Psychosomatics 2013:54:472–478

Original Research Reports

Panic Disorder Prevalence Among Patients Referred for an Electrocardiogram in a Nigerian Teaching Hospital

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Background: *Panic disorder is a common chronic illness that is often unrecognized, misdiagnosed, and untreated because it often presents to the physicians with symptoms that are similar to those of emergency medical conditions. One study of the prevalence of panic disorder in the general population in Nigeria has been published, but no studies have examined the prevalence of panic disorder in a sample of Nigerian patients with cardiac symptoms. This study investigated the 12-month prevalence of panic disorder among patients who were referred for an electrocardiogram in a Nigerian teaching hospital.* **Methods:** *Three hundred consecutive patients who were referred for an electrocardiogram were assessed for panic disorder using the Structured Clinical Interview for DSM-IV (SCID).* **Results:** *The prevalence of panic attacks and panic disorder were 10.0% and 7.0%, respectively. Age was associated with the presence of both panic attacks and panic disorder.* **Conclusions:** *This study suggests that panic disorder is common among patients who are referred for an electrocardiogram. It is recommended that patients whose cardiovascular or respiratory symptoms are not well explained by the diseases of such systems be evaluated for mental illness.*

(Psychosomatics 2013; 54:472–478)

Panic disorder is a common, chronic illness, associated with considerable morbidity and social costs.[1–3] In 1990, panic disorder was the 27th leading cause of nonfatal burden of disease in the world. At that time, it accounted for 1.0% of the total global years living with disability (YLD), with the same percentage as ischemic heart disease.[4]

The lifetime prevalence of panic disorder has been put at 1.5% to 5%.[5–9] In hospital settings, the prevalence rises to as high as 50%, especially when patients with cardiac pathology and patients with endocrine pathology are studied.[10,11] Although several effective treatments are now available, as many as half the number of the sufferers are either undiagnosed, misdiagnosed, or untreated.[12–14] One reason for the under-diagnosis is that most of the patients suffering from the disorder are initially seen at presentation by general practitioners, internal medicine specialists, or emergency room physicians. Their complaints, which include palpitations, chest pain, dizziness, and breathlessness often mimic those of emergency medical conditions, such as myocardial infarction, cardiac arrhythmias, cardiac failure, and other myocardial diseases. However, a significant number of such patients who present to medical clinics with these panic-like symptoms have no organic basis for their complaints.[15] Unfortunately, in current medical practice, many persons with panic disorder often undergo elaborate, expensive, but often inconclusive medical workups such as electrocardiograms, chest X-rays, and echocardiography. Such patients are thus offered ineffective treatment, while others are treated for nonspecific anxiety.[13]

In Nigeria, very few studies on panic disorder are available. Among these, the reported prevalences include

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3% in a psychiatric outpatient clinic of a teaching hospital,[16] and lifetime and 12-month prevalences of 0.2% and 0.1% in the community.[17]

There is no study in Nigeria that has addressed patients who are at a high risk for panic disorder, such as patients referred for cardiac or respiratory investigation. Such studies are particularly important since reports from Europe and the United States show that the prevalence of panic disorder is high among such patients.[10,12,18,19] Improving the recognition and treatment of panic disorder either alone or as a comorbid illness in Nigeria could reduce the burden, social costs, and economic costs attributable to under-diagnosis, misdiagnosis, and under-treatment of this condition.[2,20]

The aim of the present study was to estimate the prevalence of panic disorder among patients that have been referred for an electrocardiogram and the sociodemographic factors associated with such patients in a Nigerian teaching hospital.

METHODS

Study Setting

The study was carried out in the electrocardiogram room of the University College Hospital (UCH), Ibadan. This is an 812-bed teaching hospital located in southwest Nigeria. All patients (this included outpatients as well as inpatients who could leave their ward beds) for whom an electrocardiogram was requested at UCH come to this room except patients who are too ill to leave their ward beds. The electrocardiograms are done between 8 am and 5 pm daily on each working day.

Subjects

The inclusion criteria were (1) referral for an electrocardiogram, (2) age between 18 and 65 years, and (3) signed informed consent. The first 300 patients that met the criteria were included in the study.

