Nonpsychiatric Medical Comorbidity, Health Perceptions, and Treatment Outcome in Patients With Panic Disorder

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Panic disorder is frequently complicated by high rates of co-occurring nonpsychiatric medical conditions. The present study examined the relationship between medical morbidity, perceived physical health, and treatment outcome in panic disorder. Patients meeting the American Psychiatric Association's Diagnostic and Statistical Manual of mental disorders (1994) criteria for panic disorder ($N = 71$) completed 12 sessions of cognitive–behavioral treatment and were assessed at posttreatment and 6-month follow-up. Medical comorbidity and perceived health were both found to be related to end-state functioning. Medical comorbidity did not uniquely predict outcome beyond its shared variance with perceived health. At posttreatment, 71% of patients who perceived their physical health as good met recovery criteria compared with only 35% of those who perceived their health as poor. At follow-up, 67% of those who perceived their physical health as good met composite recovery criteria compared with only 33% of those with perceived poor health. These findings offer preliminary support for the impact of physical health, both actual and perceived, on treatment outcome of patients with panic disorder.

Key words: panic disorder, medical diagnosis, comorbidity, health perceptions, cognitive–behavioral treatment

Panic disorder is frequently complicated by the presence of other psychiatric and medical conditions. In terms of psychiatric comorbidity, as many as 70% of patients with panic disorder present with co-occurring Axis I and Axis II disorders (Brown & Barlow, 1992; Friedman, Shear, & Frances, 1987; Lesser et al., 1988; Reich, 1988). Similarly, patients with panic disorder show high rates of nonpsychiatric medical conditions. The association between panic disorder and cardiorespiratory disorders, such as asthma, chronic obstructive pulmonary disease, and mitral valve prolapse, is well established (Gorman et al., 1988; Karajgi, Rifkin, Doddi, & Kolli, 1990; Weissman, Markowitz, Ouellette, Greenwald, & Kahn, 1990; Zandbergen et al., 1991). Epidemiological reports indicate that chronic medical conditions are more prevalent in people with a lifetime history of an anxiety disorder (Wells, Golding, & Burnam, 1989).

Longitudinal evaluation of panic disorder indicates an increased prevalence of chronic medical conditions (e.g., hypertension, migraine headaches, ulcer, thyroid disease) compared to other anxiety conditions and to the general population (Rogers et al., 1994).

The high rate of comorbidity in panic disorder has naturally led to evaluation of the effects of co-occurring conditions on treatment outcome. Mellman and Uhde (1987) found poorer response to pharmacotherapy in patients with panic disorder and comorbid obsessive–compulsive disorder. Pollack, Otto, Rosenbaum, and Sachs (1992) reported poorer outcome for panic disorder patients with comorbid Axis II disorders. However, Brown, Antony, and Barlow (1995) found that co-occurring Axis I diagnoses did not differentially affect treatment outcome. Further evaluation of the impact of comorbidity on treatment outcome has been recommended due to the scarcity of such studies (Shear, Leon, & Spielman, 1994). The lack of research in this area is particularly apparent for nonpsychiatric medical comorbidity; we could find no studies examining its impact on treatment outcome in panic disorder.

The relationship between panic disorder and nonpsychiatric medical illness is complex. Panic disorder can contribute to the development of physical conditions, exacerbate existing physical conditions, or both (Karajgi et al., 1990; Kawachi et al., 1994). In addition, nonpsychiatric medical conditions can contribute to the development of panic disorder (Kahn, Drusin, & Klein, 1987; Raj, Corvea, & Dagon, 1993), exacerbate panic disorder symptoms, or both (McCue & McCue, 1984). Alternatively, panic disorder and medical illnesses can independently co-occur.

Determining whether concurrent nonpsychiatric medical

conditions are a cause, are a consequence, or are independent of panic disorder is often difficult. Whatever the relationship, the interplay between panic disorder and physical conditions is likely to influence response to treatment. Consider some of the prominent psychological theories of panic disorder (Barlow, 1988; Clark, 1986). These models describe two mechanisms for the generation or maintenance of panic including (a) cognitive misappraisal of benign bodily sensations, and (b) interoceptive conditioning that links bodily cues with sympathetic arousal. Bodily perturbations are a common and necessary element for the generation of fear in each of these mechanisms. The presence of physical conditions that create bodily perturbations will necessarily place an individual at greater risk for both a catastrophic misappraisal of sensations and an interoceptively mediated fear response. In line with these psychological models of panic disorder, nonpsychiatric medical morbidity is likely to maintain panic disorder when the physical condition produces bodily sensations that are likely to be misattributed.

