

AWARENESS OF HEART FAILURE AMONG PATIENTS ATTENDING CARDIOLOGY CLINIC OF A TERTIARY CENTRE IN IBADAN, SOUTH WESTERN NIGERIA

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Background: Despite the rise in the burden of heart failure (HF), there seems to be poor level of awareness concerning the syndrome particularly in the low- and middle-income countries. This study sought to determine the level of awareness of HF among patients attending cardiology clinic in a big tertiary institution in South Western Nigeria.

Methods: Patients attending the Cardiology clinic at University College Hospital, Ibadan were recruited. A structured questionnaire was used to assess their level of awareness of HF. Normally distributed continuous variables were summarised as means and standard deviations. Categorical variables were expressed as frequencies and percentages. The statistical analysis was done using SPSS, Windows version 23.0 (Armonk, NY: IBM Corp).

Results: Majority of the participants were females (55.2%) with mean age of 56.4 years. Most patients (54.0%) were educated to tertiary level, lived in urban area (96.4%) and had hypertension (88.0%). The overall knowledge of the course of HF was not optimal, however, most patients have heard about HF before the study and are aware of common aetiologies and symptoms of HF. There was mixed performance with the knowledge of treatment of HF with many misconceptions. The most preferred source for information was the clinic (99.4%). Others included the internet (83.0%), and patient guides (67.6%).

Conclusions: This study highlighted the gap and the need for educational interventions to address misconceptions and improve patients' knowledge about HF.

Keywords: Heart failure, Hypertension, Cardiovascular risk factors, Nigeria

INTRODUCTION

Heart failure (HF) continues to be a widely prevalent condition on a global scale, characterised by significant rates of morbidity and mortality. It is estimated that around 63.5 million individuals worldwide are affected by this disorder.¹ In Africa, at least 3-7% of all hospital admissions are for HF.² The cause of HF varies around the world. In sub-Saharan Africa including Nigeria, rheumatic heart disease is still a common cause, especially among young people although hypertension is the overall commonest cause.^{1,3} Hypertension is largely asymptomatic and owing to the profound lack of awareness and poor perception of the disease, most Nigerians with at least one cardiovascular risk factor such as hypertension frequently present in the hospital only when complications have occurred or severely elevated blood pressure values are incidentally recorded.^{4,5}

The prevalence of HF is on the increase globally. This is due to the increase in the burden of cardiovascular diseases and longer life expectancy. Heart failure imposes additional socioeconomic burdens on the system with high mortality and re-admission rate.⁽¹⁾ Even with all the medical importance of HF and socioeconomic burdens it confers, awareness of HF is unexpectedly low.^{6,7} Awareness of heart failure (HF) is crucial, as controlling risk factors can significantly reduce the progression to HF, lower hospital readmission rates, and decrease premature mortality.^{6,7}

In the Study of Heart failure Awareness and Perception in Europe (SHAPE) study among households in selected nine European countries in 2005, it was reported that the knowledge of HF was very low.⁷ Only 3% understood the symptoms of HF, which

was much lower than those of angina (31%) and ischemic stroke (51%).⁷ European studies in the 2010s also showed no improvement in HF awareness. A survey on the awareness of HF in the general population of South Korea was carried out in 2019.⁸ Despite the fact that it was a relatively recent study, the level of awareness was not particularly high in comparison to other studies. There is a paucity of research that assesses the level of awareness of HF among individuals who already have one or more cardiovascular risk factors or diseases. Most of the available studies of awareness of HF are among the general population.⁸⁻¹⁰ Those with one or more HF risk factors, have increased risk of developing HF and it is important to determine their level of awareness.¹¹ Furthermore, misunderstandings, misconceptions, and lack of knowledge of HF all contribute to insufficient self-care and ultimately poor outcome.¹²

It is crucial to address this knowledge gap as early detection and intervention can significantly improve outcomes for individuals at risk of HF. By conducting comprehensive research, we can better understand the factors contributing to the lack of awareness and develop targeted interventions to educate and empower individuals with cardiovascular risk factors or diseases.

