

# Prevalence and Recognition of Panic States in STARNET Patients Presenting with Chest Pain

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**BACKGROUND.** The purpose of this study was to document the prevalence of panic states in patients presenting with chest pain in primary care settings, to determine the recognition rate of panic states by family physicians, and to assess the impact of lack of recognition on interventions and costs.

**METHODS.** Patients from the South Texas Ambulatory Research Network (STARNET) presenting with a new complaint of chest pain were asked to participate in the study. Before seeing their physician, subjects completed the panic disorder section of the Structured Clinical Interview (SCID) of the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised*. The SCID was used to assign diagnoses of panic disorder, infrequent panic, or limited symptom attacks. Health care outcomes included medications prescribed, tests ordered, follow-up and referrals, costs, and physician diagnosis.

**RESULTS.** Although approximately one half of the 51 patients in this study met criteria for either panic disorder or infrequent panic, few were recognized by physicians as having a panic state ( $\kappa = -.003$ ). Patients with panic disorder were more likely to receive follow-up or referral ( $P = .042$ ), incurring higher follow-up costs ( $P = .080$ ). Patients with infrequent panic received more testing ( $P = .008$ ), with higher costs for testing ( $P = .001$ ) and higher overall costs ( $P = .067$ ). Panic-diagnosis associations were found between psychotropic ( $P = .001$ ) and total ( $P = .070$ ) medications as well as follow-up and referral costs ( $P = .009$ ).

**CONCLUSIONS.** Although common, panic states are rarely recognized in patients presenting with complaints of chest pain. The presence of panic leads to more testing, follow-up, and referral with subsequent higher costs. Failure to diagnose panic results in increased prescribing of medications, higher costs, and inappropriate pharmacotherapy.

**KEY WORDS.** Chest pain; panic disorder; physicians, family; diagnosis, dual (psychiatry). (*J Fam Pract* 1997; 45:54-63)

The prevalence of chest pain in primary care settings ranges from 7% to 11%,<sup>1,3</sup> and the lifetime prevalence of significant chest pain in the general population may be as high as 25%.<sup>3,4</sup> In only 11% to 34% of ambulatory patients, however, is there a cardiac cause for chest pain. Although psychosocial causes are identified among 6% to 8% of patients,<sup>2,5,6</sup> as many as 83% may remain undiagnosed after the initial visit to a physician.<sup>2</sup>

Noncardiac chest pain has significant impact not

only on patients, but on the health care system as well. Seventy percent of patients with noncardiac pain continue to have pain following an angiogram, and 50% report being unable to exert themselves. One year later, 50% of these patients are disabled by their pain and are heavy utilizers of the health care system.<sup>8</sup> On average, the annual health care costs are \$3500 per patient with 2.2 physician or emergency department visits, 0.8 hospitalizations, and up to 24 prescribed medications per year.<sup>9</sup>

Panic disorder is a common cause of noncardiac chest pain, and chest pain is a prominent feature of panic disorder.<sup>10</sup> The presence of chest pain is an important predictor of care-seeking. Among patients with panic disorder, chest pain predicts presentation to the emergency department,<sup>11</sup> primary care physicians,<sup>11-13</sup> and psychiatrists.<sup>13</sup> In family practice settings, the prevalences of current panic disorder and infrequent panic are 13.3% and 8.7%,

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respectively.<sup>14</sup> These prevalences increase to 42% and 16%, respectively, among patients with unexplained panic-related symptoms.<sup>15</sup>

The prevalence of panic disorder in primary care patients with chest pain is unknown. Cope<sup>16</sup> reported that 62% of veterans seen in a general medicine clinic for chest pain had prominent anxiety that was thought to be a cause of the pain. Katon<sup>17</sup> found that 22% of primary care patients referred to psychiatry for panic disorder had initially presented with chest pain.