In addition to nonpsychiatric medical comorbidity, the relationship between panic disorder and perceived physical health is of interest. Whereas comorbid physical conditions presumably reflect the actual physical status of the patient, perceptions of health reflect individual differences in perceived physical vulnerability, and also serve as likely psychosocial mediators of treatment-seeking and behavioral-responding to illness (Realini & Katerndahl, 1993). For example, health perceptions have been found to be highly associated with perceived vulnerability to illness regardless of actual health status (Connelly, Philbrick, Smith, Kaiser, & Wymer, 1989). Among patients with panic disorder, there is a strong association between medical morbidity and perceived health (Schmidt, Telch, & Joiner, 1996). Yet, perceived health often differs from diagnosed medical morbidity or physician ratings of health (Idler & Kasl, 1991; LaRue, Bank, Jarvik, & Hetland, 1979; Maddox & Douglass, 1973). When their perception of health is compared to physical examination, some individuals realistically appraise their health status (health realists), whereas others overestimate (health optimists), or underestimate (health pessimists) their health.

Health-related pessimism and exaggerated health concerns are common in patients with panic disorder. Patients with panic disorder perceive themselves as having poorer health compared to nonclinical controls and depressed patients (Weissman, 1991). Worry and anxiety are central to the panic disorder syndrome and are often directed at health-related concerns, for example, fear of dying and fear of heart attack (American Psychiatric Association, [APA], 1994). Many panic disorder patients believe that a panic attack will lead to catastrophic medical consequences, such as heart attack or stroke (Ottaviani & Beck, 1987; Telch, Brouillard, Telch, Agras, & Taylor, 1989). Panic disorder patients worry more about bodily sensations (McNally, 1990; Schmidt, Lerew, & Trakowski, in press) and have also been found to exhibit somatization traits (Starcevic, Fallon, Uhlenhuth, & Pathak, 1994) and hypochondriacal concerns (Barsky, Barnett, & Cleary, 1994).

It is unclear whether health-related concerns are a cause, are a consequence, or are independent of panic attacks. In any case, individual differences in perceived physical vulnerability may influence treatment response. Individuals who perceive themselves as being unhealthy or physically vulnerable may be more likely to appraise bodily cues as threatening to their health. These patients may expect the worst when exposed to ambiguous physical symptoms. On the other hand, those patients with perceived good health may tend to overlook bodily cues or appraise physical perturbations as nonthreatening.

The present study extends the treatment outcome literature as it examines the relationship between actual and perceived health and end-state functioning in patients with panic disorder. Consistent with psychological models of panic disorder, it was predicted that comorbid nonpsychiatric medical conditions and more negative perception of health would be associated with poorer outcome at posttreatment and follow-up.

Method

Participants

The sample consisted of 71 patients meeting the following criteria: (a) principal Axis I diagnosis of panic disorder with or without agoraphobia according to the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (1994); (b) no change in medication type or dose during the 8 weeks before treatment; (c) no evidence of serious suicide intent; (d) no evidence of current substance abuse; and (e) no evidence of current or past schizophrenia, bipolar disorder, or organic mental disorder. Participant demographics are presented in Table 1.

Procedure

Patients were selected from a large pool of applicants who presented for evaluation at an academic research center specializing in the assessment and treatment of anxiety disorders. Diagnostic assessment was based on an initial phone screening interview followed by a face-to-face structured clinical interview using the Structural Clinical Interview for the DSM—Non-Patient Version (SCID-NP; First, Spitzer, Gibbon, & Williams, 1994). Randomly selected videotaped interviews from the center demonstrated acceptable kappa coefficients for interrater agreement for all Axis I diagnoses (see Telch, Schmidt, Jaimez, Jacquin, & Harrington, 1995).

