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Association of Depression with Atherogenic Index among Patients Attending a Cardiology Clinic in Southern Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author ATE designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author CUE managed the analyses of the study. Both authors managed the literature searches, read and approved the final manuscript.

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ABSTRACT

Introduction: Cardiovascular diseases (CVDs) are a leading cause of death worldwide. Atherogenic Index of Plasma (AIP) (log_{10} triglyceride TG/high density lipoprotein cholesterol HDL-C) predicts CVD risk. Depression is a common finding in patients with CVD and a contributory factor to cardiac related deaths and all-cause mortality. AIP has been found to be increased in patients with CVD who were also found to be depressed. We determined the prevalence of depression and its relationship with AIP in patients attending a cardiology clinic for various cardiac related ailments.
Study Design: Cross-sectional study.
Methods: Ninety four adult patients were recruited. None of the patients were receiving cholesterol lowering medications or antidepressants. Demographic, clinical data and anthropometric

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measurements were taken. Fasting lipid profiles inclusive of HDL‑C and TG were recorded. AIP of -0.3-0.11, 0.11-0.24 and >0.24 were classified as low, intermediate and high risk respectively. The Center for Epidemiologic Studies-Depression (CES-D) scale was used to assess depressive symptoms. A score ≥16 on the CESD was used as an indicator for elevated depressive symptoms (EDSs) associated with clinical depression based on the diagnostic and statistical manual (DSM IV).

Results: Majority of the patients were middle aged (52.1%), married (73.4%), female (59.6%), overweight (41.5%) with tertiary level of education (44.7%). Prevalence of depression was 28.7%. Persons with primary education had reduced odds of being depressed compared to those with no formal education, 92% O.R 0.08 (0.001 - 0.89), p=0.04. The most common diagnosis was hypertension (69.1%). Others were heart failure (20.2%), stroke (7.4%) and ischaemic heart disease (3.2%). There was a significantly positive but weak correlation between AIP with CESD scores (r= 0.28, p= 0.006).

Conclusion: Comorbid depression in patients with CVDs are often missed, undiagnosed and untreated. Routine screening for comorbid depression is recommended, and further studies are needed to understand the interaction between atherogenic index and depression to improve morbidity and ensure long-term survival of patients.

Keywords: Atherogenic index; depression; hypertension; cardiovascular diseases.

1. INTRODUCTION

Studies have shown that depression is common in patients with cardiovascular disease (CVD) and contributes to adverse psychiatric, functional, and cardiovascular outcomes such as cardiac related deaths and all-cause mortality [1]. Depression occurs quite frequently in patients with cardiac disease and studies show over 20% of patients fulfilling the criteria for a major depressive disorder [1,2]. Studies indicate prevalence of depression ranges from 4.1% in the Nigerian general population [3] to 18.2% among geriatric patients [4] and occurs more in women and in patients of lower socioeconomic status [5]. Several factors are implicated in the development of depression. Some of these factors include chronic stress [6,7], female gender [8,9], poverty [5], lack of employment [10], lesser years of formal education [11], advancing age [4], disability [12], chronic ailments [13] and loneliness [12]. However, several studies have implicated depression as being independent as a risk factor for cardiovascular disease, rather than just being an emotional response to cardiovascular ailments [14]. In Nigeria, a prevalence rate of 27.5% has been recorded for major depressive disorder among heart failure patients [15]. Depressive symptoms are often chronic and persistent, and have been associated, with not only the development of coronary artery disease (CAD), but also its progression, the occurrence of recurrent cardiac events, and an increased risk of mortality [16,17]. Factors that increase the risk of adverse cardiac outcomes among depressed persons include: impaired adherence to health behaviours and adverse physiological effects of depression which include inflammation [18,19], endothelial dysfunction [20,21], platelet hyperactivity [22-24], and autonomic nervous system abnormalities [25-28].

