

## BURDEN OF ERECTILE DYSFUNCTION AMONG HEART FAILURE PATIENTS IN A CENTRE IN THE SOUTH-WESTERN NIGERIA: A PILOT STUDY

O. Adebayo<sup>1</sup>, A. Aje<sup>1</sup>, O.S. Ogah<sup>2</sup>, A. Adebisi<sup>2</sup>, A.M. Adeoye<sup>2</sup>, O. Oladapo<sup>2</sup>

1. Department of Medicine, University College Hospital, Ibadan, Nigeria.
2. Department of Medicine, University College Hospital, Ibadan, Nigeria/Department of Medicine, Faculty of Clinical Sciences, University of Ibadan, Ibadan, Nigeria.

*Correspondence:*

**Dr. O. Adebayo**

Department of Medicine,  
University College Hospital, Ibadan,  
Nigeria  
E-mail: doctorladi@yahoo.com

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**Background:** Erectile dysfunction (ED) is a common problem among heart failure (HF) patients but is usually ignored in busy clinics in developing countries like Nigeria. Evidence abound that it has a great impact on the quality of life, survival, and prognosis of HF patients.

**Objective:** This study sought to evaluate the burden of ED among HF patients at the University College Hospital, Ibadan.

**Methods:** This pilot cross-sectional study was conducted in the Cardiology clinic of the Medical Outpatient Unit of the Department of Medicine, University College Hospital, Ibadan. Consenting male patients with chronic HF were consecutively recruited into the study between June 2017 and March 2018. The International Index of Erectile Function-version five (IIFE-5) was used to assess the presence and degree of ED. Statistical analysis was done with SPSS version 23.

**Results:** A total of 98 patients were recruited with a mean  $\pm$  standard deviation (SD) age of  $57.6 \pm 13.3$  years, and age range of 20–88 years. The majority of the participants were married (78.6%), and the mean  $\pm$  SD duration of HF diagnosis was  $3.7 \pm 4.6$  years. The overall frequency of ED was 76.5%, and those with previous self-reported ED were 21.4%. Mild erectile dysfunction, mild to moderate erectile dysfunction, moderate erectile dysfunction, and severe erectile dysfunction were present in 24(24.5%), 28(28.6%), 14(14.3%), and 9(9.2%) respectively.

**Conclusion:** Erectile dysfunction is common among chronic heart failure patients in Ibadan. Therefore, adequate attention is needed for this sexual health issue among males with heart failure to improve their quality of care.

**Keywords:** Erectile function, Epidemiology, Erectile dysfunction, Heart failure, Cardiovascular disease

### INTRODUCTION

Erection in human males is primarily a vascular event elicited by psychological, vascular, hormonal, and neurologic factors.<sup>1</sup> Erectile dysfunction, on the other hand, is the inability to achieve and maintain an erection sufficiently to permit satisfactory sexual intercourse.<sup>2</sup> While there are multiple pathogenic pathways in heart failure affecting human erectile function, the commonest pathways appear to be the vasculogenic pathway and drug-induced, while psychogenic plays a lesser role.<sup>2</sup> Hormonal and neurogenic pathways appear to play little role in pathobiology of ED in heart failure.<sup>2</sup>

Furthermore, heart failure (HF) and erectile dysfunction (ED) share similar risk factors such as hypertension, age, diabetes mellitus, and coronary artery disease.<sup>1,3</sup>

In addition, physiologic complications of HF create unique organic and psychological factors, which contribute to ED in this patient population.<sup>1</sup> Finally, standard HF therapy such as beta-receptor blockers, digoxin, and thiazide diuretics are identified as culprits for ED among HF patients.<sup>4</sup> Regardless of the cause of the HF, all of the aforementioned factors make ED extremely common among HF patients.<sup>1,3,5</sup>

This dysfunction has been found to herald cardiac disease, in as much as 42% to 75% of coronary artery disease patients.<sup>1,3,5</sup> The high burden of ED has severe implications for HF patients' quality of life.<sup>6</sup> The dysfunction has also been identified as a complication of HF.<sup>7</sup> In addition, the comorbid state of ED coexisting with HF confers a serious clinical challenge

to the healthcare team. Unfortunately, there are few studies that have assessed the burden among the black population, and this is even worse among the Nigerian HF population, even though, previous studies among general population of Nigerians with different cardiovascular diseases or risk factors have observed a high burden of ED.<sup>8,9</sup> Furthermore, the burden of HF is high and appears to be on the increase, as is the associated burden of erectile dysfunction.

This study sought to assess the burden of ED among chronic HF population attending the University College Hospital, Ibadan.

## MATERIALS AND METHODS

### Study Site

The study was carried out at the Cardiology clinic of the Medical out-patient Unit, Department of Medicine, University College Hospital, Ibadan.

### Study design

The study was a cross-sectional in nature.

### Study population

One hundred male chronic HF participants were recruited. Two participants were excluded because the case report form (CRF) were incorrectly completed. The participants included consecutive and consenting male patients with HF who were aged 18 years and above. The presence of heart failure was assessed based on Framingham heart failure diagnostic criteria.