Participants received a group-administered cognitive–behavioral treatment that consisted of 12 sessions over an 8-week period. The treatment protocol includes four major components: (a) education and corrective information regarding the etiology and maintenance of panic disorder, (b) cognitive therapy, (c) respiratory control techniques, and (d) interoceptive exposure (cf. Telch et al., 1993). Treatment integrity was maintained by utilizing a structured and manualized treatment protocol (Telch & Schmidt, 1990) that describes the specific goals and strategies for each session. The treatment was administered by one of two licensed psychologists with at least 5 years of experience with cognitive–behavioral treatment of anxiety disorders.

All 71 participants who began treatment were assessed at posttreatment. Eleven participants did not complete the 6-month follow-up. Six of these participants received additional treatment because of relapse and were discontinued from the follow-up phase. The remaining participants could not be contacted due to

Table 1

Comparison of Panic Disorder (PD) Patients Categorized by the Presence of a Comorbid Medical Condition on Demographic and Clinical Variables

Variable	PD ($n = 34$)	PD and medical condition ($n = 37$)	Total ($N = 71$)
Age (years)			
M	33.2	36.2	34.8
SD	9.2	9.9	9.7
Sex (% female)	73.5	70.3	71.8
Ethnicity (%)			
Caucasian	91.2	83.8	87.3
Hispanic	8.8	13.5	11.3
African American	0.0	2.7	1.4
Marital status (%)			
Never married	32.3	18.9	23.9
Married	55.9	64.9	60.6
Divorced or separated	11.8	16.2	15.5
Education (%)			
High school or less	26.5	24.3	25.3
Part college	47.0	40.6	43.7
College graduate or beyond	26.5	35.1	31.0
Employment status (%)			
Employed	55.9	67.5	62.9
Not employed	38.2	29.8	32.8
Student	5.9	2.7	4.3
Physician visits (6 months)			
M	3.1	5.8	4.5
SD	2.9	5.3	4.1
ER visits (6 months)			
M	0.6	1.9	1.1
SD	0.2	2.3	1.6
Hospitalization in past 6 months (% yes)	0.0	11.0	5.6
Panic frequency (past month)			
M	2.2	2.0	2.1
SD	2.4	2.0	2.2
Anxiety (SPRAS)			
M	50.8	55.9	53.4
SD	25.9	30.3	28.1
Phobic avoidance (FQ-Ago)			
M	12.1	13.0	12.6
SD	10.6	8.7	9.7
Fear of fear (ASI)			
M	32.5	33.5	33.0
SD	9.7	11.4	10.6
Impairment (SDS)			
M	3.6	3.5	3.6
SD	1.0	1.0	1.0
Secondary diagnoses (%)			
Simple phobia	17.8	24.3	21.7
Major depression	23.5	16.2	18.9
GAD	14.7	16.2	15.5
Social phobia	8.8	16.2	12.9
Dysthymia	11.8	5.4	8.4

Note. There were no significant group differences. ER = emergency room; SPRAS = Sheehan Patient-Rated Anxiety Scale; FQ-Ago = Agoraphobia subscale of the Fear Questionnaire; ASI = Anxiety Sensitivity Index; SDS = Sheehan Disability Scale; GAD = Generalized Anxiety Disorder.

address changes. Comparisons between those completing treatment and those lost to follow-up indicated no significant differences in demographics, medical comorbidity, health perceptions, symptom severity at pretreatment or posttreatment, and composite recovery status ($ps > .05$).

Measures

An assessment battery tapping the major clinical dimensions of panic disorder (i.e., panic attacks, anxiety, phobic avoidance, fear of fear) was administered to all participants at baseline (Week 0), posttreatment (Week 9), and 6-month follow-up (Week 35). The presence of chronic medical conditions and perceived health was assessed using the General Health Survey (GHS) at baseline. The clinical facets of panic disorder were assessed with the following measures: (a) Texas Panic Attack Record Form (cf. Ballenger et al., 1988), (b) Sheehan Patient-Rated Anxiety Scale (SPRAS; Sheehan, 1983), (c) Agoraphobia subscale of the Marks and Mathews Fear Questionnaire (FQ-Ago; Marks & Matthews; 1979), and (d) Anxiety Sensitivity Index (ASI; Reiss et al., 1986). Clinical

impairment was assessed with the Sheehan Disability Scale (SDS; Ballenger et al., 1988).

