Objective: To evaluate outpatients from Toronto-area cardiology clinics for panic disorder (PD) and investigate differences between patients with and without PD.

Method: Participants were diagnosed using both standard DSM-IV criteria and an altered formulation that identified a more fearful panic group.

Results: There was a prevalence of panic disorder (12.5%) in cardiac outpatients in keeping with previous studies. Patients with PD did not differ significantly from other patients with regard to the presence of significant heart disease. The higher prevalence of palpitations found in patients who met criteria for PD compared with those who did not reflects previous findings. PD cases did not differ significantly in family history from respondents without the disorder, but the more fearful group did (P < 0.05).

Conclusion: PD often presents with cardiac symptoms, especially palpitations, and is often comorbid with heart disease.

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Key Words: panic disorder, heart disease, family history, palpitations, cardiologists

Few psychopathological syndromes have generated as much debate and controversy in recent years as PD (1). PD is defined in the DSM-IV as a condition involving the repeated occurrence of panic attacks—spells of intense fear or discomfort with symptoms that may include heart palpitations, tachycardia, chest pain, and trembling (1,2). In addition, an individual experiencing a panic attack may describe characteristic thinking patterns, including fear of dying, losing control, or embarrassment (2). To qualify for a diagnosis of PD, a patient must also experience anxiety between attacks about the next occurrence. This phenomenon of “anticipatory anxiety” was declared an essential part of the disorder in the DSM-IV, as opposed to a separate condition allowing for a secondary pathway to a diagnosis of PD, as was possible in the DSM-III-R (1).

The diagnosis of PD can be further complicated by the presence of agoraphobia. A person who experiences a panic attack in a crowded mall or while driving on the highway may speculate that the setting precipitated the attack and avoid such environments in future. This person may fear the embarrassment and helplessness of having a panic attack in a place where it is difficult to escape or get help (for example, public transit) and avoid such situations. These patterns of phobic avoidance contribute to the condition of agoraphobia (3). Although it was previously believed that agoraphobia was always preceded by panic attacks, it is now accepted that agoraphobia may develop before panic, or even independently (2).

PD is primarily a disease of young adulthood, although affected individuals have been diagnosed in both preadolescent and older adult populations (1). Studies in the United States have found the lifetime prevalence of PD to be between 1.2% and 3.3% (4). About twice as many women are affected as men, with more women experiencing PD accompanied by agoraphobia (1). The severity of attacks does not seem to differ between the sexes (1).

Researchers have attempted to expose a hereditary component of PD. In one study (5), the first-degree relatives of 40
agoraphobic patients with panic, of 40 “pure” PD patients, and of 20 nonanxious controls were interviewed. Results indicated that the morbidity risk for PD was higher in relatives of PD sufferers (17.3%) and agoraphobics (8.3%) than in relatives of controls (4.2%). In an effort to prove the 2 disorders distinct, the authors reported that rates of generalized anxiety disorder (GAD) did not differ across relatives of the 3 groups (5). This study has been criticized, however, because “limited symptom” panic and “infrequent” panic cases were classified as PD (1) and because important instances of the 2 disorders existing simultaneously would have been overlooked because of the hierarchical nature of the DSM-III, where GAD is not diagnosed in the presence of PD (6). In a study looking at 85 pairs of twins, 32 of which were monozygotic and 53 were dizygotic, Torgersen (7) grouped together PD, infrequent panic, and agoraphobia with panic and found a concordance rate of 31% among monozygotic twins compared with 0% among dizygotic twins, strengthening the case for a hereditary component in PD.

PD, especially in conjunction with agoraphobia, is often associated with marked physical and social disability (2). One study suggested that 20% of people with PD will attempt suicide within their lifetimes (2,8). Substance abuse, especially alcoholism, has also been found to be prevalent in PD sufferers. Affected individuals may be able to reduce their between-attack anticipatory anxiety through alcohol abuse, leading them to drink more in an effort to alleviate the panic attacks themselves (1,3). Early detection and prompt treatment is therefore crucial in order to reduce these deleterious effects (2).

Because of the large number and variation of symptoms associated with panic attacks, PD may often mimic various cardiovascular and cardiorespiratory conditions. As a result, diagnosis of PD is often missed in search of organic disease, and time and money are wasted on fruitless medical evaluations (9,10). In one series of PD patients, it was found that 70% had already seen more than 10 physicians (10,11). An earlier survey showed that only 25% of all people with anxiety disorders had been treated in the previous year, and those untreated were more frequent users of medical services than were people with other psychological disorders or those with no psychological disorder (3).