Dyslipidemia is highly prevalent in Africa [29-31], ranging 60-89 percent in several populations (healthy persons [32,33], elderly persons [34], type 2 diabetes mellitus [35-37], and hypertensives [38,39]) with the predominant dyslipidaemic pattern being low HDL-C [29,30,34-39]. Also commonly elevated are LDL-C, TC and TG levels [29,30,32,39-41]. An atherogenic dyslipidaemic profile is associated with increased cardiovascular disease risk and is typically characterized by elevated levels of TG, low HDL-C and increased small, dense LDL-C particles [42-45]. Globally, several prospective epidemiologic researches have documented the relationship between atherogenic index of plasma (AIP) and CVD [46,47-50]. Calculation of AIP involves two important lipid fractions; triglycerides (TG) and high density lipoprotein cholesterol (HDL-C), and both parameters are independent risk factors for CAD [51]. AIP is useful as a diagnostic alternative in predicting cardiovascular disease risk even when TG and HDL-C appear normal [46,52]. Studies show that AIP (log 10 triglyceride/high-density lipoprotein−cholesterol) predicts high blood pressure, diabetes, and vascular events [46,47]. AIP and other lipid indices including Castelli's Risk Index I & II (TC/HDL-C and LDL-C/HDL-C respectively), non-HDL-C (TC minus HDL-C),

TC∗TG∗LDL/HDL-C (lipoprotein combined index, LCI), and atherogenic coefficient (AC) {(non-HDL-C)/HDL-C} have been shown to contribute significantly to CAD risk estimation even when the absolute values of individual components of the fasting lipid profile appear normal [52,53-56]. These lipid ratios are considered to be better predictors for CAD when compared to single lipid parameters [55,57-59]. AIP shows positive correlation with other lipid ratios [60,61]. However, AIP may be a better predictor of CAD risk than other lipid ratios [53,61-63]. AIP has several other advantages. First, because it is a logarithmically transformed ratio of the molar concentrations of TG and HDL-C, it can correct for the lack of a normal distribution. Also, AIP values are obtained by direct calculation and do not require any extra cost. Thirdly, the high predictive value of AIP's is also thought to be linked to its strong correlation with presence of small low density lipoprotein particles (sdLDL), an important marker for predicting atherosclerosis [64-66]. sdLDL invades and deposits on the arterial wall much more and with greater ease than large LDL particles, and it is also easily oxidized. Phagocytosis of oxidized LDL by macrophages results in foam cells which further lead to atherosclerosis and CVDs. Several studies have shown that sdLDL serves as an important marker for prediction of atherosclerosis [67], however in resource poor settings such as ours, direct detection methods are unavailable. AIP is a useful alternative marker for prediction of atherosclerosis as its value is inversely associated with the diameter of LDL-C particles [64] meaning AIP is indicative of small dense LDL particle size [66-69]. Also, the parameters (TG and HDL-C) for its calculation are readily available in our setting. AIP values of -0.3 to 0.1, 0.1-0.24 and >0.24 are associated with low, medium and high cardiovascular disease risks respectively [65]. Serum cholesterol, both total and lipoprotein fractions, has been associated with mid- and late-life depression and higher baseline atherogenic indices are directly linked to faster increase in depressive symptoms among women [70]. AIP has been found to be increased in Caucasian patients with depression [71-74] including Latin American male patients with acute myocardial infarcts who were also found to be depressed [71]. Possible mechanisms include inflammatory effects of depression which is associated with disorders in metabolism of fatty acids including decreased levels of HDL-C [75,76]. The American Heart Association recommends routine screening of all cardiac patients for depression given the potential impact depression could have on quality of life and cardiovascular outcomes [77]. There is an independent association of age and depression [78-80] with increased risk of cardiovascular events and it has been advised that elderly depressed patients should have careful monitoring of their lipid status for possible abnormalities to reduce cardiovascular disease risk [72].