GHS. The short-form of the GHS is a 36-item self-report measure of perceptions about health. The GHS is comprised of six subscales. Three subscales measure the perceived impact of health on physical functioning, work functioning, and social functioning. Other subscales assess general perceptions of physical health, mental health, and pain. Because we were interested in the relationship between perceived physical health and clinical outcome, we excluded the mental health subscale from overall GHS scores. Each subscale is scored by transforming item responses to a linear scale ranging from 0–100 with higher scores indicating better functioning. The six subscales have demonstrated acceptable reliability and validity in both patient and general populations (Stewart, Hays, & Ware, 1988).

Nonpsychiatric medical comorbidity. The GHS contains a checklist for assessing the presence of chronic physical illnesses (e.g., hypertension, asthma, arthritis) and a 6-month history of visits to health professionals that has been validated with nonpsychiatric and psychiatric samples (McHorney, Ware, Lu, & Sherbourne, 1994; McHorney, Ware, & Raczek, 1993). An aggregate measure of nonpsychiatric medical morbidity (i.e., number of chronic medical conditions reported) was used in the data analysis.

Texas Panic Attack Record Form. Panic attacks were assessed using a prospective self-monitoring approach similar to that used in the Ballenger et al. (1988) study, which has been found to reduce overreporting bias (Margraf, Taylor, Ehlers, Roth, & Agras, 1987). Participants were provided with daily panic diary forms. For each panic episode, participants were instructed to record the (a) date, (b) time, (c) duration, (d) severity, (e) symptoms experienced, and (f) setting parameters (e.g., place, activity, accompanied). Panic attacks with three or fewer symptoms (i.e., limited symptom attacks) were not included in the panic attack count. The importance of immediate recording was emphasized to increase the accuracy of participants' recollection of the panic attack.

SPRAS. The SPRAS is a 35-item self-report scale for assessing the intensity of anxiety symptoms. Each of the 35 symptoms (e.g., shaking or trembling) is rated on a 5-point scale ranging from 0 (*not at all distressing*) to 4 (*extremely distressing*). We modified the instructions so that symptom ratings were based on a 1-week time frame.

FQ-Ago. The FQ-Ago was used to assess phobic avoidance. The FQ consists of 15 items representing three separate phobia types (agoraphobia, blood and injury phobia, and social phobia). For each item, the participant rates the degree of avoidance to the object or situation. The five-item FQ-Ago has demonstrated adequate psychometric properties and is a widely used self-report measure for assessing agoraphobia (Jacobson, Wilson, & Tupper, 1988).

ASI. The ASI is a 16-item self-report measure of the fear of bodily sensations associated with arousal. Each item consists of a possible negative consequence of anxiety symptoms. Items are rated on a 0 to 4 point Likert scale and are summed to compute a total score. The ASI has demonstrated high internal consistency and satisfactory test–retest reliability (Telch, Shermis, & Lucas, 1989).

SDS. The SDS is a four-item self-report measure of global impairment created by the presenting problem. Three items assess impairment in (a) work activities, (b) social life and leisure activities, and (c) family life and home responsibilities. Each item is rated on an 11-point Likert scale (0 = *not at all*, 1–3 = *mild*, 4–6 = *moderate*, 7–9 = *marked*, 10 = *severe*). One item assesses overall work and social disability and is scored on a 5-point scale.

Composite measure of end-state functioning. We developed a composite measure of clinically significant change for the evalua-

tion of end-state functioning at posttreatment and follow-up. A patient was classified as recovered when scores on each of three clinical dimensions (i.e., panic frequency, anxiety, and phobic avoidance) fell within the normal range. Recovery criteria for the SPRAS and FQ are based on well-established cutoff scores reported in the literature (see Telch et al., 1993). The recovery criterion for panic attacks was set at zero.

Results

Description of Nonpsychiatric Medical Comorbidity

Approximately half (52%) of all patients reported the presence of at least one chronic physical health condition on the GHS at intake. Of those patients reporting a physical condition, 68% ($n = 25$) reported one physical condition, 16% ($n = 6$) reported two conditions, and 16% ($n = 6$) reported three or more conditions ($M = 0.7$, $SD = 0.9$). The most frequently endorsed physical conditions included chronic back problems (46%), hypertension (27%), asthma (24%), arthritis (22%), irritable bowel syndrome (16%), ulcer (16%), heart condition (13%), and other, for example, cancer, migraine, diabetes (24%). A substantial number of patients (35%) had seen a physician for a physical health problem in the past month and most (89%) had a physician visit during the past 12 months. However, only 6% had been hospitalized for a medical condition in the past 6 months.