Researchers have already begun to attempt to investigate the incidence of missed diagnoses of PD. In one study of patients with atypical chest pain and no arteriographic evidence of coronary artery disease, nearly 60% met criteria for diagnosis of PD (2,12). In a study conducted by Goldberg and others (13), 414 patients seen by noninvasive cardiologists at least twice within one year were studied using a questionnaire. Possible PD patients were interviewed using the Structured Clinical Interview for DSM-III-R (SCID). The estimated prevalence of PD in cardiac outpatients was 9.2% (13). Barsky and others (9) screened 145 consecutive patients referred for ambulatory electrocardiographic evaluation of palpitations for PD. Palpitations are recognized as the most common somatic symptom of panic attacks in patients presenting in medical settings, occurring in about two-thirds of attacks (9,14). Forty patients in this study (27.6%) qualified for a diagnosis of lifetime panic disorder by the standards of the then-current DSM-III-R, and 27 patients (18.6%) fulfilled criteria for current, one-month PD (9).

In the present study, we extend this line of research by determining the prevalence of PD in patients presenting to cardiologists and by investigating differences between PD cases and others in the cardiac outpatient population with regard to age and gender. We explore the family history of panic patients, as well as the prevalence of palpitations in panic attacks. The study also compares the occurrence of diagnosable PD in patients presenting to cardiologists and the cardiologists’ estimation of the prevalence of PD among their patients. We hypothesized that PD affects a significant number of these people, as has been observed in previous studies (9,13). We also hypothesized that the cardiologists would, on the whole, tend to underestimate the number of PD cases among their patients.

Methods

Participants

Consecutive outpatients presenting to 13 community cardiologists comprised the study population. The inclusion criteria were an appointment or other meeting with the cardiologist on an assigned day, a willingness to complete the study questionnaire, and sufficient knowledge of English to answer the questions. Individuals who had sufficient command of English to enable them to complete the questionnaire with minor explanations were included. We also included individuals with little or no English language proficiency who were accompanied by an able interpreter. The cardiologists identified cases for whom recent events and medical complications rendered questioning a patient inappropriate, and these individuals were excluded.

A total of 128 outpatients participated in the study. The mean age of the group was 59.9 years, and this group consisted mostly of males (58.6%). It was difficult to obtain an exact count of the number of patients who were not interviewed on assigned days, whether they were excluded because they failed to meet inclusion criteria, because cardiologists requested that some patients not be approached, or because the time constraints dictated the manner in which data were collected. We estimate that the sample of 128 participants represents at least 85% of patients attending the cardiologists on the interview days.

Procedure

Description of the Questionnaire

Participants completed a 2-page questionnaire to screen for PD. The questionnaire included 27 items and was based on a previous instrument designed by 2 of the authors (BB and CS). Both questionnaires used the DSM-IV criteria for PD and inquired about whether the respondent had
experienced any episodes that included the 13 primary symptoms associated with PD. The questionnaire used in this study continued by asking if the respondent had experienced “great fear” or “extreme discomfort” with these episodes and inquired about the number of episodes that may have occurred within various time periods. The second component inquired about whether the respondent had any worries associated with any episodes and whether the individual had changed his or her behaviour as a result. Another section inquired about family history of unexplained chest pain or palpitations, PD, or other anxiety disorders. One question asked if the current visit was the respondent’s first, second, or third or later visit to this cardiologist. Demographic information was recorded, and the participants were offered an opportunity to receive the survey results. The length of time to complete the questionnaire varied with the amount of explanation or translation needed, but averaged approximately 5 minutes.

Administration of the Questionnaire

Although the questionnaire was designed for self-administration, many people, for many reasons (for example, poor eyesight, convenience), preferred to have the interviewer ask the questions. This practice was adopted for the majority. In all cases, the interviewer was present while the respondent completed the questionnaire. Every attempt was made to keep questionnaire administration as uniform as possible. Following completion of the questionnaire, a quick review of the questionnaire established whether further questioning was necessary. If patients answered “yes” to any of the family history questions, additional brief questioning established the particular relationship and the diagnosis.