The Center for Epidemiologic Studies-Depression (CES-D) scale, is a 20-item self-report symptom rating scale that assesses affective and depressed mood and has been shown to be reliable in assessing depressive symptoms [81]. A score ≥16 on the CESD is indicative of elevated depressive symptoms (EDSs), associated with clinical depression based on the diagnostic and statistical manual, fourth edition criteria [81,82]. Higher levels of AIP, total cholesterol (TC) and anthropometric measures with lower (HDL) levels have been found in hypertensive women compared to men [83]. Several studies conducted within African populations have demonstrated that a significant proportion of persons have high AIP and consequently high cardiovascular risk with higher atherogenic index values [84,85]. These aforementioned studies however did not assess if any relationship existed between AIP and depression. Unfortunately, in this part of the world, studies on depression and its possible relationship with atherogenic indices are scarce. This is despite the availability of laboratory tests for lipid profiles and brief screening tools which can be used to assess depression.

It is against this background that we aim to determine the prevalence of depression and its correlation with AIP among patients attending the cardiology clinic of the Niger Delta University Teaching Hospital (NDUTH) Okolobiri, Bayelsa state, Nigeria. Medical personnel would benefit from knowing that patients with cardiovascular diseases may be depressed and may have an atherogenic lipid profile and that this coexistence could further increase the risk of cardiovascular mortality.

1.1 Ethical Considerations

Approval and Consent was obtained from the ethical committee of Niger Delta University Teaching Hospital (NDUTH) Okolobiri and only patients who gave informed written consent were recruited for the study. Patients found to have dyslipidaemia and or depressive symptoms as

measured by CES-D score ≥16 [81,82] were placed on lipid lowering therapy and referred to a psychiatrist respectively.

2. MATERIALS AND METHODS

2.1 Study Population

Ninety four adult patients with a variety of cardiac related ailments were recruited consecutively at the cardiology clinic of Niger Delta University Teaching Hospital. Patients already on lipid lowering medications and or antidepressant medications were excluded.

2.2 Study Setting

The Niger Delta University Teaching Hospital (NDUTH) is a 170 bed tertiary hospital situated in Okolobiri, a semi-urban city in the Bayelsa State, Nigeria. The cardiology unit is a part of the internal medicine department of the teaching hospital and consists of a consultant cardiologist and several resident doctors. The unit receives approximately 45 patients per month. Main ailments managed include systemic hypertension and hypertensive emergencies, ischaemic heart disease, deep venous thrombosis and pulmonary embolism, and heart failure secondary to a variety of causes such as hypertension, dilated cardiomyopathies, rheumatic heart disease, myocardial infarcts, and cardiac arrhythmias especially atrial fibrillation.

2.3 Study Design

A cross sectional study.

2.4 Study Procedures

Questionnaire: The participants completed an interviewer led questionnaire collecting data on sociodemographic characteristics (age, sex, marital status and employment status). Symptoms of depression were assessed using the Center for Epidemiologic Studies-Depression (CES-D) scale. The CES-D is a 20-item self-report symptom rating scale that assesses affective and depressed mood [81] depressive symptoms (EDSs), associated with clinical depression based on the diagnostic and statistical manual, fourth edition criteria [82].

Hospital records: Clinical history of diagnosed cardiac ailments, prescribed medications, latest electrocardiography (ECG), chest radiograph and echocardiography findings were retrieved using standardized data extraction from the patients hospital records.

Physical measurements: A single reading of every participants' weight and height was taken by a trained intern doctor to compute a body mass index (BMI). Height was measured in metres (m) using a standardized height–o–meter (PGZ-160 Pyrochy medical) with the subject standing feet together without shoes, against a vertical ruled bar to which a movable horizontal bar was attached. During measurement, the horizontal bar was brought to the vertex of the subjects head, and the reading at this level was taken to the nearest millimeter. Weight was measured in kilograms (kg) using a standardized scale (PGZ-160 Pyrochy medical) and participants were required to wear only light clothing. BMI categorization was done in accordance with WHO guidelines [86].