The current study was conducted to document the prevalence of panic states in patients presenting with chest pain in family practice settings; to determine the recognition rate of panic states by family physicians; and to assess the impact of lack of recognition on interventions prescribed and costs. The authors hypothesized that panic states would be common but rarely recognized by physicians. They also expected that failure to recognize panic as a cause of chest pain would be associated with more frequent testing, referrals, nonpsychotropic prescriptions, and higher costs but with fewer psychotropic prescriptions.

## METHODS

### SUBJECTS

This study was conducted in the private practices of family physicians in the South Texas Ambulatory Research Network (STARNET). The network is composed of 10 family practice physicians, each from a different practice, who collaborate on primary care research projects. Physicians in eight of the 10 practices participated in this study. Two physicians chose not to participate because of concerns about time constraints on office staff.

Between June 1994 and October 1995, the office staff in each STARNET practice identified consecutive English-speaking adults 18 years and older who presented to the physician's office with a chief complaint of new-onset chest pain. This included patients with only one complaint (chest pain) as well as those with several symptoms that included chest pain. Patients were excluded if they had been seen previously for chest pain at the practice. Participating subjects granted written permission to release their medical records for the purposes of the study and completed a confidential questionnaire.

### INSTRUMENTS

Each subject provided demographic information and completed the panic disorder section of the Structured Clinical Interview (SCID) of the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised* (DSM-III-R).<sup>18</sup> The SCID is a structured interview designed to establish DSM-III-R diagnoses. Criteria for a DSM-III-R diagnosis of panic disorder are shown in Table 1. Compared with a psychiatrist-derived diagnosis, the panic disorder section of the SCID was shown to be valid and to have good interrater reliability. The questionnaire was administered as each patient waited in the examination room. Without knowledge of the physician's progress note, the principal investigator (D.K.) encoded the SCID results. Patients with spontaneous attacks that included at least four panic-related symptoms peaking within 10 minutes of onset and were unrelated to other medical conditions or medications were defined as having "panic attacks." Patients who met the above criteria but had fewer than four panic-related symptoms were defined as having "limited symptom attacks." Patients with at least four panic attacks in the previous 4 weeks or 1 month of concern about having another panic attack were defined as having "panic disorder." Patients with panic attacks that did not meet criteria for panic disorder were defined as having "infrequent panic." All other patients were considered to have "no panic."

The physician seeing the patient was unaware of the results of the panic attack screening. The office staff later photocopied physicians' progress notes for each visit and attached them to the questionnaire. Data were extracted from the progress notes by one investigator (C.T.), who used a prepared data extraction form while blinded to the SCID diagnosis. Interventions such as laboratory tests, medications, referrals, and return visits were recorded. When these variables were not documented in the chart, they were encoded as "not ordered." Costs were calculated based on 1995 Medicare reimbursement schedules<sup>19</sup> according to the following formula:

$$\text{Costs} = \text{Total Relative Value Unit} \times \text{Geographic Adjustment Factor} \times \text{Conversion Factor}$$

Relative value units were based on the Common Procedure Codes of the Health Care Financing Administration (HCFA). The Geographic Adjustment Factor for San Antonio is 0.976 and the Conversion



TABLE 1

**Criteria for Diagnosis of Panic Disorder According to the Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised**

A. At some time during the disturbance, one or more panic attacks (discrete periods of intense fear or discomfort) have occurred that were (1) unexpected and (2) not triggered by situations in which the person was the focus of others' attention.

B. Either four attacks, as defined in criterion A, have occurred within a 4-week period, or one or more attacks have been followed by a period of at least a month of persistent fear of having another attack.

C. At least four\* of the following symptoms developed during at least one of the attacks:

1. Shortness of breath (dyspnea) or smothering sensation
2. Dizziness, unsteady feelings, or faintness
3. Palpitations or accelerated heart rate (tachycardia)
4. Trembling or shaking
5. Sweating
6. Choking
7. Nausea or abdominal distress
8. Depersonalization or derealization
9. Numbness or tingling sensations (paresthesias)
10. Flashes (hot flashes) or chills
11. Chest pain or discomfort
12. Fear of dying
13. Fear of going crazy or losing control

D. During at least some of the attacks, at least four of the C symptoms developed suddenly and increased in intensity within 10 minutes of the beginning of the first C symptom noticed in the attack.

