

Generalised Anxiety Disorder and Cardiovascular Disease: A Study at a University Teaching Hospital in North-Central Nigeria

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ABSTRACT

The association between anxiety and cardiovascular events in patients with cardiovascular disease (CVD) has shown anxiety disorders to increase the risk of major cardiac events and mortality, anxiety disorders have also been linked to the onset, progression and prognosis of CVD. Therefore, this study was aimed to determine the prevalence and correlates of generalised anxiety disorder (GAD) in patients attending the cardiology clinic of Benue State University Teaching Hospital (BSUTH). It was part of a larger study conducted among 106 consenting participants within the period of June 2017 to August, 2017. The result shows that 54(50.9%) of the respondents were female while 52 (49.1%) were male. Twenty-eight (26.4%) were married, 15(14.2%) were single while 63(59.4%) were previously married. Eight-two (77.4%) of the subjects were diagnosed with hypertension, Rheumatic heart disease was diagnosed in 8(7.5%) subjects, heart failure 3 (2.8%) and cardiomyopathy 9(8.5%). Thirty-two subjects were diagnosed with GAD representing a prevalence rate of 30.2%. Generalised anxiety disorder was significantly associated with female gender ($p=0.001$), marital status ($p=0.008$), unsatisfactory relationship with sexual partner (0.001), history of substance use ($p=0.001$), and low level of occupational status ($p=0.026$). However, there was no statistically significant association between GAD and body mass index -BMI ($p=0.139$), as well as the nature of a cardiovascular diagnosis ($p=0.703$). The authors therefore recommended a detail psychiatric/psychological evaluation of patients with CVD to enhance early detection and treatment for a better outcome and quality of life.

Keywords: anxiety, cardiovascular, correlates

INTRODUCTION

Anxiety disorders are commonly associated with cardiovascular disease (CVD) and may significantly influence the onset, progression and outcomes of cardiac disease like coronary artery disease (CAD). In a study by Easton and colleagues for instance, 32% of patients with heart failure (HF) were estimated to have experienced elevated level of anxiety and 13% met the criteria for an anxiety disorder.¹ Anxiety also affects approximately 20% of patients with more advanced HF who require implantation of a left ventricular assist device to support their cardiac

function.^{2,3} Generalised anxiety disorder (GAD) is reported to be highly prevalent among patients with CVD, a meta-analysis study by Tully et al⁴ has reported an 11% point prevalence and a 26 % lifetime prevalence of GAD in patients with coronary artery disease (CAD) and GAD has been associated with poor cardiac health in all the stages of CAD.⁵⁻⁷ Similarly, rates of anxiety among patients with HF have been reported to vary between 8% to 18% for anxiety disorders⁸, 17% to 28.8% for clinically significant anxiety⁹⁻¹¹ and 40% to 72% for elevated anxiety symptoms.¹²⁻¹⁴ Another

study of prevalence and measurement of anxiety in sample of patients with heart failure¹ found prevalence of anxiety to range from 6.3% to 72.3% with an overall random effects pooled prevalence of 32%. Following myocardial infarction, GAD has been linked to a nearly two-fold increased risk of mortality over the subsequent ten years⁶, and in patients with stable CAD, GAD is associated with a two-fold increased risk of a major cardiac adverse events over the next two years.⁵ It is pertinent to note that the assessment of anxiety within the context of a physical disease can be quite challenging because physical conditions like CVD share many symptoms with anxiety states. Such symptoms include fatigue, palpitations, fainting attacks, chest pain, breathlessness, tremors, headache and many more.¹⁵

The association between anxiety disorders and CVD could be explained by multiple factors involving health behaviour and physiological mechanism. Adherence to health promoting behaviours such as healthy diet, regular physical exercise, and medication adherence is clearly linked to a better outcome in patients with cardiac disease.¹⁶⁻¹⁸ In contrast, unhealthy lifestyle can result to the development or worsening of risk factors including diabetes, hypertension, elevated cholesterol, obesity and smoking all of which are known to increase the mortality in patient with cardiac disease.¹⁹ Individuals who experience anxiety appear less likely to engage in healthy behaviours with a consequent increase in dietary cholesterol intake, sedentary lifestyle and a decrease in physical activity.²⁰ This is consistent with the finding that patients with panic disorder and GAD have increased odds of dyslipidemia, obesity, diabetes and substance use^{21,22} which are documented risk factors for CVD.