Two Blood pressure (BP) measurements were taken for all participants using an Accoson mercury sphygmomanometer. Brachial artery systolic and diastolic blood pressures were determined at Korotkoff sounds 1 and 5 respectively in sitting position after 30 minutes rest, with the arm at heart level and readings taken at the nearest 2 mmHg [87,88]. The average of the two measurements was then considered as the final measurement. Cut-off values for blood pressure readings were based on the JNC VII classification and guidelines [88].

Laboratory assessment: Venous blood samples were obtained in the morning between 8-10am after patients were asked to fast overnight for 12 hours. Samples were then analysed for TC, TGs HDL and LDL. Atherogenic index of plasma was calculated as $\log_{10}$ TG/HDL-C [31,81,82]. AIP of -0.3-0.11, 0.11-0.24 and >0.24 were classified as low, intermediate and high risk respectively [65]. Dyslipidaemia was defined according to the Third Report of the Expert Panel on Detection, Evaluation, and Treatment of high blood cholesterol in adults (ATP III) [89] as follows: Total serum cholesterol ≥200 mg/dL (≥5.17 mmol/L) and/or triglyceride ≥150 mg/dL (≥1.7 mmol/L) and/or LDL‑C ≥100 mg/dL (≥2.58 mmol/L) and/or HDL‑C <40 mg/dL (<1.03 mmol/L).

2.5 Data Analysis

The data obtained was analyzed using statistical package for the social sciences (SPSS version 23.0) for Windows.

Objective one: To determine the prevalence of depression among patients attending the

cardiology clinic at the cardiology clinic at the Niger Delta University Teaching Hospital, Okolobiri, Bayelsa state, Nigeria.

This was calculated as a proportion and expressed as a percentage.

Objective two: To determine the correlation between AIP and depression among patients attending the cardiology clinic at the Niger Delta University Teaching Hospital, Okolobiri, Bayelsa state, Nigeria.

Pearson's Correlation was used to determine the relationship between AIP and CESD and the finding was presented as a scatter plot with the correlation coefficient (R) and p-value less than 0.05 accepted as significant.

Socio-demographic characteristics were summarized as frequencies (percentages) for categorical variables and means (standard deviation) for continuous variables.

Logistic regression analysis with crude and adjusted odds ratio (confidence intervals) was used to identify the determinants of depressive symptoms in the study population.

3. RESULTS

Table 1 shows the characteristics of study participants. The age range of the participants was 23 years – 88 years while the mean age was 58.41±14.29 years. Most of the subjects were married (73.4%), civil servants (38.3%) and 44.7% of them had tertiary level of education. Prevalence of depression was 28.7%. The most common diagnosis was hypertension (69.1%).

As shown in Table 2, univariate analysis revealed primary education as the only predictor of depression in the study population. Persons with primary education had an 11% lower odds of being depressed with this odds being as low as 2% and as high as 59% (p=0.01). After adjusting for confounders, only primary education was still found to predict depressive symptoms such that there was a 8% decreased odds of those with primary education manifesting depressive symptoms (p=0.04) compared to those with no formal education. AIP was not found to be associated.

As seen in Fig. 1, there was significant positive but weak correlation between AIP (atherogenic index of plasma) with CESD (r=0.28, p=0.006).