E. Not due to an organic disturbance

\*Attacks involving four or more symptoms are panic attacks; attacks involving fewer than four symptoms are limited symptom attacks. Adapted from the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition Revised*, Washington, DC: American Psychiatric Association, 1987.

Factor for primary care services is \$36.382. Payments were calculated for each test, referral, and visit. Because the quantity dispensed was rarely recorded, medication costs could not be estimated.

### ANALYSIS

Seeking an alpha of .05 and a large effect size, the statistical power was 94% and 75% for chi-square

and Mann-Whitney testing, respectively. A *P* value of  $\geq .05$  but  $\leq .1$  was deemed to show a trend toward significance. The prevalences of panic states and physician recognition rates were measured in percentages, and physician diagnostic agreement was measured against the SCID using kappa statistics. Because costs are not normally distributed, the natural logarithmic transformations of costs were used in analyses. The effects of panic diagnosis and physician recognition of anxiety upon outcome were assessed with chi-square for nominal variables and multivariate analysis of variance (MANOVA) for continuous variables. MANOVA was conducted after eliminating colinear variables. Kruskal-Wallis analysis of variance was used when continuous variables were not normally distributed. The Duncan Multiple Range Test was used for post hoc testing. Exploratory analyses to compare outcome differences, such as those between Hispanic and non-Hispanic white subjects, were conducted using chi-square, Fisher's exact test, Spearman correlation ( $r_s$ ), and the Mann-Whitney *U* test.

### RESULTS

Only two (3.8%) patients of 53 who were approached declined to participate in the study. Overall, the sample was predominantly middle-aged, married, female, and of a relatively high socioeconomic status (Table 2). Only 10 (19%) of 51 patients presented with a single complaint: chest pain (mean, 3.0 complaints  $\pm$  standard deviation [SD] 1.8).

Physician diagnoses after the initial visit are shown in Table 3. Although psychiatric causes were the most common ( $n=19$ ), external chest causes were also frequent ( $n=9$ ). A diagnosis of coronary artery disease was rarely made ( $n=2$ ). There was little agreement between physician diagnoses and SCID-derived panic diagnoses (Table 4). Although a majority of patients received a panic diagnosis, few were recognized by the primary care physician as having a panic state. Agreement between a panic diagnosis of panic attacks (infrequent panic plus panic disorder) and a physician diagnosis of either panic attacks or anxiety (panic plus anxiety plus stress) were poor (kappa = -.003 and -.094, respectively).

Overall, 76% of patients received at least one medication (mean, 1.10 $\pm$ 0.79). Similarly, 66% of patients received at least one test (mean, 1.53 $\pm$ 1.53).



TABLE 2

**Characteristics of 51 Study Participants Who Presented with Chest Pain**

Characteristic	Measure
Female, n (%)	36 (71)
Race/ethnicity, n (%)	
Hispanic	23 (45)
Non-Hispanic white	25 (49)
African-American	3 (6)
Age, y (mean $\pm$ standard deviation)	42.6 $\pm$ 14.6
Marital status, n (%)	
Single	9 (18)
Married	32 (63)
Marital loss*	10 (20)
Education, n (%)	
Some college	25 (49)
High school graduation	14 (28)
Less than 12 years	12 (24)
Occupation†, n (%)	
Managerial/administration	11 (22)
Clerical	9 (18)
Laborer	9 (18)
Housewife/student	12 (25)
Retired/unemployed	8 (16)

\*Marital loss includes separated, divorced, or widowed.

†Data in this category are missing for 2 patients. Percentages are based on a sample of 49.