Relationship Between Nonpsychiatric Medical Comorbidity and Health Perception

As expected, we found medical comorbidity to be highly associated with perceived health. Patients with a comorbid physical condition reported significantly poorer perceived health compared to those without, $F(1, 70) = 5.45, p < .05$. Number of reported physical conditions was highly correlated with overall GHS scores ($r = -.65$) as well as significantly correlated with each of the GHS subscales ($ps < .05$).

Relationship Between Nonpsychiatric Medical Comorbidity, Health Perception, and Pretreatment Symptoms

The relationship between physical conditions, health perception, and each of the major clinical features of panic disorder (i.e., panic attacks, anxiety, panic-related avoidance, fear of fear, and overall impairment) was examined to determine whether individual facets of panic disorder were differentially associated with comorbidity and perceived health (see Table 2). The positively skewed panic attack frequency data was normalized using logarithmic transformation. Comorbidity was not significantly correlated with pretreatment symptoms ($ps > .05$). On the other hand, perceived health was highly associated with pretreatment symptoms. Overall GHS scores were significantly correlated with SPRAS ($r = -.34, p < .01$), FQ-Ago ($r = -.33, p < .01$), ASI ($r = -.28, p < .05$), and SDS ($r = -.33, p < .01$). Negative correlations indicate that higher symptom

Table 2

Correlations Between Nonpsychiatric Medical Conditions, Perceived Health, and Symptoms at Pretreatment, Posttreatment, and 6-Month Follow-Up

Clinical features of panic disorder	Pre	Post	FU
Nonpsychiatric medical conditions			
Panic frequency	-.01	.04	.08
Anxiety (SPRAS)	.14	.21	.17
Phobic avoidance (FQ-Ago)	.19	.30*	.35*
Fear of fear (ASI)	.04	.22	.23
Overall impairment (SDS)	.06	.26*	.26*
Perceived health			
Panic frequency	-.07	.02	-.01
Anxiety (SPRAS)	-.42***	-.16	-.18
Phobic avoidance (FQ-Ago)	-.35**	-.29*	-.22
Fear of fear (ASI)	-.28*	-.21	-.29*
Overall impairment (SDS)	-.34**	-.29*	-.33*

Note. Pre = pretreatment; Post = residualized change at posttreatment; FU = residualized change from pretreatment to 6-month follow-up; Panic frequency = log transformation of panic frequency; SPRAS = Sheehan Patient-Rated Anxiety Scale; FQ-Ago = Agoraphobia subscale of the Fear Questionnaire; ASI = Anxiety Sensitivity Index; SDS = Sheehan Disability Scale. Negative correlations indicate that greater symptom severity is associated with more negative perceptions of health.
*$p < .05$. **$p < .01$. ***$p < .001$.

severity was associated with more negative perceptions of health.

Relationship Between Nonpsychiatric Medical Comorbidity and Treatment Outcome

The relationship between comorbidity and demographic factors (i.e., age, gender, ethnicity, marital status, education) was evaluated using separate regression analyses. None of these analyses were significant ($ps > .05$), and, accordingly, demographic variables were not used as covariates in the subsequent analyses.

Logistic regression analyses were conducted to examine whether nonpsychiatric medical comorbidity predicted composite recovery at posttreatment and both composite recovery and relapse at 6-month follow-up. Comorbidity was marginally associated with poorer recovery at posttreatment, $\chi^2(1, N = 71) = 3.23$, odds ratio $= 2.72$, $p < .10$, but was not significantly related to 6-month follow-up, $\chi^2(1, N = 60) = 1.75$, odds ratio $= 1.55, p > .05$.

The relationship between comorbidity and change on each of the individual clinical features of panic disorder was also evaluated (see Table 2 for a summary). Residualized change scores were calculated for each clinical feature to assess change from (a) pretreatment to posttreatment, and (b) pretreatment to 6-month follow-up. Nonpsychiatric medical comorbidity was regressed on each of the outcome variables. When we controlled for pretreatment symptoms, comorbidity was associated with increased phobic avoidance and overall symptom impairment at posttreatment: phobic avoidance: $t(71) = 2.44$, $p < .05$, $\beta = .59$;

impairment: $t(71) = 2.05$, $p < .05$, $\beta = .10$; and at follow-up, phobic avoidance: $t(60) = 2.81, p < .01$, $\beta = 0.55$; impairment: $t(60) = 2.01, p < .05$, $\beta = 0.11$.