Study Instrument

The study instrument was administered in two parts. The first part was devised to obtain socio-demographic information on age, sex, marital status, educational status, reasons for which the patient might have been referred and the diagnosis made by the referring doctor.

The second part was derived from the panic disorder module of the Structured Clinical Interview for DSM-IV.[21] SCID-IV is a semi-structured clinical interview that yields a current and lifetime DSM-IV Axis I disorders. It also has specific questions that rule out organic conditions. The instrument was translated into Yoruba (the local language) and back-translated.

Diagnosis

The diagnosis of panic disorder in this study was based on DSM-IV diagnostic criteria. Diagnostic assessment was made with the use of the Structured Clinical Interview for DSM-IV (SCID). One of the authors (O.B.E.) was trained in the use of the SCID prior to the commencement of the study. Panic disorder was defined according to the DSM-IV criteria for panic disorder (i.e., the presence of recurrent unexpected panic attacks in which at least one of the attacks has been followed by 1 month [or more] of one or more of either a persistent concern about having additional attacks, worry about the implications of the attack or its consequences or a significant change in behavior related to the attacks). Also, the attack should not be due to the direct physiological effects of substance or general medical condition and the attacks should not be accounted for by another mental disorder.

Patients' case notes were later examined to record the diagnoses made in the medical units that referred them. All the units in the medical departments were headed by consultants. The diagnoses made by the referring physicians were grouped according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision Version for 2006 (ICD-10). The University of Ibadan/University College Hospital Institutional Review Board approved the study protocol. Signed informed consent was obtained from the participants after the aims and objectives of the study were explained to them.

Data Collection

The reasons for referral for an electrocardiogram were sometimes different from the diagnoses made by the physicians in some cases, so the reasons for referral for electrocardiogram were analyzed separately. The reasons for referral for electrocardiogram were grouped into six categories. These are (1) cardiac disease and hypertension; (2) cardio-respiratory symptoms, this comprises those who were referred on account of symptoms and signs that are referable to the cardiac or respiratory system. These symp-

toms are chest pain, cough, palpitations, easy fatigability, fainting spells, and breathlessness. A subject who was referred on account of panic attacks was also classified in this group; (3) "pretreatment evaluation" comprised those who were referred because the subject was going for chemotherapy, radiotherapy, or hemodialysis; (4) "routine" comprised those who came for routine medical checkup, pregnancy, and those who were previously ill and were now symptom-free but wanted to know their state of health; (5) pre-employment examination group comprised mainly of young individuals who were referred by their employers for medical examination; (6) "others" comprised those who were referred on account of diabetes mellitus, ulcers, unexplained weight loss, and chronic pharyngitis. For further analysis, the subjects were further divided into two groups. The first two groups were classified as "cardiovascular and non-respiratory system related reasons" whereas the remaining four groups were classified as "non-cardiovascular and non-respiratory system related reasons".

The interview lasted about 5–7 minutes for subjects who had never had a panic attack and 20–30 minutes for subjects who had experienced a panic attack.

Data Analysis

The data obtained was entered into and analyzed using the Statistical Package for Social Sciences (SPSS v. 11, Chicago , USA). Univariate analysis was done using means, modes, and proportions, and these were presented in tables. For subjects who were referred on account of a particular symptom or disorder (216 subjects), χ^2 tests and odds ratios were used to explore relationships and associations between, panic disorder, panic attacks, and sociodemographic variables. Fisher's test was used where appropriate (expected values <5 in a cell). The level of significance was set at 0.05, two-tailed. Multivariate analysis was done using binary logistic regression analysis.

RESULTS

Socio-demographic Characteristics

Three hundred subjects were interviewed. Of these, 167 (55.7%) were women. Their ages ranged between 19 and 65 years with a mean of 44.15 years (S.D ±12.4). Of these, 237 (79.0%) were married, 62 (20.7%) had never been married, while one person was widowed. One hundred sixty-four (54.7%) of the respondents had at least tertiary education. Primary school education included the first 6 years of formal education where people are expected to become literate. Secondary school education included the next 6 years of formal education. Both polytechnic education and university education were classified as tertiary education (Table 1).