All 20 electrocardiograms (ECGs) obtained were normal. None of the patients had an echocardiogram or exercise treadmill test. Although few patients were referred to mental health counselors or cardiologists, 47% were given a referral or return appointment. The per-patient cost of testing associated with the initial visit was \$46.36 $\pm$ \$64.57, with a maximum of \$304; the cost of follow-up and referral was \$18.41 $\pm$ \$24.90, with a maximum of \$120. The total cost, including that of the initial visit, was \$102.99 $\pm$ \$69.75, with a maximum of \$423.48.

The relationships between visit outcome and panic state are presented in Table 5. Patients with panic disorder were more likely to receive a cardiac medication (Fisher's  $P=.031$ ). Patients with infrequent panic had more testing overall and were more likely to have a test performed to determine thyroid-stimulating hormone (TSH) level ( $\chi^2=5.00$ ,  $P=.025$ ). Only patients with panic attacks were referred to cardiologists. Patients with panic disorder were

more likely to be given a follow-up visit or an appointment at the conclusion of the initial visit. The presence of panic was associated with significant cost differences. Testing costs were higher among patients with infrequent panic. Although total cost comparison was significant on univariate analysis (Kruskal-Wallis [ $z$ ]=5.40,  $P=.067$ ), MANOVA determined the differences to be nonsignificant. Although outcomes were not related to the number of presenting complaints, they were associated with the number of panic-related symptoms reported on the SCID. The total number of psychotropic medications prescribed ( $r_s=.41$ ,  $P=.021$ ) and total medications prescribed ( $r_s=.38$ ,  $P=.031$ ) were positively related to the number of symptoms. Since the number of symptoms was inversely related to the number ( $r_s=-.40$ ,  $P=.029$ ) and cost ( $r_s=-.36$ ,  $P=.046$ ) of tests

TABLE 3

**Physician Diagnoses After the Initial Visits of 51 Patients Who Presented with Chest Pain**

Diagnosis	Frequency (n)
Psychiatric	
Panic	4
Anxiety/stress	12
Depression	3
Pulmonary	
Pleuritic	1
Bronchitis	1
External chest	
Costochondral	2
Thoracic outlet syndrome	1
Chest wall neuralgia	2
Musculoskeletal	4
Cardiovascular	
Coronary insufficiency	2
Hypertension	2
Gastrointestinal	
Peptic ulcer/gallstones	1
Reflux esophagitis	4
Other	
Perimenopausal	1
Viral syndrome	5
Symptomatic	
Noncardiac	1
None, chest pain	5



TABLE 4

**Panic Diagnoses and Physician Diagnosis After the Initial Visits of 51 Patients Who Presented with Chest Pain**

Physician Diagnosis	SCID Panic Diagnosis*, n			
	No Panic	Limited Symptom Attacks	Infrequent Panic	Panic Disorder
Panic attacks	2	0	2	0
Anxiety/stress	6	1	2	3
Other diagnoses	15	2	8	10
Total	23	3	12	13

\*Panic diagnoses were based on the panic disorder section of the Structured Clinical Interview (SCID) of the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised*, which was completed by all participating patients.

ordered, the number of symptoms was inversely related to total costs ( $r_s = -.48$ ,  $P = .010$ ).

Table 6 shows the impact of physician diagnosis and presence of panic attacks on outcomes. Because physicians made the diagnosis of panic in only four patients, two of whom had no panic state, Table 6 includes patients with any anxiety diagnosis, ie, panic, anxiety, or stress. With respect to treatment, large intergroup differences were found. The presence of panic attacks was less important than the diagnosis of anxiety or stress, or the interaction of the two. Not only did the groups differ in the numbers of psychotropic and nonpsychotropic drugs prescribed, but also patients diagnosed with anxiety or stress were more likely to receive benzodiazepines (Fisher's  $P = .002$ ), buspirone (Fisher's  $P = .080$ ), and antidepressants (Fisher's  $P = .063$ ). Without that diagnosis, patients received  $H_2$ -blockers more frequently (Fisher's  $P = .031$ ). No statistically significant differences were found in testing, follow-up, or referral. Significant interactions between physician diagnosis and presence of panic attacks were found for psychotropic and total medications as well as follow-up and referral costs. Patients with undiagnosed panic attacks received prescriptions for fewer psychotropic medications but more nonpsychotropic medications. They tended to have few tests ordered but more referrals and follow-up visits. Those with unrecognized panic had more testing, follow-up visits, and referrals, and higher total costs. Although MANOVA testing was not significant for the presence of panic attacks, it was significant