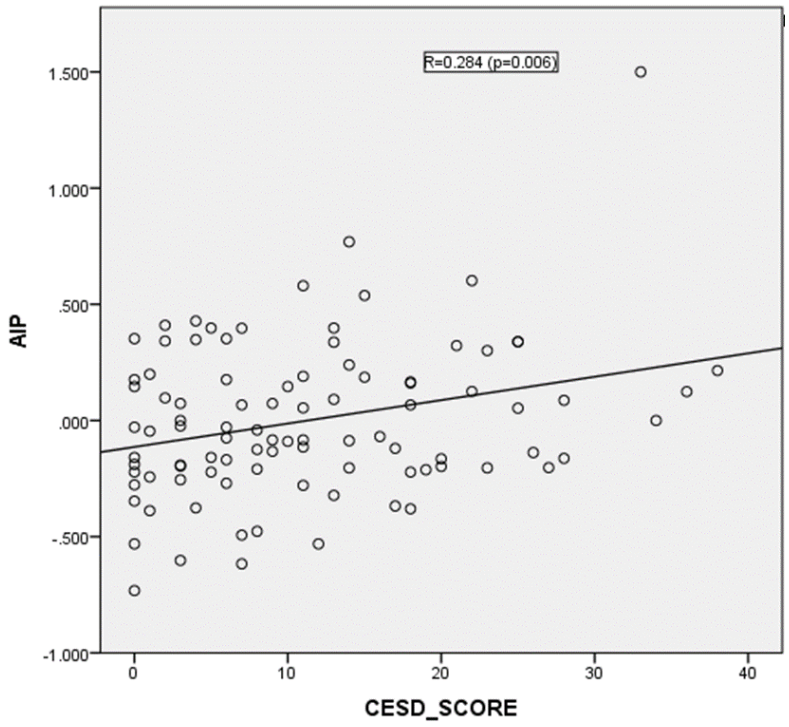

Fig. 1. Scatter plot diagram showing relationship between AIP and depression
NB: Significant at p<0.05; r=Pearson correlation coefficient

Table 1. Socio-demographic characteristics of study participants

Variable		Number	Percentage %
Age (years)	18-44	17	18.1%
	45-64	49	52.1%
	>65	28	29.8%
	Mean age ± SD		58.41±14.29
Sex	Male	38	40.4%
	Female	56	59.6%
Marital Status	Single	5	5.3%
	Married	69	73.4%
	Divorced	18	19.1%
	Separated	2	2.1%
Body mass index BMI (Kg/m^2)	<18.5	3	3.2%
	18.5 – 24.9	22	23.4%
	25 – 29.9	39	41.5%
	≥30	30	31.9%
Occupational Group	Civil Servant	36	38.3%
	Trader/Business	17	18.1%
	Farmers	13	13.8%
	Artisan	10	10.6%
	Retired	18	19.1%
Educational level	None	10	10.6%
	Primary	27	28.7%
	Secondary	15	16.0%
	Tertiary	42	44.7%
Drugs	Angiotensin converting enzyme inhibitors	13	13.8%
	Aldosterone receptor blockers	15	16.0%
	Beta blockers	7	7.4%
	Calcium channel blockers	30	31.9%
	Centrally Acting	3	3.2%
	Diuretics	23	24.5%
	No drugs	3	3.2%
CESD score	Not Depressed	67	71.3%
	Depressed	27	28.7%
Main diagnosis	Hypertension	65	69.1%
	Hypertensive cardiomyopathy (with heart failure)	14	14.9%
	Dilated cardiomyopathy (with heart failure)	5	5.3%
	Ischaemic heart disease	3	3.2%
	Stroke	7	7.4%
AIP	Low atherogenic risk	62	66.0%
	Intermediate atherogenic risk	13	13.8%
	High atherogenic risk	19	20.2%
Lipid profile	Dyslipidaemia	81	86.2%
	Normal	13	13.8%

N/B: AIP-atherogenic index of plasma, CESD score- Center for Epidemiologic Studies-Depression (CES-D) score