This study sought to determine the level of awareness of HF among patients attending Cardiology Clinic of the University College Hospital (UCH), Ibadan.

METHODS

Study design

The study was a cross-sectional study design.

Study site

The study was carried out at the UCH, Ibadan. Ibadan occupies 3,080 square kilometres and is the state capital of Oyo State, located in South Western part of Nigeria. The city is situated 119 kilometres North-West from Lagos, the commercial centre of Nigeria and, 530 kilometres from Abuja, the Federal capital territory. It is a 1000-bedded federal tertiary health facility serving the population in Oyo State and other states in the South-West region of Nigeria.

Study population

Patients attending the Cardiology clinic of the Department of Medicine at UCH, Ibadan. The study was conducted between November 2023 to November 2024.

Sample size calculation

To calculate the sample size for the study, we used the formula for estimating a population proportion when there is no prior estimate of the proportion.

$$n = (Z^2 * p * (1-p)) / E^2$$

where:

n = sample size

Z = Z-score corresponding to the desired confidence level (e.g., 1.96 for 95% confidence)

p = estimated proportion (since there is no prior estimate, we used 0.5 as a conservative estimate)

E = margin of error (e.g., 0.05 for 5% margin of error)

Substituting the values, we get:

$$n = (1.96^2 * 0.5 * (1-0.5)) / 0.05^2$$

$$n = (3.8416 * 0.25) / 0.0025$$

$$n = 384.16$$

Rounding up to the nearest whole number, we get:

$$n = 385$$

We anticipated the non-response rate would be 10%. Ultimately, we recruited 500 participants into the study.

Sampling technique

Consecutive sampling was employed: Every patient that met the inclusion criteria for the study were recruited until the required sample size is achieved.

i. Inclusion criteria

Adult patients above 18 years attending Cardiology Clinic of the University College Hospital, Ibadan.

ii. Exclusion criteria

Adult patients who could not provide information themselves due to dementia, dumbness, deafness, or any other communication problems, were excluded from the study.

Data collection

A structured interviewer administered questionnaire was used for the study. The questionnaire assessed participants' insight regarding causes, symptoms, prevalence, course, HF treatment, and sources of information on HF.

Data collection procedure

Each participant who gave their informed consent were interviewed at the clinic with an effort made to ensure privacy. The interviewer read questions from the questionnaires to the participants, and their answers were recorded. Unclear details such as risk factors were extracted from the case notes.

Data analysis

The data were entered into a case study form (CSF) and subsequently entered into a secured electronic database. The statistical analyses were done using International Business Machines (IBM) Corporation Statistical Product and Service Solutions (SPSS) for Windows version 23.0 (Armonk, NY: IBM Corp). The data were subjected to a normality test. Normally distributed continuous variables would be summarised as means, & standard deviations. Categorical variables were expressed as frequencies and percentages. Charts were also used to express categorical variables. The performance of each variable of positively framed questions were graded into five categories into Excellent (80-100%), Very Good (60-79%), Good (40-

59%), Fair (20-39%) and Poor (0-19%) while negatively framed question was reverse graded.

Ethical consideration

Ethical approval for the study was sought from the University College Hospital research ethical review committee (UI/EC/23/0588). All aspects of the study were conducted within the principles of Good Clinical Practice and in accordance with the Declaration of Helsinki. Only patients with written informed consent were included in the study.