for a diagnosis of anxiety or stress ( $F = 3.02$ ,  $P = .017$ ) and for the interaction between panic attacks and physician diagnosis ( $F = 4.31$ ,  $P = .002$ ).

Although ethnicity was unrelated to the presence of panic attacks or a diagnosis of anxiety or stress, Hispanic patients received more medications, primarily psychotropic (1.32 vs 0.88, Mann-Whitney  $\chi^2 = 1.81$ ,  $P = .071$ ). They also had more return visits (48% vs 20%,  $\chi^2 = 4.17$ ,  $P = .041$ ).

## DISCUSSION

This practice-based study found that a majority of patients presenting with chest pain had a panic diagnosis, and 26% had panic disorder. Few cases, however, were recognized by physicians. Patients with subsyndromal panic had the most tests ordered, received the most interventions, underwent the greatest number of tests, and incurred the highest total costs. Patients with panic disorder received the most medications and had the most follow-up visits and referrals. Diagnoses of anxiety or stress accounted for the medications prescribed. Patients with unrecognized panic attacks received more nonpsychotropic medications and interventions while incurring higher costs, but these differences were not statistically significant.

The high prevalences of panic disorder (26%) and infrequent panic (24%) found in this study are similar to those found in nonprimary care populations. In patients with chest pain referred for esophageal motility studies, the prevalence of panic disorder was 49% in patients with heart disease and 34% in patients without heart disease.<sup>20</sup> Emergency department (ED) patients with atypical chest pain frequently have panic states; the prevalences of panic disorder is 16% to 47%<sup>21,22</sup> and 43% for infrequent panic.<sup>21</sup> Overall, of ED patients with acute chest pain, 18% have panic disorder.<sup>23</sup> Most studies on the prevalence of panic disorder in patients with chest pain have been conducted in cardiology settings. Of patients referred for an ECG, 47% were anxious. Although 46% of them refused an interview, 62% of those interviewed had panic disorder.<sup>24</sup> In patients with chest pain who have normal diagnostic workups, the prevalence of panic disorder ranges



TABLE 5

## Consequences of Panic States Among 51 Patients Presenting for Chest Pain

Outcome	Panic Group				$\chi^2$ Statistic (P value)	MANOVA F (P value)
	None (n=23)	Limited Symptoms (n=3)	Infrequent Panic (n=12)	Panic Disorder (n=13)		
Mean no. of medications prescribed per patient						
Psychotropic	0.48	0.33	0.58	0.62	—	NS
Nonpsychotropic	0.64	0.33	0.42	0.62	—	NS
Total	1.14	0.67	1.00	1.23	—	NS
Mean no. of tests per patient	1.33 *	2.67	2.45 †	0.75 *	—	5.42 (.008)
% of patients with medical visit/referral						
Cardiology referral	0	0	8	15	NS	—
Return visit	28	50	33	62	5.80 (.055)	—
Any visit	35	33	42	77	6.35 (.042)	—
Mean no. of total interventions per patient	2.86	3.67	3.64	2.67	—	NS
Mean cost per patient, \$						
All testing	42.43	59.67	81.27 *	17.92 †	—	2.98 (.061)
All visits	15.91	10.00	15.08	27.85	—	2.67 (.080)
Total	94.62	110.15	135.48	86.06	—	NS

\* † Two groupings based on post hoc testing.  
NS denotes nonsignificant.

from 10% to 58%<sup>25-31</sup> and that of infrequent panic ranges from 20% to 24%.<sup>25,32</sup> Carter et al<sup>33</sup> found that 31% of patients admitted to the cardiac care unit for chest pain had panic disorder. Our study is the first to document the prevalence of panic states in family practice patients with chest pain.