Other Data

In addition to the data collected by questionnaire, cardiologists were asked to indicate each patient’s diagnosis as well as whether the individual had significant heart disease. Each cardiologist also estimated the proportion of patients in treatment whose complaints are primarily PD. This information was requested in order to compare the cardiologists’ estimated prevalence of PD within their own clinics with the prevalence estimated on the basis of the questionnaire. We hoped that this comparison might allow us to explore whether cardiologists under- or overrecognize PD.

Data Analysis

Once all participants had been assessed, 2 groups were identified: 1) individuals experiencing panic attacks and 2) those who were not. The panic attack group was then subdivided into those who met DSM-IV criteria for PD and those who experienced panic attacks but did not meet such criteria. Respondents not diagnosed with PD (regardless of whether they reported panic attacks) were combined to form another group. Two sets of criteria were used to classify patients as “PD” or “non-PD,” namely, DSM-IV and a more stringent set of criteria (based on the DSM-IV) that required the presence of all 3 DSM-IV features (that is, worry about more episodes, worry about the effects of the episodes, and significantly changed behaviour).

Results

Panic Attacks

Of the 128 outpatients, 16 patients (12.5%) had experienced panic attacks in the preceding month. The panic attack group included more women (62.5%) than the nonpanic attack group (38.4% female), but this difference was not significant ($\chi^2[1] = 3.35$). Panic attack patients were somewhat but not significantly older (mean $[M] = 66.2$ years) than the nonpanic attack patients ($M = 59.0$ years) ($t[125] = -1.82$).

According to their cardiologists, 10 of the 16 panic attack patients (62.5%) had significant heart disease. Among the nonpanic attack patients, 63 (56.3%) had significant heart disease ($\chi^2[1] = 0.22$, ns).

Three of the patients with panic attacks (18.8%) indicated a family history for at least 1 of the 3 variables examined (that is, chest pain, unexplained palpitations, or another anxiety disorder). In the group of nonpanic attack patients, by contrast, 27 (24.1%) reported a family history for 1 of the 3 items, but this difference was not significant ($\chi^2[1] = 0.22$). The prevalence of a family history of PD-related conditions was virtually identical between the 2 groups (out of a possible 3, $M = 0.31$ for those with panic attacks, and $M = 0.29$ for those without) ($t[126] < 1.0$, ns).

Eleven of the DSM-IV PD cases (68.8%) described palpitations as a part of their episodes. Of the non-PD patients, 41 (36.6%) reported palpitations ($\chi^2[1] = 6.00$, $P = 0.014$). Panic attack patients therefore account for 21.2% of all outpatients with palpitations. If one discounts the palpitations as a diagnostic symptom (that is, in order to define a panic attack, individuals must have episodes of 4 of the remaining 12 symptoms), 2 people (18.2%) would no longer qualify for a diagnosis of DSM-IV panic attacks.

Panic Disorder Using DSM-IV Criteria

When the 16 outpatients who fulfilled criteria for panic attacks were further evaluated to determine how many fulfilled criteria for a diagnosis of DSM-IV PD, all 16 (12.5% of the total population) qualified. The demographic, significant heart disease, family history, symptom number, and palpitation information and statistical analyses for the DSM-IV PD outpatients and non-PD outpatients are therefore identical to the data outlined previously for the panic attack and nonpanic attack groups.

Panic Disorder Using “Stricter” Criteria

Reevaluating the patients with the altered criteria requiring the presence of all 3 PD symptoms identified 7 of the 128 outpatients (5.5%) as “severe cases.” The remaining 9 patients of the 16 who experienced panic attacks in the preceding month (7.0% of the total population) continued to fulfill the criteria for panic attacks but not for “severe” PD.
As observed for the DSM-IV criteria, the “severe” PD group contained more females (71.4%) than the non-PD group (39.7%), but this difference was not significant ($\chi^2[1] = 2.75$). Also, the PD group was older (although not significantly) than the non-PD group, with mean ages of 65.0 and 59.6 years, respectively ($t[125] < 1.0$).

The “severe” PD patients and non-PD patients (using this definition) were virtually identical in prevalence of significant heart disease. Four “severe” PD patients (57.1%) were deemed by their cardiologists to have significant heart disease, compared with 69 (57.0%) non-PD patients ($\chi^2[1] = 0.00$, ns).