RESULTS

More of the participants were females and most were educated to secondary level, lived in urban area and

Table 1: Basic profile of participants

| Variables | Frequency | Percentage |
|--|------------|------------|
| Age(years) mean (standard deviation) | 56.4(15.9) | |
| Gender | | |
| Male | 224 | 44.8 |
| Female | 276 | 55.2 |
| Level of education | | |
| Primary | 65 | 13.0 |
| Secondary | 144 | 28.8 |
| Tertiary | 270 | 54.0 |
| No formal education | 7 | 1.4 |
| Others (specify) | 14 | 2.8 |
| Urbanization level of residence | | |
| Urban | 482 | 96.4 |
| Rural | 13 | 2.6 |
| Mixed | 5 | 1.0 |
| Smoking | | |
| Never | 484 | 96.8 |
| Ex-smoker (quit more than 1 year) | 15 | 3.0 |
| Current smoker | 1 | 0.2 |
| Alcohol consumption (during last year) | | |
| Yes | 43 | 8.6 |
| No | 457 | 91.4 |

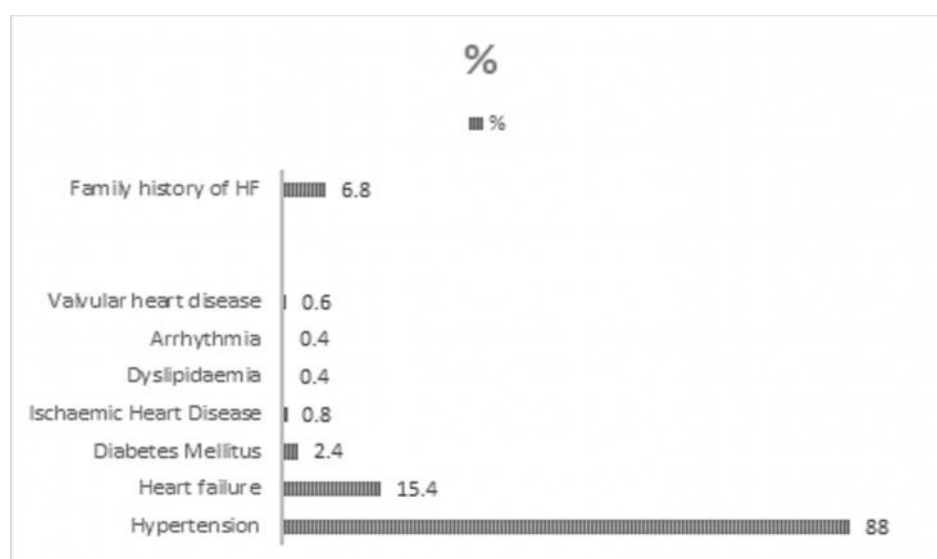
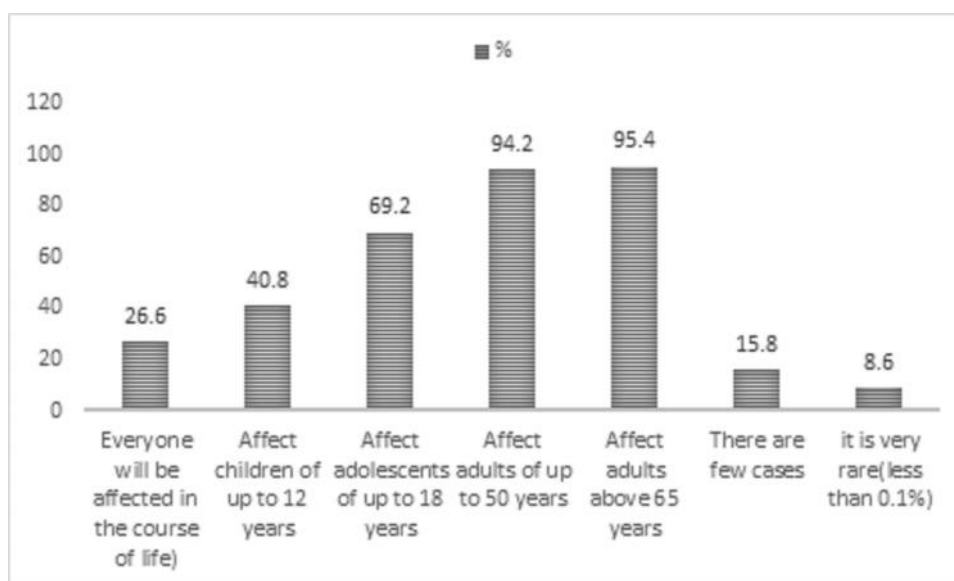