Even though panic attacks were common in patients with chest pain, panic states were rarely recognized, and one half of panic state diagnoses were incorrect. Previous studies support this lack of panic recognition by physicians. Sheehan<sup>34</sup> reported that 70% of newly diagnosed patients with panic disorder seen in an anxiety disorders clinic had seen at least 10 physicians without having their condition diagnosed, and 95% had seen a psychiatrist. Andersen and Harthorn<sup>35</sup> found that although 98% of primary care physicians recognized the presence of an anxiety disorder, only 60% diagnosed the specific disorder correctly. Borus et al<sup>36</sup> found that internists and nurse practitioners recognized only 44% of patients

with an anxiety disorder as having a mental illness and only 17% as having an anxiety disorder, even though they expressed confidence in their diagnoses. Further, 19% of these patients were falsely identified as having a mental disorder. Emergency department physicians also failed to recognize panic. Although the prevalence of panic attacks was high in patients with atypical chest pain, only one patient received a diagnosis of "anxiety" and none received a mental health referral.<sup>21</sup> The low frequency of a diagnosis of anxiety or stress (7.5%) found in previous primary care studies may further reflect a lack of recognition.<sup>2,5,6</sup>

If panic is common in patients presenting with chest pain, what are the consequences of these panic states? This study found no difference in medication prescription across panic states, although patients with panic disorder were more likely to receive cardiac medication. This study also found that while patients with infrequent panic had more tests



ordered and, consequently, higher testing costs, those with panic disorder were more likely to be given a return appointment, resulting in higher costs for follow-up and referral. Previous studies found that although patients with panic disorder had more severe chest pain and poorer perceived health, functional status,<sup>37</sup> and quality of life,<sup>38</sup> there was no difference in the prescription of cardiac or psychotropic medications.<sup>26</sup> This finding may explain why only 58% of patients with chest pain report benefit from prescribed medications, and only 2% report benefit from prescribed nonpharmacologic therapy.<sup>3</sup> Katon et al<sup>30</sup> found that those with chest pain and panic disorder received more medication. This finding may be attributable to hypochondriasis<sup>30</sup> or increased chest pain severity in patients with panic disorder.<sup>40</sup> The relationship between infrequent panic and testing

may be explained by greater physician uncertainty regarding cases involving fewer symptoms and attacks. The more frequent follow-up and cardiology referral for patients with panic disorder in this study is similar to that of previous utilization studies.<sup>41</sup>

The presence of both a panic diagnosis and the physician diagnosis are important factors in outcome. When considered in conjunction with the physician's diagnosis of anxiety, the presence of panic attacks alone has less impact than the physician diagnosis. The diagnosis of anxiety resulted in the prescribing of more psychotropic but fewer nonpsychotropic medications. For patients with a diagnosis of anxiety disorder in primary care settings, primary care physicians advocate pharmacotherapy (68%) in addition to mental health referral (80%) and primary care-based counseling (93%).<sup>35</sup>

TABLE 6

Consequences of Physician Diagnosis Among 49 Patients\* Presenting with Chest Pain

Outcome	Physician Diagnosis of Patients with No Panic†		Physician Diagnosis of Patients with Panic Attacks ‡		MANOVA, F (P value)		
	No Anxiety (n=15)	Anxiety (n=9)	No Anxiety (n=18)	Anxiety (n=7)	Panic	Diagnosed	Interaction
Mean no. of medications per patient							
Psychotropic	0.07	1.22	0.44	1.00	NS	12.05 (.001)	13.80 (.001)
Nonpsychotropic	0.80	0.13	0.61	0.29	NS	6.86 (.012)	NS
Total	0.87	1.50	1.06	1.29	NS	NS	3.45 (.070)
Mean total no. of tests per patient	1.67	1.38	1.50	1.80	NS	NS	NS
% of patients with medical visit/referral							
Cardiology referral	0	0	17	0	—	—	—
Return visit	13	33	50	43	—	—	—
Any visit	25	44	67	43	—	—	v
Mean total no. of interventions per patient	2.73	3.38	3.22	2.80	NS	NS	NS
Mean cost per patient, \$							
All testing	39.00	60.63	50.89	38.60	NS	NS	NS
All visits	5.13	18.78	25.17	12.86	NS	NS	7.42 (.009)
Total	84.61	122.23	116.54	85.08	NS	NS	NS