TABLE 1. Sociodemographic Characteristics of Subjects

Characteristics	Frequency	Percentage (%)
Sex		
Male	133	44.3
Female	167	55.7
Total	300	100
Age		
<24	33	11.0
25–34	35	11.7
35–44	67	22.5
45–54	94	31.5
55 and above	69	23.2
Total	298	100.0
Marital status		
Never married	62	20.7
Married	237	79.0
Widowed	1	0.3
Total	300	100
Educational status		
No formal education	12	4.0
Primary education	56	18.7
Secondary education	68	22.7
Tertiary	164	54.7
Total	300	100%

Presence of Panic Attacks and Panic Disorder

Of the 300 subjects included in the analysis, 30 subjects (10.0%) had at least one panic attack in the previous 12 months, whereas 21 (7.0%) fulfilled the criteria for panic disorder in the same period of time.

Panic Attacks and Medical Conditions

Panic disorder was associated with panic attacks in 21 (70.0%) of the 30 subjects with panic attacks. Cardiac disease was associated with panic attacks in two of the subjects, other conditions include were hyperthyroidism (two subjects), phaechromocytoma (two subjects), hypoglycemia (1 subject), and post-traumatic stress disorder (one subject).

Reasons for Electrocardiogram Request

One hundred and nine respondents (38.1%) were referred on account of cardiac disease or hypertension while

TABLE 2. Distribution of Panic Symptoms in Subjects with Panic Disorder

Panic Symptoms	Frequency	Percentage
Palpitation, pounding heart or accelerated heart	14	66.7
Chest pain	6	28.6
Sweating	7	33.3
Trembling	7	33.3
Shortness of breath	9	42.9
Chocking	7	33.3
Nausea	6	28.6
Dizziness	7	33.3
Derealization	3	14.3
Fear of losing control or going crazy	4	19.1
Fear of dying	13	61.9
Paraesthesia	3	14.3
Chills or hot flush	3	14.3

64 (22.4%) were referred on account of cardio-respiratory symptoms. The highest number of patients with panic disorder came from the group of subjects who were referred on account of cardio-respiratory symptoms.

Distribution of Panic Symptoms in Patients with Panic Disorder

The most common symptom in 21 subjects with panic disorder was palpitations (66.7%). Thirteen subjects (61.9%) complained of fear of dying, and nine subjects (42.9%) complained of shortness of breath. Only three subjects (14.3%) complained of derealization, paraesthesia, and feeling of chill or hot flushes (Table 2).

Concordance Between Referring Physician's Diagnostic Impression and Patient's Research Diagnosis

Of the 21 patients that had panic disorder, only in four (19.0%) of the subjects did the referring physicians make a diagnosis of a psychiatric disorder, and only in one was a specific diagnosis of panic disorder made. The diagnoses made by the physicians for these patients were panic attack, hypochondriasis, psychosomatic disorder, and panic disorder.

Socio-demographic Correlates for Panic Attack and Panic Disorder

The presence of panic attacks was significantly associated with age of the respondents. Five (35.7%) of the subjects who were 25 years old or younger had at least one panic attack in the preceding 12 months compared with 22 (11.9%) who were above 25 years of age ($P = 0.02$). Similarly, four (28.6%) subjects who were 25 years or younger had panic disorder compared with 15 (7.4%) who were older than 25 years ($P = 0.02$) (Tables 3 and 4).

There was a significant relationship between the presence of panic attacks and reasons for ECG requests that were either related to the cardiovascular or respiratory system. Panic attacks were present in 25 (14.5%) of subjects with cardiovascular or respiratory system-related reasons for referral, compared with 5 (4.4%) of those whose reasons for ECG requests were not related to such systems. Subjects who were referred on account of cardiovascular system or respiratory system related reasons were also four times more likely to have panic attacks than subjects whose reasons for referral were not related to such systems ($\chi^2 = 7.318$, $P = 0.007$, OR = 3.649, 1.353–9.836). Similarly, there was a significant relationship between the presence of panic disorder and reasons for ECG requests that were either related to the cardiovascular or respiratory system. Panic disorder was present in 17 (9.8%) of subjects with cardiovascular or respiratory system-related reasons for referral compared with 4 (3.5%) of those whose reasons for ECG requests were not related to such systems. In addition, subjects who were referred on account of cardiovascular system or respiratory system-related reasons were three times more likely to have panic disorder than subjects whose reasons for referral were not related to such systems ($\chi^2 = 3.971$, $P = 0.046$, OR = 2.970, 95% CI 0.972–9.068).