Figure 1: Chart showing the risk factors for HF among participants

Table 2: Table showing respondent awareness of HF and aetiology of HF

| Variables | Frequency | Percentage |
|---|-----------|------------|
| Awareness of heart failure | | |
| Yes | 401 | 80.2 |
| No | 99 | 19.8 |
| Knowledge of someone with heart failure | | |
| Yes | 82 | 16.4 |
| No | 418 | 83.6 |
| Consider heart failure as normal sequence of ageing | | |
| Yes | 151 | 30.2 |
| No | 236 | 47.2 |
| I don't know | 113 | 22.6 |
| Heart cannot pump enough blood around the body | | |
| Yes | 484 | 96.8 |
| No | 16 | 3.2 |
| Disturbed blood flow in the heart muscle | | |
| Yes | 478 | 95.6 |
| No | 22 | 4.4 |
| Failure of the heart | | |
| Yes | 470 | 94.0 |
| No | 30 | 6.0 |
| Elevated blood pressure | | |
| Yes | 462 | 92.4 |
| No | 38 | 7.6 |

**Figure 2:** Figure showing respondents understanding of epidemiology of HF

have hypertension (Table 1). Smoking and alcohol ingestion were not common. Most participants had hypertension (Figure 1). Table 2 showed that most participants had heard of the disease before the study and were aware of common aetiologies of the disease. However, the awareness of the frequency of HF in different population was generally poor except for the high proportion that are aware elderly people are

affected as shown in Figure 2. While Table 3 showed that the knowledge of the course of HF is very poor. The awareness of symptoms of HF and what is not a symptom varies. There was mixed performance with the knowledge of treatment of HF with many misconceptions (Table 4). The clinics were the most preferred source for information (99.4%).

Table 3: Awareness of the course, complications and symptoms of HF

| Variables | Frequency | Percentage |
|---|-----------|------------|
| Heart failure does not affect multiple organs | | |
| Yes | 311 | 62.6 |
| No | 101 | 20.3 |
| I don't know | 85 | 17.1 |
| Course of HF | | |
| HF mostly goes away by itself | | |
| Yes | 60 | 12.0 |
| No | 440 | 88.0 |
| Healed after at least one month of treatment | | |
| Yes | 121 | 24.2 |
| No | 379 | 75.8 |
| As bad as malignancy/cancer diseases | | |
| Yes | 308 | 61.6 |
| No | 192 | 38.4 |
| Can healed through surgery | | |
| Yes | 202 | 40.4 |
| No | 298 | 59.6 |
| Awareness of typical complaints and symptoms of heart failure | | |
| Headache | | |
| Yes | 442 | 88.4 |
| No | 58 | 11.6 |
| Weight gain | | |
| Yes | 188 | 37.6 |
| No | 312 | 62.4 |
| Dizziness | | |
| Yes | 475 | 95.0 |
| No | 25 | 5.0 |
| Short of breath | | |
| Yes | 475 | 95.0 |
| No | 25 | 5.0 |
| Sweating | | |
| Yes | 455 | 91.0 |
| No | 45 | 9.0 |
| Weakness of physical performance | | |
| Yes | 475 | 95.0 |
| No | 25 | 5.0 |
| Paralysis | | |
| Yes | 324 | 64.8 |
| No | 176 | 35.2 |
| Vomiting | | |
| Yes | 113 | 22.6 |
| No | 387 | 77.4 |
| Sudden chest pain) | | |
| Yes | 461 | 92.2 |
| No | 39 | 7.8 |
| Swelling of feet and legs | | |
| Yes | 453 | 90.6 |
| No | 47 | 9.4 |