Table 2. Predictors of depressive status

Variables	Crude O.R (C.I)	p-value	Adjusted O.R (C.I)	p-value
Age	1.02 (0.99 - 1.05)	0.28	0.95 (0.86 - 1.04)	0.27
Marital status				
Single (ref)				
Married	0.20 (0.03 - 1.31)	0.09	0.12 (0.10 - 1.45)	0.09
Divorced	0	1	0	
Widowed	0.49 (0.065 - 3.61)	0.48	0.41 (0.26 - 6.37)	0.52
Education				
None (ref)				
Primary	0.11 (0.02 - 0.59)	0.01*	0.08 (0.001 - 0.89)	0.04*
Secondary	0.42 (0.08 - 2.06)	0.28	1.54 (0.15 - 15.62)	0.71
Tertiary	0.37 (0.09 - 1.45)	0.15	0.73 (0.08 - 6.34)	0.77
Age group				
18-44 years (ref)				
45-64 years	0.48 (0.13-1.8)	0.28	1.21 (0.11 - 13.54)	0.88
65 and above	1.8 (0.52-6.22)	0.35	6.79 (0.14 - 332.7)	0.34
BMI category				
Underweight (ref)				
Normal	0.29 (0.02 -3.67)	0.34	0.53 (0.02 - 14.29)	0.71
Overweight	0.25 (0.02 - 3.02)	0.28	0.51 (0.01 -22.36)	0.73
Obese	0.08 (0.01 - 1.06)	0.06	0.86 (0.006 - 130.21)	0.95
AIP	2.5 (0.65 - 9.63)	0.18	3.16 (0.44 - 22.72)	0.25

4. DISCUSSION

In our study we found the prevalence of depression to be 28.7% among patients attending the cardiac clinic. The diagnoses made included hypertension, heart failure (identified aetiologies were hypertensive cardiomyopathy and dilated cardiomyopathy), ischaemic heart disease and stroke. Several Nigerian based studies have recorded prevalence of depression in the range of 20-30% in populations that consisted of hypertensives, diabetics (type 1 and type 2), heart failure patients and patients with chronic kidney diseases [15,90-92]. It has been estimated that depression will become the second most important cause of disease burden in the world by the year 2020 [93]. Depression is the single largest contributor to global disability (7.5% of all years lived with disability (YLD) in 2015), with greater than 80% of this non-fatal disease burden occurring in low- and middle-income countries including Africa. In Africa, depression accounts for 731 YLD per 100 000 population (7.9% of YLD) and is ranked as the 2nd largest contributor to non-fatal health loss in the region [94]. In Nigeria, it accounts for 7.5% YLD [94].

Studies show a bidirectional relationship between depression and cardiovascular disease, with as much as 20-50% of patients who died from myocardial infarction having a prior history of depression [95]. Conversely, the presence of cardiac diseases seems to increase the probability of occurrence of depressive states [96]. Depression has been shown to be an independent risk factor in the pathophysiologic progression of cardiovascular disease, rather than merely a secondary emotional response to cardiovascular illness [14]. Depressed mood may link with coronary artery disease and atherosclerosis through several factors such as altered stress and inflammatory system regulation or metabolic dysregulation manifesting as unfavourable serum lipid profiles [97].

Also in our study, primary education was seen to be related to lower odds of depression compared to those who had no formal education. This relationship was however not significantly sustained for higher levels of discussion. Higher educational level may be protective against depression [11,98-100].

We found a significant positive but weak correlation between AIP and CESD. AIP has previously been shown to be significantly increased in patients with mood disorders versus controls, both in depression and bipolar disorders and it is thought that lipid abnormalities leading to increased atherogenic potential may be involved in the pathophysiology of mood

disorders [73]. Several other studies have found a positive relationship between atherogenic indices and depression [70, 73,101,102].

5. CONCLUSION

Major depression and depressive symptoms, commonly encountered in patients with cardiac ailments, are frequently unrecognized and consequently undertreated just as the patients in the present study had never been diagnosed with depression nor had any interactions with a psychiatrist previously. Depression contributes to a high disease burden in terms of YLDs globally and also in Nigeria. Primary education was the only predictor of depression. Having some formal education may be protective against depressive symptoms compared to not having any formal education. AIP had a significant positive but weak correlation with depressive symptoms. Elucidation of atherogenic index interactions and their effect on depressive symptoms and mood disorders will surely assist treatment modalities that will hopefully improve these patients' quality of life, reduce their morbidity and improve long-term survival.