\*Physician diagnosis missing for two patients.

†No panic + limited symptoms.

‡Infrequent panic + panic disorder.

NS denotes nonsignificant.

NOTE: All results of chi-square testing were nonsignificant.



TABLE 7

## Results of ASPN and MIRNET Studies and Current Study on Patients Presenting with Chest Pain

Variable	Studies on Chest Pain		
	ASPN, 1990*	MIRNET, 1994†	Current
Assessment duration	Any visit	Episode of care	Initial visit
Mean no. of visits per patient	1.2	1.5	1.0
Sample size, n	832	399	51
Patients with prior emergency department visit, %	4	—	8
Patients undergoing tests, %			
Bloodwork	15	27	35
Electrocardiogram	21	51	39
Echocardiogram	—	6	0
Exercise treadmill	—	18	0
Patients with return visit, %	57	—	35
Patients referred, %	7	19	10
Mental health	—	1	2
Cardiology	—	14	6
Patients undergoing any test or receiving referral, %	—	75	70
Patients hospitalized, %	7	—	0
Patients with physician diagnosis, %			
Psychosomatic	7	8/8‡	37
Cardiac	34	12/16‡	8
Chest wall	25	20/36‡	18

\*Ambulatory Sentinel Practice Network. Exploratory report of chest pain in primary care. *J Am Board Fam Pract* 1990; 3:143-50.

†Klinkman MS, Stevens D, Gorenflo DW. Episodes of care for chest pain. *J Fam Pract* 1994; 38:345-52.

‡Initial diagnosis/final diagnosis.

NOTE: Blanks on table indicate that data were not provided.

ASPN denotes Ambulatory Sentinel Practice Network; MIRNET, Michigan Research Network.

Only seven (28%) patients with panic attacks in this study had a diagnosis of anxiety. Significant associations were found between panic diagnosis and prescriptions for psychotropic and total medications as well as between follow-up and referral costs. Failure to diagnose unrecognized panic in 18 patients was associated with incorrect medication prescribing, \$221 more in laboratory costs, \$222 more in follow-up and referral costs, and \$566 more in total costs. Previous work suggests that failure to recognize panic results in more laboratory testing,<sup>12,42</sup> fewer mental health referrals,<sup>12,21,42</sup> increased utilization of medical settings,<sup>43</sup> and fewer prescriptions for psychotropic medications.<sup>12,42</sup> In another study, atypical cardiac pain not recognized as panic was treated with alprazolam therapy with some success.<sup>43</sup>

This study suggests that patients with panic states often present to family physicians with complaints of chest pain and may not have their conditions diagnosed at the initial visit, potentially leading to the use of nonpsychotropic rather than psychotropic medications, cardiology referrals and follow-up visits, and higher costs. This does not imply that patients presenting with chest pain should not be first evaluated for potentially life-threatening conditions; however, once this has been accomplished and no cardiac cause is apparent, panic states should rank high in the differential diagnosis. A

diagnosis of panic should prompt a search for likely consequences, such as depression, suicidal ideation, agoraphobia, and substance abuse, as well as patient education concerning the diagnosis, its treatability, and elimination of dietary stimulants. Laboratory testing is not indicated. Appropriate treatment can include cognitive behavior therapy or psychotropic medication, such as tricyclic antidepressants, selective serotonin reuptake inhibitors, monoamine oxi-

Kane et al<sup>20</sup> found that less than 60% of patients whose condition was diagnosed as an anxiety disorder were given a mental health referral or tranquilizer, even though most patients indicated that a referral would be acceptable to them. The typical internal medicine workup for chest pain costs a mean of \$272. Although an organic cause was found in only 11% of cases, 70% of patients found the prescribed treatment helpful.<sup>4</sup>



dase inhibitors, and high-potency benzodiazepines.