Physiological mechanism implicated in the relationship between anxiety and CVD include the role of inflammatory markers, endothelial dysfunction, platelet dysfunction and autonomic dysfunction. Both anxiety and anxiety disorders are associated with increased inflammatory markers²³, inflammatory pathways involving interleukin-1 (IL-1), interleukin-6 (IL-6), tumour necrosis factor (TNF) and C-reactive protein (CRP) have all been implicated in the development of atherosclerosis and heart disease including CAD, HF, and unstable angina. Patients with GAD have also been reported to have decreased levels of circulatory endothelial progenitor cells that are vital to healthy endothelial function. And anxiety disorders also are associated with changes in platelet activity with greater

aggregation of platelet which may either precipitate or worsen a cardiovascular situation.²⁴

Disrupted variability in heart rate (a measure of beat to beat variability of the heart) and baroreflex sensitivity have been associated with increased adverse outcomes and mortality in post myocardial infarction and HF patients. Decrease heart rate variability has been associated with GAD.²⁵ Thus, dysfunction in the body's ability to regulate autonomic function in patients with anxiety disorders could be a mechanism linking anxiety disorders to cardiovascular events. Despite these startling revelations, there is an abysmal lack of literature in this region with respect to study of anxiety disorders among patients with CVD. This study became necessary in order to create awareness as well as forming a template for further studies in this field of specialty.

MATERIALS AND METHODS

This was part of a larger cross-sectional descriptive study conducted at the cardiology clinic of BSUTH, Makurdi, a tertiary health institution that offers health services for people of Benue and the surrounding states like Cross-River, Nasarawa and Kogi. About two thousands patients were already registered at the cardiology unit during the period of this study between June, 2017 and August, 2017. Ethical clearance was sort and obtained at the BSUTH before the commencement of the study.

Study Instruments

1. **A questionnaire** designed by the authors to document the socio-demographic and clinical variables of respondents.
2. **Hospital Anxiety and Depression Scale (HADS)**

This is a self assessment scale for detecting the states of anxiety and depression in a setting of a Medical Out-Patients Clinic. The scale consists of 14-items that are divided into an anxiety and a depression sub-scales, each comprising seven questions rated on a score of 0 to 3. A total score less than 7 on each subscale is considered normal, while a score of 7 to 21 is considered evidence of anxiety or depression depending on the subscale used. The anxiety subscale was used in this study to screen for anxiety disorders. This instrument has been validated and used in this environment.²⁶

3. Mini International Neuropsychiatric Interview (MINI)

This instrument was used for the diagnosis of generalised anxiety disorder (GAD) in the subjects studied. It is a brief structured instrument for major psychiatric diagnosis in the DSM-IV (Diagnostic and Statistical Manual) and ICD-10 (International Classification of Diseases). Validation and reliability studies have been done comparing the MINI to the Structured Clinical Interview (SCID-P) for DSM –IIIR and the Composite International Diagnostic Interview (CIDI) developed by the World Health Organisation for ICD-10. The results of these studies show that the MINI has acceptably high validity and reliability scores. This instrument has been used in Nigerian studies.²⁷

Procedure

The study was carried among consenting patients at the cardiology clinic of BSUTH. It was conducted in two phases. In the first phase, the socio-demographic variables of every consecutive patient were recorded using a proforma designed by the authors after obtaining an informed consent. Subjects were also screened for anxiety disorders using HADS. During the second phase of this study, participants with a score of 7 and above on HADS were interviewed by a psychiatrist using MINI for the diagnosis of GAD. This process was repeated on every clinic day until the desired sample size of 106 was obtained.

Exclusion Criteria

This included subjects that were critically ill, those receiving treatment for other chronic medical conditions like diabetes mellitus, cancer, tuberculosis, human immunodeficiency virus (HIV) infection as well as those that could not provide informed consent.

Data Analysis

The data was coded and analysed using Statistical Package for Social Sciences (SPSS) version 22. Frequency statistics, cross tabulation and chi square were used to compare variables where necessary, the level of significance was set at $p < 0.05$.