Binary logistic regression analysis showed that subjects who were less than 25 years old were 4.6 times more likely to have panic attacks compared with those who were above the age of 25 years ($P = 0.01$). Similarly subjects who were less than 25 years were 5 times more likely to have panic disorder than those who were above 25 years of age ($P=0.01$).

DISCUSSION

The 12-month prevalence of panic attacks and panic disorder in this study were 10% and 7% respectively. The prevalence of panic disorder in the current study was higher than the 12-month prevalence of 0.1% in an earlier report in a large-scale community study of mental disorders in South West Nigeria.[17] Whereas the study by Gureje et al was done in the community where the prevalence of panic disorder is expected to be lower, the current study was conducted among subjects that were at a higher risk for panic disorder, majority of whom had complained to

TABLE 3. Relationship Between Panic Attacks and Sociodemographic Variables

	Present *n* (%)	Absent *n* (%)	Total *n* (%)	χ^2	*P* Value
Age					0.02 (Fishers)
<25 years	5 (35.7)	34 (64.3)	14		
>25 years	25 (11.9)	236 (81.9)	202		
Sex					0.53
Male	9 (10.7)	75 (89.3)	84	0.40	
Female	18 (13.6)	114 (86.4)	132		
Marital status					(0.51) Fisher)
Never married	4 (17.4)	19 (82.6)	23		
Married	23 (11.9)	170 (88.1)	193		
Educational status					0.68
Primary and below	8 (14.0)	49 (86.0)	57	0.17	
Secondary and above	19 (11.9)	140 (88.1)	159		
Occupational status					0.47
Employed	21 (12.0)	154 (88.0)	175	0.57	
Unemployed	6 (15.0)	34 (85.0)	40		
Family history	1 (7.7)	12 (92.3)	13		1.00 (Fishers)
	26 (13.0)	186 (93.5)	200		

their doctors of symptoms referable to the cardiovascular or respiratory systems. The prevalence of 7% for panic disorder is however similar to prevalences of 9.1% and 3% found in other hospital based studies in West Africa.[16,22] The prevalence of 3% earlier cited was found among a psychiatric out-patient population. Such patients are at a lesser risk for panic disorder than patients referred for cardiology related investigative procedures such as the electrocardiogram. Higher prevalence estimates of 25% and 17% have been reported among patients who complained of chest pain and patients referred for pulmonary function test in the United States.[12,23] Such higher prevalence estimates might be due to the highly selective nature of these subjects, given that such patients had *ab initio* complained of symptoms or had signs that were associated with cardiovascular or respiratory system pathology. Therefore, such subjects are more likely to have panic attacks or panic disorder compared to the subjects in the current study, which was conducted in an unselected group of patients.

In the current study, the subjects who were at the highest risk for panic disorder were those that were referred on account of cardiac disease, hypertension, and those with cardio-respiratory symptoms. This group comprised 60% of the subjects in this study. However, the cardiac disease and hypertension group also included subjects referred on account of uncomplicated hypertension who do not have any cardio-respiratory symptoms. Therefore such patients are at a reduced risk of panic disorder than if they had such symptoms. It is noteworthy that the

TABLE 4. Relationship Between Panic Disorder and Sociodemographic Variables

Variable	Present *n* (%)	Absent *n* (%)	Total *n* (%)	χ^2	*P* Value
Age					0.02 (Fishers)
<25 years	4 (28.6)	10 (71.4)	14		
>25 years	15 (7.4)	187 (92.6)	202		
Sex					0.5
Male	6 (7.1)	78 (92.9)	84	0.47	
Female	13 (9.8)	119 (90.2)	132		
Marital status					0.41 (Fisher)
Never married	3 (3.0)	20 (87.0)	23		
Married	16 (8.3)	177 (91.7)	193		
Educational status					0.58
Primary school and below	4 (7.0)	53 (93.0)	57	0.31	
Secondary school and above	15 (9.4)	144 (90.6)	159		
Occupational status					0.37
Employed	14 (8.0)	161 (92.0)	175	0.81	
Unemployed	5 (12.5)	35 (87.5)	40		
Family history	1 (7.7)	12 (92.3)	13		1.00 (Fishers)
	18 (9.0)	182 (91.0)	200		

cardio-respiratory group produced the highest number and percentage of subjects with panic disorder. This is in keeping with previous studies that show that the prevalence of panic disorder is high among people that present with cardio-respiratory symptoms.[15,23]