There are several limitations to this study. The first is the generalizability of these results. Unlike previous primary care studies of chest pain, this study looked specifically for panic states, and the participating physicians selected the topic for study. In addition, the unique ethnic composition of San Antonio may compromise the generalizability of the findings. Table 7 compares this study with two previous family practice network-based studies in terms of diagnoses, testing, and utilization. Demographically, the patients in our study were predominantly female, Hispanic, and middle-aged. The referral rate lies between that of the other studies, while the proportion receiving any test or referral is comparable even to that in internal medicine settings.<sup>2</sup> The mean cost per episode in the Michigan Research Network (MIRNET) study was \$202, which is comparable to our study findings. The physicians in the current study, however, were more likely to make a psychosomatic diagnosis than those in either of the other studies. This difference may relate to the focus of the study or the interests of the participating physicians. The Ambulatory Sentinel Practice Network (ASPEN) study found that physicians were most tentative about their psychosomatic diagnoses.<sup>6</sup> In general, although physician diagnostic patterns differed, outcome rates across the studies appear similar. Because our study focused on the initial visit, it may be inherently different from the MIRNET and ASPEN studies.

Another limitation of this study is the focus on the initial presentation for chest pain rather than on episode of care. This difference may account for lower recognition rates because we used medical record documentation that may have had incomplete information. Focusing on initial visit rather than episode of care may also cause lower rates of testing, medication prescribing, costs, and referrals, even though less than 34% of MIRNET patients had more than one visit.<sup>5</sup> Diagnostically, physicians tend to be confident after the first visit, with only 20% to 38% subsequently changing their diagnosis.<sup>5,6</sup> The overall rate of psychosomatic diagnoses did not change between the initial and final visits.<sup>5</sup> A further limitation is the lack of follow-up information, which restricts our ability to draw conclusions. Additionally, the validity of the conclusions may be compromised because patients presented with more symptoms than chest pain alone as a chief com-

plaint. We also cannot isolate the effects of comorbidity on the costs assessed. For example, in the 16 cases involving more than one diagnosis, costs may apply to secondary diagnoses.

Because chest pain is part of the DSM-III-R criteria for panic, the use of a sample based on the presence of chest pain predisposes to a diagnosis of panic disorder. If chest pain is not used as part of the criteria, however, there is no change in the prevalence of limited symptom attacks, and the prevalences of infrequent panic and panic disorder decrease by only 6% each. Hence, although the prevalence of panic attacks is affected, the overall conclusions probably are not.

Finally, although the sample size was adequate for analyses, its small size limits the statistical power for subgroup analyses, such as the "limited symptoms attack" group. In addition, prevalence rates lack precision. A broader limitation is that this study focuses on one aspect of a complex interaction and, therefore, may lack applicability.

## CONCLUSIONS

Primary care physicians in this study frequently failed to recognize panic states in patients presenting with chest pain. Infrequent panic was associated with more testing and higher testing and total costs, whereas panic disorder was associated with more follow-up and referral and higher follow-up costs. Physician diagnosis of anxiety led to the prescribing of more psychotropic but fewer nonpsychotropic medications. Failure to recognize panic was associated with fewer psychotropic prescriptions but higher follow-up and referral costs. Patients with unrecognized panic received more nonpsychotropic medication, had more follow-up and referral visits, received more interventions, and incurred higher testing and total costs. Not only are panic states common in patients presenting with chest pain but they are rarely recognized, thereby resulting in more interventions, higher costs, and less appropriate treatment. This study needs to be replicated in other settings using a larger sample.

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