RESULTS

A total of 106 subjects were recruited for this study, 54 (50.9%) were female while 52 (49.1%) were male. As shown in table 1 below, their age ranged from 24 to 83 years with a mean of 53.48 ± 14.77 years, their mean height, weight and body mass index (BMI) were 1.61 ± 0.009 metres, 71.51 ± 12.04 kg and 27.42 ± 3.57 kg/m² respectively. Twenty-eight (26.4%) were married, 15(14.2%) were single, while 63 (59.4%) were previously married (divorced, separated, widowed) as shown in table2. The same table shows that, 36(34.0%) of the respondents reported having an excellent relation with their sexual partners, 20(18.9%) reported a good relationship while 50(47.2%) were having an unsatisfactory relationship with their sexual partners. Sixty-three (59.4%) of the subjects scored 7

and above on HADS during the screening phase of the study, in the second stage, 32 were diagnosed with GAD (using MINI), representing a prevalence rate of 30.2%. As illustrated in table 3, there was a statistically significance relationship between GAD and respondents' gender status ($p=0.001$), marital status ($p=0.008$), educational attainment ($p=0.006$), relationship with sexual partner ($p=0.001$), occupational status (0.026), and use of psychoactive substances ($p=0.001$). No statistically significant relationship was found between GAD and the various cardiovascular diagnosis ($p=0.703$) as well as the respondents' BMI.

Table 1: Ranges, means and standard deviations of subjects' continuous variables

Variable	Range	Mean
Age (years)	24-83	53.48±14.77
Height (metres)	1.40-1.80	1.61±0.09
Weight (Kg)	50-98	71.51±12.04
BMI (Kg/m ²)	21.0-35.2	27.42±3.57
HADS (A)score	2-20	7.92±4.25

Table2: Frequency Distribution of Respondents' Socio-demographic and Clinical Variables

Variable	Frequency (n)	Percentage (%)
Gender		
male	52	49.1
female	54	50.9
total	106	100.0
BMI (kg/ m²)		
normal	34	32.1
Overweight/Obesity	72	67.9
total	106	100.0
Educational attainment		
none	37	34.9
primary	29	27.4
secondary	23	21.7
others	17	16.0
total	106	100.0
Occupational status		
I & II	13	12.3
III & IV	36	34.0
V & VI	57	53.7
total	106	100.0
Marital status		
single	15	14.2
married	28	26.4
previously married	63	59.4
total	106	100.0
Partner relationship		
excellent	36	34.0
good	20	18.9
poor	50	47.2
total	106	100.0
Substance used		
present	58	54.7
not present	48	45.3
total	106	100.0
Types of substances		
alcohol	50	47.2
multiple	8	7.5
none	48	45.3
total	106	100.0
Diagnoses		
hypertension	82	77.4
rheumatic heart diseases	8	7.5
heart failure	3	2.8
cardiomyopathies	9	8.5
others	4	3.8
Total	106	100.0

Table3: Relationship between GAD and Respondents' Socio-demographic and Clinical Attributes

Variable	Gad	No Gad	Total	Statistics
Gender				
male	8	44	52	X ² =10.615 df=1 p=0.001
female	24	30	54	
total	32	74	106	
BMI				
normal	7	27	34	X ² =2.189 df=1 p=0.139
Overweight	25	47	72	
total	32	74	106	
Education				
none	11	26	37	X ² =12.292 df=3 p=0.006
primary	11	18	29	
secondary	1	22	23	
tertiary	9	8	17	
total	32	74	106	
Occupation				
I&II	8	5	13	X ² =7.268 df=2 p=0.026
III&IV	8	28	36	
V&VI	16	41	57	
total	32	74	106	
Marital status				
single	1	14	15	X ² =9.629 df=2 p=0.008
married	5	23	28	
prev. married	26	37	63	
total	32	74	106	
Relationship				
excellent	2	34	36	X ² =19.932 df= 2 p=0.001
good	5	15	20	
poor	25	25	50	
total	32	74	106	
Substance used				
yes	31	27	58	X ² =32.880 df=1 p=0.001
no	1	47	48	
total	32	58	106	
Diagnoses				
hypertension	24	58	82	X ² =0.146 df=1 p= 0.703
others	8	16	24	
total	32	58	106	

DISCUSSION

While much of the literature on psychiatric morbidity among patients with cardiovascular disease has focused on depression, it has recently been established that anxiety disorders are also common in this population. However, there is paucity of knowledge about this in our environment.