Another reason why the prevalence of panic disorder in the current study is lower than the prevalence estimates from Europe and America is that some of the earlier studies in Europe and America were based on self-reporting. Studies based on self-reporting have been reported to yield higher prevalence estimates.[6] Apart from the methodological issue noted (self-reporting), the lower prevalence estimate in this study, compared to those in Europe and America is in keeping with reports of low level of panic symptoms among blacks.[6]

Over 80% of subjects who had panic attacks or panic disorder came with ECG requests that were related to the cardiovascular or respiratory system, while less than 20% came from ECG requests that were not related to such systems. Also, over 40% of subjects with panic disorder came from the cardio-respiratory symptoms group alone. This is in keeping with reports of higher prevalence of panic attack and panic disorder among cardiology patients, chest pain patients; and respiratology clinic attendees.[6,12,24]

The most frequent symptoms during a panic attack in this study were palpitations, pounding or accelerated heart, followed by fear of dying, and then shortness of breath. This is in keeping with earlier reports that the most frequent symptoms during a bad panic attack are palpitations, pounding or accelerated heart, followed by fear of losing control or going crazy.[25] However, fear of going crazy was not common in this study in view of the fact that in Nigeria, it may be more socially acceptable for some patients to admit that they felt as if they were going to die than to admit that they were loosing control or going crazy.

Subjects who were less than 25 years were significantly more likely to have both panic disorder and panic attacks compared to those older than 25 years. This finding is in keeping with the statement by Saddock and Saddock that panic disorder most commonly develops in young adulthood with the mean age of presentation being about 25 years.[26] The authors however stated that both panic disorder and agoraphobia can develop at any age.

Of the 19 subjects who met the diagnostic criteria for panic disorder, only in four of the subjects was a psychiatric diagnosis made by the referring physician, and only one physician made a specific diagnosis of panic disorder. Hence, psychiatric disorder was recognized in 21% of the subjects while 79% were unrecognized. This is similar to previous reports that up to 98% of patients with panic disorder were not recognized by the attending cardiologist.[18,19] A possible explanation for the under-recognition is that cardiac diseases have high rates of co-morbidity with panic disorder.[10,11,27] In such patients, it is easy to recognize the cardiac or medical condition and fail to recognize the co-morbid panic disorder, especially since the symptoms are similar. Secondly, because of the similarity in the symptomatology of panic disorder and cardiac disease, it is easier and safer for a physician to consider a cardiac disease as a differential diagnosis because it is more life-threatening than to consider panic disorder as an option in patients with such symptoms.

One limitation of this study is the small number of subjects positive for panic disorder. The number of subjects with panic disorder and panic attacks was only 21 and 30, respectively. This weakens the statistical power of the study and makes it susceptible to type II error. Thus, some clinically significant associations between panic disorder or panic attacks and socio-demographic variables may not have been found to be significant. Another limitation is the study sample, which is largely urban and educated. Also, this is not an entirely representative cohort since patients too sick to walk to the ECG room were not included. This may have lowered the rates of panic attack and panic disorder in this study.

However, a possible strength of the study is the fact that the diagnosis was made using a structured interview by a clinician. Some of the previous studies on panic disorder used lay interviewers to administer the CIDI (Composite International Diagnostic Interview) while some others were based on self-reporting of panic disorder/panic attack symptoms.

It is advised that physicians should attend to symptoms that are suggestive of panic attacks and, when in doubt, such patients should be referred to a mental health professional for assessment and treatment. Likewise, patients with heart disease who continue to complain of chest pain that is not well explained by their heart disease should be referred for evaluation for a possible mental illness and specifically for panic disorder.

There is a need for prospective studies of patients with panic attacks and panic disorder so as to further identify associated risk factors and better describe outcome. It

would also be beneficial to compare outcome of panic disorder between patients with and patients without comorbid medical conditions.

Disclosure: The authors disclosed no proprietary or commercial interest in any product mentioned or concept discussed in this article.

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