Relationship Between Health Perception and Treatment Outcome

Examination of the relationship between perceived health and demographic variables indicated that older patients reported significantly poorer perceived health, $r = -.28$, $t(70) = -2.50$, $p < .05$. Gender, ethnicity, marital status, and education were not significantly associated with overall GHS scores ($ps > .05$).

We used multiple logistic regression analyses to evaluate the relationship between perceived health and treatment outcome with age as a covariate. We constructed separate models for each of the categorical outcome variables. After we controlled for age, perceived poor health was associated with lower rates of recovery at posttreatment $\chi^2(1, N = 71) = 4.20$, odds ratio $= 10.4$, $p < .05$, and at 6-month follow-up, $\chi^2(1, N = 60) = 4.04$, odds ratio $= 10.0, p < .05$.

We used a series of chi-square analyses using a tertian split of GHS scores (i.e., upper, middle, lower thirds) to further examine the relationship between outcome status and perceived health. The results of these analyses are illustrated in Figure 1. A significantly greater percentage of participants in the upper third of the GHS distribution, compared to those in the lowest third, met recovery criteria at posttreatment, $\chi^2(1, N = 71) = 6.06$, $p < .05$, and 6-month follow-up, $\chi^2(1, N = 60) = 6.12, p < .05$. Differences between participants in the middle versus lower or upper thirds did not reach statistical significance ($ps > .05$). At posttreatment, 71% of participants in the highest third of the GHS distribution met recovery criteria compared to 61% in the middle third and only 35% of those in the lowest third. At follow-up, 67% of participants in the highest third met recovery criteria compared to 47% of those in the middle third and 33% in the lowest third.

The relationship between perceived health and changes on each of the individual clinical features of panic disorder was also evaluated (see Table 2). Perception of poorer health was associated with increased phobic avoidance at posttreatment, $t(71) = -2.33, p < .05$, $\beta = -.01$, increased fear of fear at follow-up, $t(60) = -2.02, p < .05$, $\beta = -.02$, and greater overall symptom impairment at both posttreatment, $t(71) = -2.46, p < .05$, $\beta = -.01$, and follow-up, $t(60) = -2.21, p < .05$, $\beta = -.01$.

Relative Contributions of Nonpsychiatric Medical Comorbidity and Perceived Health in Predicting Treatment Outcome

Both nonpsychiatric medical comorbidity and perceived health were found to be related to end-state functioning. We used hierarchical multiple regression analyses to assess the relative contributions of comorbidity and perceived health in predicting composite recovery. Age was entered first as a covariate. Next, GHS and comorbidity were simultaneously
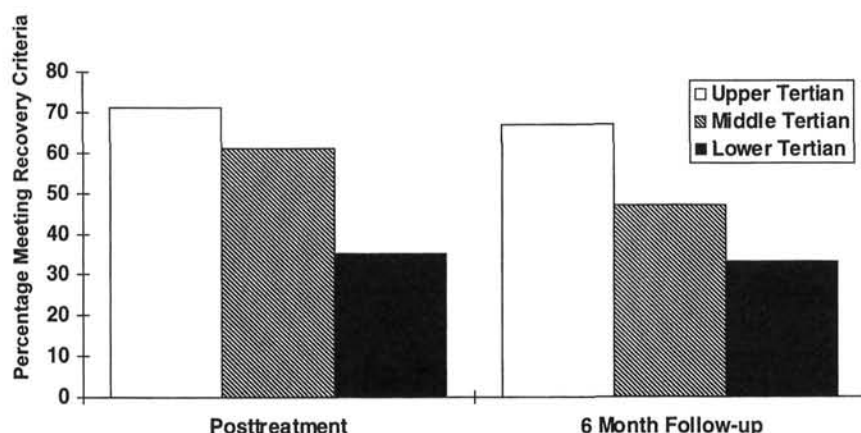
Figure 1. Percentage of patients scoring in the upper, middle, and lower thirds of the General Health Survey (GHS) distribution meeting recovery criteria at posttreatment and 6-month follow-up. Upper > lower at post and follow-up, $p < .05$.

entered. Perceived health accounted for 9% of the variance in predicting posttreatment recovery and 7% of the variance in predicting 6-month follow-up recovery. Medical comorbidity accounted for less than 1% of the variance in the composite recovery predictions ($ps > .05$), suggesting that actual health status accounts for little unique variance above and beyond the variance shared with perceived physical health.