This study revealed that 59.4% of the respondents had a clinically significant elevated level of anxiety during the screening phase while 30.2% were eventually diagnosed with generalised anxiety disorder (GAD). This reported level of anxiety is consistent with the finding in other studies of patients with CVD^{4,28,29} where elevated anxiety symptoms were reported to be in a range of 40% and 72%. The prevalence rate of GAD as reported in this study is 30.2%, a finding that is slightly higher than that of a study by Bankier and colleagues³⁰ which found the prevalence rate of GAD to be 24%. However, unlike this study, their study included

only patients with coronary artery disease (CAD). Unhealthy behaviours like lack of physical activity, poor dietary habit, excessive alcohol use, as well as physiological mechanisms like inflammatory factors, endothelial dysfunction, platelet and autonomic dysfunction have all been implicated to explain the link GAD and CVD.

In this study, GAD was found to be common in female than male gender in a ratio of 3:1, a finding that concurred well with that of the most widely documented findings in epidemiological studies of psychiatric disorders that reported women to be significantly more likely than men to develop an anxiety disorder throughout lifespan.^{31,32} One plausible explanation to this gender distribution of anxiety disorders is the fact that women are more sensitive to psychological trauma and cardiovascular events are also subject to the vulnerability to trauma or deterioration of the previous psychological trauma or anxiety symptoms.³³ Also, hormonal factors and the likelihood of women to report psychological symptoms as against men could offer another possible reason for this observed gender difference in generalised anxiety disorder.

Generalised anxiety disorder (GAD) in this study was found to be associated with not being married as well as an unsatisfactory social relationship with a sexual partner. This finding is on the same page with that of a meta-analysis study by Kasalova *et al*³⁴ that reported dissatisfaction in a relationship as a trigger for the development of anxiety disorders and could also be responsible for the modulation and manifestation of the anxiety disorders. This finding has also revealed that being married and having a satisfactory relationship with a sexual partner are protective for the development of GAD.

This study found an over-representation of alcohol and tobacco use among individuals with GAD, a finding that agrees with that of several others. One of the largest co-morbidity studies found that 17.7% of the respondents with a current substance used disorder (SUD) also met criteria for an anxiety disorder.³⁵ Merikangas and colleagues in another study also found anxiety disorders to generally precede the development of co-occurring alcohol (57% to 80%) and drugs (67.6% to 100%) used disorders.³⁶ Very important to note is the fact that the association between anxiety disorders and substance used disorders is multifaceted. Anxiety related disorders may increase the risk for the development of SUD and substance used disorders may also alter the presentation and treatment outcome of anxiety disorders. Both anxiety

and substance used disorders are also intricately related to the aetiology, presentation and prognosis of cardiovascular disorders.

In this study, there was a preponderance of GAD among respondents with low occupational status (class V and VI) and those with low level of educational attainment. This finding is in tandem with several studies that have long observed anxiety disorders to occur more frequently among those in disadvantaged social circumstances.³⁷ An explanation to this is the fact that individuals in lower occupational status are more likely to experience social and financial difficulties like procurement of medication, affordability of hospital and domestic bills, and adherence to follow up appointments. These social difficulties may synergistically expose them to the development of anxiety disorders.

There was no significant association between having a diagnosis of GAD and the respondents' body mass index (BMI) in this study, a finding that is at variance with that of Romona SD, et al³⁸ that reported anxiety disorders to be common among those at the extreme of weight (underweight, overweight and obesity). And very plausible biopsychosocial mechanisms that link obesity and anxiety disorders have been proposed.³⁹ The lack of association between GAD and BMI in this study may be due to the site of the study and the study design, a larger community based and comparative studies are necessary to make a generalization of this finding. Despite these findings, there is a dearth of literature in this environment with respect to generalised anxiety disorders and cardiovascular disease.

CONCLUSION

Generalised anxiety disorder was found to be highly prevalent in this population of patients with cardiovascular disorder and several psychosocial factors were also identified to be associated with these findings. It is therefore imperative to screen, identify and treat generalised anxiety disorder in individuals with cardiovascular disorders in order to improve their outcome and quality of life.

LIMITATION

Since this was a cross-sectional descriptive study, it is difficult to generalise its findings but the strength of this study is in the use of a standardised diagnostic instrument to diagnose GAD

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Conflict of Interest

None declared.

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