Table 4: Table showing respondent awareness of treatment of HF

| Variables | Frequency | Percentage |
|---|-----------|------------|
| Consider heart failure as a condition that is better to take it easy and rest | | |
| Yes | 406 | 81.2 |
| No | 46 | 9.2 |
| I don't know | 48 | 9.6 |
| Timing for hospital presentation with breathlessness, tiredness or swollen ankles | | |
| Immediately | 453 | 90.6 |
| 1-2 days | 20 | 4.0 |
| Within 1 week | 10 | 2.0 |
| 1-3 weeks | 2 | 0.4 |
| Within 1 month | 12 | 2.4 |
| Not seek medical help | 3 | 0.6 |
| Self-care and perception of treatment, complications and hospitalisation in heart failure | | |
| Taking Healthy diet | | |
| Yes | 489 | 97.8 |
| No | 11 | 2.2 |
| Sufficient physical exercises | | |
| Yes | 492 | 98.4 |
| No | 8 | 1.6 |
| Not smoking | | |
| Yes | 488 | 97.6 |
| No | 12 | 2.4 |
| No treatment | | |
| Yes | 42 | 8.4 |
| No | 458 | 91.6 |
| Requires strict bed rest for several months | | |
| Yes | 167 | 33.4 |
| No | 333 | 66.6 |
| Diet | | |
| Yes | 492 | 98.4 |
| No | 8 | 1.6 |
| Mostly, lifelong treatment with medicines | | |
| Yes | 440 | 88.0 |
| No | 60 | 12.0 |
| Factors that can lead to hospitalization in heart failure | | |
| Stroke | | |
| Yes | 478 | 95.6 |
| No | 22 | 4.4 |
| High blood pressure | | |
| Yes | 473 | 94.6 |
| No | 27 | 5.4 |
| Heart failure itself | | |
| Yes | 491 | 98.2 |
| No | 9 | 1.8 |
| Diabetes mellitus | | |
| Yes | 417 | 83.4 |
| No | 83 | 16.6 |
| Renal dysfunction | | |
| Yes | 246 | 49.2 |
| No | 254 | 50.8 |
| Avoidance of sports activities by HF patients | | |

Table 4: cont'd

| | | | |
|-----------------------------------|------------|-----|------|
| | Yes | 297 | 59.4 |
| | No | 203 | 40.6 |
| Cardiac arrhythmia) | | | |
| | Yes | 478 | 95.6 |
| | No | 22 | 4.4 |
| Treatment of heart failure | | | |
| Psychotherapy | | | |
| | Yes | 135 | 27.0 |
| | No | 130 | 26.0 |
| | Don't know | 235 | 47.0 |
| Pacemaker | | | |
| | Yes | 274 | 54.8 |
| | No | 80 | 16.0 |
| | Don't know | 146 | 29.2 |
| Diet | | | |
| | Yes | 452 | 90.4 |
| | No | 10 | 2.0 |
| | Don't know | 38 | 7.6 |
| Concoction | | | |
| | Yes | 48 | 9.6 |
| | No | 389 | 77.8 |
| | Don't know | 63 | 12.6 |
| Light therapy | | | |
| | Yes | 261 | 55.1 |
| | No | 85 | 17.9 |
| | Don't know | 128 | 27.0 |
| Talk therapy) | | | |
| | Yes | 311 | 65.5 |
| | No | 49 | 10.3 |
| | Don't know | 115 | 24.2 |
| Sport | | | |
| | Yes | 383 | 76.6 |
| | No | 37 | 7.4 |
| | Don't know | 80 | 16.0 |
| Drug therapy | | | |
| | Yes | 453 | 90.6 |
| | No | 9 | 1.8 |
| | Don't know | 38 | 7.6 |
| Bed rest | | | |
| | Yes | 432 | 86.4 |
| | No | 24 | 4.8 |
| | Don't know | 44 | 8.8 |
| Acupuncture | | | |
| | Yes | 67 | 13.4 |
| | No | 133 | 26.6 |
| | Don't know | 300 | 60.0 |

Other frequently mentioned sources were the internet (83.0%), and patient guides (67.6%) (Table 5). Sources like friends/family (74.8%) and herbalists (3.0%) were less reported.