6. LIMITATIONS OF THE STUDY

Our study is limited in that the sample size was small, anthropometric measurements were taken once and participant selection was non-random. Given the study design we were unable to determine causation of depression. Hence it is recommended that further studies on larger populations may be needed to draw further conclusions. However, despite these limitations, this study showed prevalence of depression may be high in patients with CVDs, and may be associated with increased plasma atherogenicity.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX 1

Center for Epidemiologic Studies Depression Scale (CES-D)

Date: _____

Below is a list of some of the ways you may have felt or behaved. Please indicate how often you've felt this way during the **past week**. Respond to all items.

Place a check mark in the appropriate column. During the past week	**Rarely or none of the time (less than 1 day)**	**Some or a little of the time (1-2 days)**	**Occasionally or a moderate amount of time (3-4 days)**	**All of the time (5-7 days)**
1. I was bothered by things that usually don't bother me.				
2. I did not feel like eating; my appetite was poor.				
3. I felt that I could not shake off the blues even with help from my family.				
4. I felt that I was just as good as other people.				
5. I had trouble keeping my mind on what I was doing				
6. I felt depressed.				
7. I felt that everything I did was an effort.				
8. I felt hopeful about the future.				
9. I thought my life had been a failure.				
10. I felt fearful				
11. My sleep was restless.				
12. I was happy.				
13. I talked less than usual				
14. I felt lonely.				
15. People were unfriendly.				
16. I enjoyed life.				
17. I had crying spells.				
18. I felt sad.				
19. I felt that people disliked me.				
20. I could not "get going."				

Source: Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1: 385-401. © 2006 depression-help-resource.com. All rights reserved

Scoring for Center for Epidemiologic Studies Depression Scale (CES-D)

Directions: Do not score if missing more than 4 responses. 1) For each item, look up your response and corresponding score (0-3). 2) Fill in the score for each item under the last column labeled "Score". 3) Calculate your Total Score by adding up all 20 scores

During the past week…….	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	All of the time (5-7 days)	Score
1. I was bothered by things that usually don't bother me.	0	1	2	3	
2. I did not feel like eating; my appetite was poor.	0	1	2	3	
3. I felt that I could not shake off the blues even with help from my family.	0	1	2	3	
4. I felt that I was just as good as other people.	3	2	1	0	
5. I had trouble keeping my mind on what I was doing	0	1	2	3	
6. I felt depressed.	0	1	2	3	
7. I felt that everything I did was an effort.	0	1	2	3	
8. I felt hopeful about the future.	3	2	1	0	
9. I thought my life had been a failure.	0	1	2	3	
10. I felt fearful	0	1	2	3	
11. My sleep was restless.	0	1	2	3	
12. I was happy.	3	2	1	0	
13. I talked less than usual	0	1	2	3	
14. I felt lonely.	0	1	2	3	
15. People were unfriendly.	0	1	2	3	
16. I enjoyed life.	3	2	1	0	
17. I had crying spells.	0	1	2	3	
18. I felt sad.	0	1	2	3	
19. I felt that people disliked me.	0	1	2	3	
20. I could not "get going."	0	1	2	3	
				Total : score	

Scoring Results: Total Score of 16 or higher is considered depressed. If your score indicates depression, see a health care/mental health professional for further evaluation and treatment. Bring these test results to your appointment.

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APPENDIX 2

Association of depression with atherogenic index among patients attending a cardiology clinic in southern Nigeria, by Ambakederemo Tamaraemumoemi Emmanuella, Chikezie Uzoechi Eze

Initials:	Date:
Hospital No:	Cardiology No:
Age:	Sex:
Marital Status:	Educational Status:
Occupation:	Phone No:
Height (meters):	Weight (kg):

BMI (kg/m²):

Blood pressure (mmHg):

Diagnosis:

Total cholesterol (mmol/l):

Triglycerides (mmol/l):

High density lipoprotein-C (mmol/l):

Low density lipoprotein-C (mmol/l):

Atherogenic index of plasma ($\log_{10}$ TG/ HDL-C)

Prescribed medications:

ECG Result Summary:

Echo Result Summary:

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