The same 3 patients who reported a family history of at least one item in the DSM-IV PD group were still included in the smaller “severe” PD group. The proportion of PD patients reporting at least one family history item therefore increased to 42.9%, while the percentage of non-PD patients reporting such history fell slightly to 22.3%. This did not, however, constitute a significant difference ($\chi^2[1] = 1.56$). Prevalence of a family history of PD differed significantly between the 2 groups: M = 0.71 for the severe PD patients and M = 0.27 for the non-PD patients ($t[126] = -1.98$, $P < 0.05$).

Six (85.7%) of the severe PD patients described having sudden, episodic palpitations in the past month, compared with 46 (38.0%) non-PD patients, a significant difference ($\chi^2[1] = 6.24, P < 0.01$). These PD patients account for 11.5% of the 52 outpatients reporting palpitations. Removing the palpitations as a diagnostic symptom as before disqualifies only one individual from a diagnosis of PD.

### Other Data

The cardiologists’ estimates of the proportion of their patients who primarily experience PD ranged from 0% to 20%. The majority of estimates (7 of 13) put PD patients at 5% or less of the total population. The remainder (6 of 13) estimated that PD patients made up 10% or more of all patients seen. On average, the cardiologists estimated that 8% of all patients in each of their practices presented with PD.

### Discussion

The prevalence of panic disorder in cardiac outpatients identified in this study (12.5%) is similar to values observed in previous studies (9,13). Furthermore, this study found no significant difference in prevalence of heart disease between either of the PD groups and their corresponding non-PD groups. This suggests that while a psychiatric component to these patients’ maladies does exist, many of them have organic disease as well, for which they have been referred to a specialist in the correct field. In other words, PD patients “belong” in a cardiology clinic at about the same rate as other patients because of complicating cardiac disease. The coexisting psychosomatic and cardiac conditions in these patients serve to raise the question: Is there any connection between heart disease and panic disorder?

The DSM-IV group in this study, in accordance with most previous studies, for example, Katerndahl and Realini (4), was made up of proportionally more females (62.5%) than the non-PD group (38.4%). The older age of the identical panic attack and DSM-IV groups, however, when compared with their corresponding nonpanic attack and non-PD groups, approached significance (M = 66.2 years, M = 59.0 years, $P < 0.1$) This fact disagrees with much of the literature (15–17). A possible explanation for the discrepancy is given by Goldberg and others (13). In their study on cardiac outpatients, results seemed to indicate the presence of 2 different subgroups of PD in cardiac outpatients: patients who had experienced PD for a relatively long time and those who had experienced PD for a relatively short time. The former group displayed PD that predated any cardiac disease and closely resembled “classic” PD, while the latter group had PD that followed the onset of cardiac disorders. While the age of onset of PD in the long-duration group was before 30, in keeping with “classic” PD, the short-duration group generally developed the disorder later in life. It was suggested that the short-duration PD group may be experiencing panic as an anxious response to developing cardiac disease (13). The development of heart disease in already anxious patients may provide a stress that triggers the onset of panic attacks and PD. This idea is supported by the fact that there is no less significant heart disease among the PD patients than the non-PD patients. Unfortunately, data concerning the age of onset of attacks were not collected in this study as they were in the study by Goldberg and others (1990), so this hypothesis cannot be confirmed.

It was noted that 21.2% of all outpatients with sudden episodes of palpitations in the past month were individuals who screened positive for DSM-IV PD. Since PD cases made up 12.5% of the outpatients, this higher value appears to reinforce the notion of palpitations as the most common somatic symptom of panic attacks in patients presenting in medical settings. A report of palpitations by 68.8% of panic attack patients closely reflects previous findings of palpitations in two-thirds of panic attacks occurring to such patients (9,14). Also, there was a significantly higher percentage of patients with palpitations in the panic attack and PD groups than in each of the corresponding nonaffected groups, lending further import to the presence of palpitations as a warning sign for possible PD. Lastly, in a study by Barsky and others (9) in which consecutive patients referred for ambulatory electrocardiographic monitoring for palpitations were studied for PD, it was found that 18.6% of the sample (that is, of patients with palpitations) had current, one-month DSM-III-R PD. That value corresponds closely with the percentage of palpitation patients with DSM-IV PD identified in our study (21.2%) or 19.2% with DSM-III-R PD.