### Data collection procedure

The interview of patients was conducted with consideration for the privacy of participants between June 2017 and March 2018. Structured CRF were used to collect sociodemographic data such as age, marital status, educational level, tribe, type of marriage, and occupation. Cardiovascular risk factors such as hypertension, diabetes mellitus, obesity, and

**Table 1:** Basic profile of all participants.

Variables	
Age (n=96) mean $\pm$ SD years	57.6 $\pm$ 13.3
Age (Range) years	20-88
Educated (Yes)	61(62.2)
Tribe(n/%)	
Yoruba	91(92.9)
Igbo	3(3.1)
Others	4(4.1)
Occupation(n/%)	
Artisans	8(8.2)
Business	15(15.3)
Civil Servant	14(14.3)
Retiree	23(23.5)
Student	1(1.0)
Trader	14(14.3)
Other	21(21.4)
Not known	2(2.0)
Marital status(n/%)	
Married	78(79.6)
Divorced	11(11.2)
Separated	1(1.0)
Single	6(6.1)
Widowed	2(2.0)
Type of marriage(n/%)	
Monogamous	75(76.5)
Polygamous	20(20.4)
Not Stated	3(3.1)
History of smoking (Yes) n (%)	16(15.8)
Number of stick/days among the smokers median (IOR)	3(14)
History of alcohol intake n (%)	23(23.5)
History of previous pelvic surgery n (%)	7(7.1)
Weight mean $\pm$ SD Kg	71.4 $\pm$ 15.2
Height mean $\pm$ SD m	1.65 $\pm$ 0.16
Waist circumference cm	85.4 $\pm$ 18.8
Hip circumference cm	88.1 $\pm$ 21.4
Waist: Hip ratio mean $\pm$ SD	1.00 $\pm$ 0.23
BMI Kg/m <sup>2</sup>	26.9 $\pm$ 9.6
Total cholesterol mean $\pm$ SD mg/dL	163.4 $\pm$ 57.0
LDL-cholesterol mean $\pm$ SD mg/dL	104.4 $\pm$ 46.5
HDL-cholesterol mean $\pm$ SD mg/dL	44.2 $\pm$ 17.6
Triglyceride mean $\pm$ SD mg/dL	85.7 $\pm$ 27.0

dyslipidemia were extracted from the case notes of patients and recorded in the CRF. Similarly, medication use was also extracted and recorded. Data such as sexual frequency per week, number of sexual partners, history of ED, history of TIA, presence of intermittent claudication, estimated duration of intercourse, and number of sexual partners were also collected. Furthermore, the history of smoking, history of alcohol, duration of heart failure diagnosis, previous heart failure admission, and history of previous pelvic surgery were elicited and recorded. The patients were classified according to the New York Heart Association (NYHA) functional classification. The International Index of Erectile Function -version five (IIFE-5) was used to assess the presence and degree of ED.

### Statistical methods

All continuous variables which were normally distributed were analyzed and expressed as mean and standard deviation, while those not normally distributed were analyzed as median with inter-quartile range. Categorical variables are expressed as frequency and percentages. All analysis was done using SPSS developed by IBM Inc., version 23.

### Ethical Considerations

The study approval with assigned number UI/EC/18/0004 was sought and obtained from the Ethical

Review Committee of UCH/UI Ibadan. The questionnaires used for the study were kept secure, and the data generated were also kept secured from third parties. The study ensured each participant gave informed consent before recruitment into the study.

### RESULTS

Table 1 shows the basic profile of participants, such as demographic information, anthropometry, and past history of all participants. The mean age and standard deviation were  $57.6 \pm 13.3$  years and most were educated, retired, and married in monogamous marriages. Behavioral risk factors such as alcohol consumption were more common than cigarette smoking.

Almost four out of every five participants had hypertension, while 8.2% were noted to have diabetes mellitus. The mean and standard deviation of the ejection fraction were  $31.3 \pm 13.8\%$  and two out of five had previous hospital admissions (table 2). More than four out of every five had NYHA classes I and II. The two most common HF drugs were loop diuretics and mineralocorticoid receptor blockers (MRAs), and the two least common were anticoagulants and nitrate.