DISCUSSION

This study revealed that a significant proportion of participants have heard of HF and were aware of its common causes and basic symptoms. However, their

Table 5: Source of information on heart failure by participants

| Variables | Frequency | Percentage |
|------------------|------------------|-------------------|
| Internet | | |
| Yes | 415 | 83.0 |
| No | 85 | 17.0 |
| Patient guide | | |
| Yes | 338 | 67.6 |
| No | 162 | 32.4 |
| Clinic | | |
| Yes | 497 | 99.4 |
| No | 3 | 0.6 |
| Radio | 24 | 4.8 |
| Radio/TV | 8 | 1.6 |
| TV | 6 | 1.2 |
| Friends/family | | |
| Yes | 371 | 74.8 |
| No | 125 | 25.2 |
| Cardiologist | | |
| Yes | 495 | 99.0 |
| No | 5 | 1.0 |
| Nurse | | |
| Yes | 399 | 79.8 |
| No | 101 | 20.2 |
| Family doctor | | |
| Yes | 409 | 81.8 |
| No | 91 | 18.2 |
| Pharmacy | | |
| Yes | 335 | 67.0 |
| No | 165 | 33.0 |
| Herbalist | | |
| Yes | 15 | 3.0 |
| No | 479 | 97.0 |
| Pharmacist | | |
| Yes | 364 | 73.4 |
| No | 132 | 26.6 |

understanding of risk factors, epidemiology, disease progression, and treatment options varied widely.

The high literacy level of the participants, with over 80% having secondary education or higher, likely contributed to their awareness of HF. Previous studies in similar settings have reported similar educational attainment levels in this study population.^{2,11} Also most participants acknowledged that adults can develop HF, despite the relatively low proportion of participants with a personal history of HF or knowledge of someone with HF.

Interestingly, the proportion of those who had heard about HF was similar to figure among lay public in previous studies in many developed countries,^{8-10,13} although some of these studies were done during the Health Failure Awareness Week in such countries.^{9,14} The influence of previous or ongoing episodes of such annual events could have had some impact on

the awareness level. The high knowledge of those who have heard of HF in the earlier mentioned societies may also be connected with higher general health literacy in such society, improved health care system and internet penetration level which democratised the knowledge of HF in the general public.

While the study of awareness of HF among Nigerian general public is poor, so also is same among population with high risk for developing HF like this study population. The Knowledge of Cardiovascular Risk Factors(CVRFs) for Heart Disease among Yoruba Rural Southwestern Nigerian Population, a contiguous area to where this study was done suggested such knowledge of CVRFs is poor.¹⁵

This study highlights the need for targeted educational interventions to address the knowledge gaps particularly regarding risk factors, disease progression, and treatment options¹² and misconceptions about HF among individuals at high risk of developing the condition. Approximately 90% of our study participants had at least one cardiovascular risk factor, making them more susceptible to HF. Previous studies have also reported poor knowledge and high frequencies of misconceptions about HF.⁸⁻¹⁰ Other studies have shown that knowledge of cardiovascular diseases is poor generally.¹⁶⁻¹⁸

While the clinics and clinicians appear to be a preferred source of HF information among this population, a key reason it may not have translated to in-depth knowledge maybe attributable to busy clinics, and lack of structured HF patient educational system. However, clinics can utilise waiting room time for educational videos or presentations on HF. Reliable and supportive information sources, such as patient guides and clinicians, can also play a crucial role in resolving misconceptions and improving HF knowledge.¹² Clinicians serve as a potential tool to resolve the high misconception prevalent among the study population.¹⁸ Interestingly, this source of HF information is already popular among the participants. Intervention should therefore be geared to improving the efficacy and efficiency of these clinical approach as source of information for HF. ⁽¹⁶⁾

The strength of this survey is hinged on the large sample size of individuals with high risk for HF and the broad variables on the different themes on HF. However, the cross-sectional nature does not allow for examination of causality and the data was self-reported which predispose to high chance of bias. We observed that 15.4% of participants had a previous history of heart failure (HF). Interestingly, a similar proportion (16.4%) reported knowing someone with

HF. Given the similarities in these proportions, we do not anticipate that prior knowledge or experience with HF will significantly impact the study's outcome. Finally, it is a single-centre study although the centre is one of the largest tertiary health institutions in Nigeria which serves patients across many states.