It is interesting to note that using the standard DSM-IV criteria, the prevalence of any known family history differs little between PD and non-PD groups. When one considers the group definitions based on the stricter criteria, however, the mean number of positive answers in the PD group
acknowledging a family history (of unexplained chest pain or palpitations, PD, or other anxiety disorders) takes on a significantly greater magnitude than the non-PD group. If a family history can predispose an individual to PD, as many studies have suggested (5,7), this result may suggest that the stricter definition comes closer to the essence of a hereditary panic disorder than the DSM-IV definition.

The mean estimate of the cardiologists regarding the percentage of patients they see in an average day suffering primarily from PD was slightly less than 8%. Compared with the DSM-IV value found in this study of 12.5%, this appears to be a slight underestimate. Two of the 13 cardiologists did pinpoint this range exactly, with estimates of 10% to 15%. Two more estimated that 10% of the patients they see suffer primarily from PD. The results of this relatively small sample of cardiologists indicate that half of the cardiologists would not anticipate seeing half of the panic disorder patients they do see. The diagnosis rate is likely to be lower.

While it appears that cardiologists have a variable rate of recognition of PD in outpatients, future studies employing a different research approach must be conducted in order to report confidently on this rate of recognition.

There are several important points that must be considered when regarding the results of this study. First, the diagnoses of PD in this study were determined solely by questionnaire and not substantiated by a structured interview as has been done in other studies. It is probable that such an interview would reduce the number of people deemed to be PD patients. It is also possible, however, that the number of PD patients present in the clinics is underestimated here because anxious patients may have been more likely to decline to fill out the questionnaire.

In addition, because the questionnaires were given by a single interviewer (AM), it was necessary that some patients be omitted because of time constraints. Nothing is known about these patients, but because their exclusion was not systematic, it is reasonable to expect that they are no different from the rest of the patient population. This is not the case, however, for a very small number of other patients, whom, because of other concurrent conditions, the cardiologists deemed should not be asked to complete the questionnaire. It is certain that the complications causing the exclusion of these patients set them apart from the rest of the cardiac outpatient population. Whether these differences may or may not increase the number of cases of PD among them is uncertain.

Another limitation of this study concerns language. Non-English-speaking patients with interpreters were allowed to participate in the study. The possibility arises, therefore, of information being distorted in translation. In most cases, however, the interpreter was a close relative of the patient and, being the person responsible for the patient’s care, was quite aware of the patient’s condition and any complaints.

Finally, as documented previously, patients did not all receive the questionnaire at the same time relative to their meeting with the cardiologist. It is possible that this may have affected patients’ answers. For example, a patient told that he or she has no significant heart disease may neglect to report symptoms which, if questioned prior to the appointment, he or she would have seen as worthy of mention. The fact that heart disease was equally prevalent among PD patients and non-PD patients, however, should have lessened such cases of report bias following an appointment. It seems unlikely that a meeting with the cardiologist would have the reverse effect, causing an increase in the number of symptoms reported.

Clinical Implications
- PD may often present to a cardiologist.
- Criteria defining more fearful PD than the DSM-IV suggest a hereditary component of PD.
- Significant heart disease does not preclude diagnosis of PD.

Limitations
- SCID interviews were not performed to follow-up questionnaire-based screening.
- Participants were interviewed at different times relative to meeting with the cardiologists.
- Translation of the questionnaire may have distorted some responses.

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Résumé

Objectif : Évaluer, à l’aide d’un questionnaire, 128 patients provenant de 13 cliniques de cardiologie de la région de Toronto, quant à la prévalence du trouble de panique.

Méthode : Le diagnostic chez les participants a été posé, en se basant à la fois sur les critères normalisés définis dans le DSM-IV et sur des critères modifiés qui ont permis d'identifier un groupe souffrant d’une peur panique plus grande.

Résultats : La prévalence du trouble de panique (12,5 %) chez les malades cardiaques traités en externe est conforme aux résultats obtenus lors d'études antérieures. Aucune différence significative n’a été observée entre les patients souffrant du trouble de panique et les autres patients, pour ce qui est de la présence de cardiopathies graves. La prévalence plus élevée de palpitations chez les patients répondant aux critères du trouble de panique, par comparaison aux autres, était elle aussi comparable aux conclusions antérieures. Aucune différence significative n’a été observée entre les antécédents familiaux des personnes souffrant du trouble de panique et ceux des autres répondants, mais une différence a été observée avec le groupe manifestant une peur panique plus grande ($P < 0,05$).

Conclusion : Le trouble de panique s’accompagne souvent de symptômes cardiaques, en particulier des palpitations.