**Table 2:** Profile of heart failure, cardiovascular risk factors and medication usage among participants

Variables	
Burden of hypertension n (%)	75(76.5)
Burden of diabetes mellitus n (%)	8(8.2)
Duration of HF diagnosis mean $\pm$ SD years	3.7 $\pm$ 4.6
Previous HF admission in last one year n (%)	37(37.8)
0-1 HF admission	32(32.7)
>1 HF admissions	5(7.9)
Ejection fraction mean $\pm$ SD %	31.3 $\pm$ 13.8
NYHA classification n (%)	
I	7(7.1)
II	76(77.6)
III	14(14.3)
IV	1(1.0)
Medications n (%)	
ACEI	40(40.8)
ARBs	19(19.4)
Beta blockers	58(59.2)
Loop diuretic	71(72.4)
Thiazide	7(7.1)
Spironolactone	69(70.4)
Digitalis	25(25.4)
Antiplatelets	10(10.4)
Anticoagulant	4(4.1)
Nitrate	3(3.1)
Calcium Channel blockers	16(16.3)
ACEI- Angiotensin-converting enzyme inhibitors, ARBs-Angiotensin II receptor blockers	

**Table 3:** Sexual health profile and pattern of erectile dysfunction among HF participants

Variables	
Sexual frequency per week	1.3
Self-reported average duration of intercourse (minutes)	4.9
Prevalence of ED n/%	75(76.5)
Previous diagnosis of ED n (%)	21(21.4)
Estimated number of sexual partners n (%)	
0- 1	76(77.6)
>1	6(19.4)
Grade of erectile dysfunction n (%)	
Mild erectile dysfunction	24(24.5)
Mild to Moderate erectile dysfunction	28(28.6)
Moderate erectile dysfunction	14(14.3)
No erectile dysfunction	23(23.5)
Severe Erectile dysfunction	9(9.2)
IIFE-5 score mean $\pm$ SD	16.2 $\pm$ 6.2
Previous TIA n (%)	7(7.1)
Intermittent claudication n (%)	11(11.2)

About three-quarters of participants had ED, with 9.2% having severe ED (table 3). More than one out of five reported a past history of ED. The frequency of sexual intercourse was about once a week among participants. The mean  $\pm$  SD of the IIFE-5 score was 16.2  $\pm$  6.2.

## DISCUSSION

Our study showed that erectile dysfunction is prevalent among chronic HF patients in Ibadan, with most with mild to moderate ED. A national study in the United States found a prevalence of ED among HF patients of 89%, which is higher than our finding of 76.5% (10). Other studies found similarly high rates but varying prevalence.<sup>4</sup> There is evidence in the literature of a higher burden of ED among blacks compared to other racial groups, which constitute 100% of our study population. (10) This burden is in the background of the burgeoning burden of heart failure, especially in low-middle income countries like Nigeria.<sup>11,12</sup> There are currently about 65 million cases (8.52 per 1,000 inhabitants), with 9.91 million years lost due to disability (YLDs) in the world.<sup>11,12</sup> These statistics are likely to get worse in the near future.<sup>11,12</sup>

This burden has grave implications among these patients considering that majority of them are married, and interestingly 20% reported being in a polygamous relationship and attempting sexual activity at least once a week, which is similar to the national average of sexual encounters of adult couples in Australia.<sup>13,14</sup> This observed frequency suggests that the patient still makes an attempt at intercourse even though they may be less satisfied. This has serious implications for marital/relationship harmony and concordance.

Furthermore, this high proportion of ED also portends a greater issue considering the likelihood it is neglected in busy HF clinics. To the rescue are drugs like phosphodiesterase-5 inhibitors like sildenafil, which are particularly effective in mild to moderate chronic heart failure, leading to an improvement in ED state and quality of life.<sup>7,15</sup>

This study population has a high burden of cardiovascular risks, which play a key role in the pathophysiology process of ED.<sup>1,3</sup> While, we did not explore the onset of previous episodes of ED if present, we believe the disease may have been present for a while in many of the patients. One out of every five participants self-reported a previous history of ED. While all HF drugs are potential aetiological factors in ED, the most important ones are thiazides, which were not common in use among our patients. Digoxin was only used in one quarter of the participants, but beta blockers (BBBs) and spironolactone were popular.<sup>4</sup> Potentially beneficial drugs such as nitrate were only used by 3% of the population. Also, ARBs are potentially beneficial and were used by one out of five participants.<sup>4</sup> Angiotensin II is involved in detumescence of the corpus cavernosum and contributes to local oxidative stress, thus leading to enhanced endothelial function and promoting vasorelaxation to improve erectile function.<sup>4</sup> Behavioural risk factors such as smoking and alcohol ingestion are not common among the participants, less than one-eighth smokes and about a quarter ingest alcohol. This would suggest this has little contribution to the burden. The effect of smoking on ED is a positive dose-response relationship therefore, increased quantity and duration of smoking correlate with a higher risk of ED.<sup>16</sup>

While the sample size may be small, this study provided good baseline data for further studies, particularly translational studies to provide possible interventions for patients with HF with coexisting ED. Also, the study noted none of the participants were on disease modifying drugs such as sodium-glucose cotransporter-2 (SGLT-2) inhibitors and angiotensin receptor/neprilysin inhibitors (ARNIs) like as a result of the period the study was conducted. The availability of information on the burden is cause for action to attend to this psychosocial issue with an impact on quality of life, survival, and eventual outcome of the patients.<sup>17</sup>

## CONCLUSION

ED is common in chronic HF in Ibadan, therefore, adequate attention is needed for this sexual issue among males with heart failure to improve their quality of care and outcomes.

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**Conflict of interest:** Nil

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