Relationship Between Psychiatric Co-Occurrence and Treatment Outcome

Because few studies have examined the effect of psychiatric co-occurrence on end-state functioning of panic disorder patients in a cognitive–behavioral therapy protocol, this relationship was also evaluated in the present sample. The effect of psychiatric co-occurence on composite recovery and changes in the primary symptom domains was assessed. Psychiatric co-occurrence was evaluated in terms of any co-occurring diagnosis, any co-occurring mood disorder diagnosis, and any co-occurring anxiety disorder diagnosis.

Consistent with other reports, approximately half (49%) of the sample received a co-occurring psychiatric diagnosis. Table 1 displays the percentage of co-occurring diagnoses for each anxiety and mood disorder. In the present sample, 38% received one or more additional anxiety disorder diagnoses and 23% received one or more mood disorder diagnoses.

Logistic regression analyses using the presence of any co-occurring psychiatric diagnosis as the predictor of composite recovery at posttreatment and 6-month follow-up were not significant: posttreatment recovery, $\chi^2(1, N = 71) = 1.13$, odds ratio $= 0.60$, $p > .05$; follow-up recovery, $\chi^2(1, N = 60) = 0.66$, odds ratio $= 0.02$, $p > .05$. Similarly, separate analyses using the presence of any co-occurring anxiety disorder, or the presence of any co-occurring mood disorder, were not significant ($ps > .05$). One-way multivariate analyses of variance (MANOVAs) using any co-

occurring psychiatric diagnosis as the grouping variable and residual change in symptoms (e.g., panic attack frequency, anxiety, phobic avoidance, fear of fear, and overall symptom impairment) at posttreatment and follow-up were not significant: posttreatment recovery, $F(1, 65) = 0.75$, $p > .05$; follow-up recovery, $F(1, 55) = 0.75$, $p > .05$. Overall, these findings are consistent with those reported by Brown et al. (1995) indicating that psychiatric co-occurrence in panic disorder does not significantly affect clinical responding to a cognitive–behavioral treatment protocol.

Discussion

In the present study, nonpsychiatric medical comorbidity was not related to pretreatment symptom severity, suggesting that the presence of comorbid physical conditions does not significantly alter the general symptomatic presentation among patients with panic disorder. However, comorbidity negatively affected response to treatment as it was related to poorer outcome at posttreatment. Examination of individual symptom measures indicated that patients with comorbid physical conditions exhibited less improvement in overall symptom impairment and phobic avoidance at posttreatment and follow-up.

On the basis of psychological models of panic (Barlow, 1988), comorbidity was predicted to more greatly influence fear of fear relative to other symptom domains. Failure to find this effect may be due to the fact that some of the more commonly endorsed chronic physical conditions, such as hypertension, do not necessarily produce perceivable symptoms. Other common conditions, such as low back pain, may produce symptoms that are generally accurately appraised by patients as being unpleasant but nonthreatening. Medical conditions producing symptoms that mimic threatening conditions (e.g., chest pain = heart attack, dizziness = faint) would be more likely to interfere with reductions in fear of fear. Further evaluation of particular physical conditions (e.g., asthma, heart disease) and their differential tendency to

produce perceivable and threatening symptoms is relevant to fear of fear models of panic.

Consistent with previous work indicating that patients with panic disorder show some ability to realistically appraise their health (Schmidt et al., 1996), nonpsychiatric medical morbidity was found to be highly correlated with perceived health. However, patients' perception and interpretation of health, relative to comorbidity status, was a better predictor of treatment outcome. Moreover, comorbidity added no unique variance to the predictive power of perceived health. This is akin to findings in the medical literature indicating that perceived health, compared to actual health, is a better predictor of important health outcomes (Idler & Kasl, 1991; Mossey & Shapiro, 1982). Taken together, these findings point to the general importance of health appraisals in health outcomes and call for further evaluation of health appraisals in both mental and physical conditions.

