an adverse effect on anxiety symptoms (eg, bronchodilators in respiratory disease). Fourth, common genetic, environmental (eg, poverty, childhood adversity),[75,76] and personality factors[67] may explain the co-occurrence of anxiety disorders with physical health problems.

The mechanism(s) that leads to reduced quality of life and increased disability among those with comorbid anxiety disorders and physical conditions requires careful consideration. Katon et al[75] present a model that poses possible mechanisms to explain the adverse impact of comorbidity of anxiety and depressive disorders with asthma. They suggest that the presence of an anxiety or depressive disorder may reduce the capacity to manage asthma and other life challenges, which may lead to decreased adherence to treatment of asthma. Decreased adherence to treatment of asthma may lead to increased asthma symptom burden and increased functional impairment. Further examination of the mechanisms that lead to increased morbidity among those with co-occurrence of anxiety and physical illness is required.

The current study has a number of limitations. First, the survey was limited to adults (aged 18-65 years); therefore, the current findings may not be generalizable to elderly and very young individuals. Second, the retrospective recall of age of onset of conditions, commonly used in cross-sectional epidemiologic surveys,[77,78] may be affected by recall errors. Future longitudinal studies on this topic are warranted. Third, although the CCI was significantly associated with functional impairment and has been commonly used to adjust for the effects of medical morbidity, it is not a complete control for medical morbidity. Fourth, although physicians diagnosed the physical illnesses, certain physical illnesses are based more on self-reported data (eg, arthritis) than others (eg, diabetes). Thus, some of the associations found in the current study may be biased by overreporting of physical symptoms in anxious patients. Finally, although the respondents to the survey did not differ significantly from nonrespondents on several variables, response to the survey may nonetheless be a potential source of selection bias.

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In conclusion, the current study demonstrated that anxiety disorders are uniquely associated with several physical health conditions in the community, and this comorbidity is itself associated with poorer functional outcomes. In combination with recent data demonstrating that anxiety disorders are risk factors for suicidal behavior,[79] the current study suggests that anxiety disorders should be considered an important public health problem in the community. During the last decade, efforts have been substantially increased to improve recognition and treatment of depression in general practice.[80] Similar efforts should be strongly considered for anxiety disorders.

Accepted for Publication: July 12, 2006.
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Financial Disclosure: None reported.
Funding/Support: The GHS was supported by grant 01EH970/8 (German Federal Ministry of Research, Education and Science). Preparation of this article was supported by a Manitoba Health Research Council Award (Dr Sareen), by US National Institutes of Health grant MH64122 (Dr Stein), and a Canada Research Chair award (Dr Cox).
Additional Information: Mental disorders were assessed in the mental health supplement of the GHS (Max-Planck Institute of Psychiatry, Munich, Germany; principal investigator: H.-U. Wittchen) and physical conditions in the core survey of the GHS (Robert Koch Institute, Berlin, Germany; principal investigators: B.-M. Kurth, W. Thefeld). A public use file from the data set can be ordered from the second author (jacobi@psychologie.tu-dresden.de).
Acknowledgment: We thank Gregory E. Ratcliffe, BSc, and Jina Pagura, BSc, for their thoughtful review of the manuscript.

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