The conceptualization of perceived health as a gauge of physical vulnerability links health perception to cognitive theories of anxiety. For example, vulnerability has been described as the central feature of all anxiety disorders (Beck & Emery, 1985). According to Beck and Emery, anxiety conditions are created by faulty cognitive processes that exaggerate the sense of vulnerability in terms of physical or psychosocial danger. Perceived health, as one component of physical vulnerability, may tap into the general sense of vulnerability that panic disorder patients experience. Findings from the present study support Beck and Emery's vulnerability conceptualization of panic disorder, because perceived health was found to be related to symptom severity and treatment outcome.

The high rates of health-related worry among patients with panic disorder has led to increased interest in the relationship between panic disorder and hypochondriasis. Although only a small percentage of patients with panic disorder receive a co-occurring *DSM* diagnosis of hypochondriasis (Brown et al., 1995), many of these patients display hypochondriacal concerns (Fava, Kellner, Zielezny, & Grandy, 1988; Otto, Pollack, Sachs, & Rosenbaum, 1992). Perceived health will necessarily overlap with hypochondriasis when the patient displays exaggerated health concerns along with an intransigence of these beliefs in the face of contradictory evidence. Thus, two issues relevant to hypochondriasis are whether health perceptions are realistic and whether they are modifiable. In terms of realistic health appraisals, the high correlation between actual and perceived health suggests many panic disorder patients accurately appraise their health. However, examination of discrepancies between actual and perceived health indicates that 13% of the patients with no medical conditions rated their health within the lower half of all patients. This group of health pessimists may represent a subsample of patients with panic disorder who have hypochondriacal features. Modifiability of health perceptions was not assessed in the present study. It is expected that disconfirming evidence presented during the treatment would have less effect on those patients with greater hypochondriacal concerns. Although several reports have indicated that cognitive–behavioral treatment is

effective for hypochondriacal beliefs (Rachman, 1993; Visser & Bouman, 1992), future work is needed to determine whether health perceptions can be modified or normalized by cognitive–behavioral treatment for panic disorder.

An important consideration regarding the study findings is that nonpsychiatric medical morbidity is based on patient self-report. Self-reports of physical conditions, versus health measures obtained from a comprehensive physical examination, is an obvious methodological limitation that leaves open the question of whether patients with panic disorder can reliably report medical diagnoses. A related consideration is that patients with panic disorder may be at risk for higher rates of false-positive diagnoses due to their overutilization of medical resources (Klerman, Weissman, Ouellette, Johnson, & Greenwald, 1991; Markowitz, Weissman, Ouellette, Lish, & Klerman, 1989). Despite potential problems, self-reported health has been shown to be highly associated with actual health status (LaRue et al., 1979; Mossey & Shapiro, 1982). For example, Bradford, Graham, and Reinert (1993) found that only 4% of their patient sample had significant discrepancies between self-reported medical conditions and documented medical histories. Thus, there is reason to believe that the self-report methodology used in the present study is likely to adequately represent health status.

It is also important to consider that perceived health often provides an accurate gauge of physical health outcomes. A number of prospective epidemiological reports have found that perceived health predicts mortality (Idler & Angel, 1990; Idler & Kasl, 1991; Idler, Kasl, & Lemke, 1990; Kaplan & Camacho, 1983; Mossey & Shapiro, 1982). In fact, health perceptions have been found to predict mortality better than the presence of health problems (Idler & Kasl, 1991) or health status assessed by physicians (Mossey & Shapiro, 1982). There is also evidence to suggest that perceived medical health and actual disease severity are independently related to illness-specific anxiety symptoms. Carr, Lehrer, and Hochron (1995) found that asthma patients' subjective reports of asthma symptomatology and pulmonary function tests independently predicted asthma-related panic fear. In addition, pulmonary function tests did not predict asthma-related fear when controlling for demographic and cognitive variables. Thus, perceived health may predict consequential mental and physical health outcomes in patients with panic disorder.

The present study points to the complex interplay between panic disorder and medical conditions. Despite increased attention to the relationship between panic disorder and medical illness, further evaluation, in particular with respect to treatment outcome, is needed. The recent National Institute of Mental Health–sponsored consensus development conference on panic disorder treatment emphasized the examination of co-occurring psychiatric conditions (Wolfe & Maser, 1994). The present study highlights the importance of medical comorbidity and suggests that evaluation of treatment outcome in panic disorder should include the delineation of co-occurring medical, psychiatric, and psychological factors.

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