Future studies should investigate the effectiveness of tailored educational interventions, particularly those leveraging popular information sources among patients, in enhancing HF knowledge and promoting healthy behaviors. Additionally, assessing the impact of structured patient education on HF outcomes in this setting maybe relevant.

CONCLUSION

The knowledge of heart failure (HF) is alarmingly poor in this population, with significant gaps in understanding disease course and treatment. This study underscores the need for targeted educational interventions to address misconceptions, improve patients' knowledge, and enhance self-care practices. Ultimately, such interventions can help reduce HF-related complications and improve health outcomes, particularly among patients with a high burden of cardiovascular risk factors.

Conflict-of-interest statement

The authors declare that they have no financial or personal relationship(s) which may have inappropriately influenced them in writing this paper.

REFERENCES

1. **Groenewegen A**, Rutten FH, Mosterd A, Hoes AW. Epidemiology of heart failure. *European journal of heart failure*. 2020;22(8):1342-56.
2. **Adebayo O**, Ogah O, Adebisi A, *et al*. Clinical Characteristics, Management, and Six-Month Outcomes after Discharge of Patients Admitted for Acute Heart Failure in Ibadan, Nigeria. *West Africa Journal of Medicine*. 2023;40(1):30-44.
3. **Roger VL**. Epidemiology of heart failure: a contemporary perspective. *Circulation research*. 2021;128(10):1421-34.
4. **Odili AN**, Chori BS, Danladi B, *et al*. Prevalence, Awareness, Treatment and Control of Hypertension in Nigeria: Data from a Nationwide Survey 2017. *Glob Heart*. 2020;15(1):47. Epub 2020/09/15.
5. **Adeloye D**, Owolabi EO, Ojji DB, *et al*. Prevalence, awareness, treatment, and control of hypertension in Nigeria in 1995 and 2020: A systematic analysis of current evidence. *The Journal of clinical hypertension*. 2021;23(5):963-977.

6. **Strömberg A.** The crucial role of patient education in heart failure. *European journal of heart failure.* 2005;7(3):363-369.
7. **Remme WJ,** McMurray JJV, Rauch B, *et al.* Public awareness of heart failure in Europe: first results from SHAPE. *European Heart Journal.* 2005;26(22):2413-2421.
8. **Jung M-H,** Kim H-L, Choi JH, *et al.* Heart failure awareness in the Korean general population: Results from the nationwide survey. *PloS one.* 2019;14(9):e0222264.
9. **Lainscak M,** Letonja M, Kovacic D, *et al.* Public health General public awareness of heart failure: results of questionnaire survey during Heart Failure Awareness Day 2011. *Archives of Medical Science.* 2014;10(2):355-360.
10. **Remme WJ,** McMurray JJ, Rauch B, *et al.* Public awareness of heart failure in Europe: first results from SHAPE. *European Heart Journal.* 2005;26(22):2413-2421.
11. **Adebayo O,** Adebisi A, Ogah O, *et al.* Predictors of acute heart failure outcomes at University College Hospital, Ibadan, Nigeria. *Annals of Ibadan Postgraduate Medicine.* 2023;21(3):27-38.
12. **Jaarsma T,** Hill L, Bayes Genis A, *et al.* Self care of heart failure patients: practical management recommendations from the Heart Failure Association of the European Society of Cardiology. *European journal of heart failure.* 2021;23(1):157-174.
13. **Lam CS,** Harding E, Bains M, *et al.* Identification of urgent gaps in public and policymaker knowledge of heart failure: Results of a global survey. *BMC Public Health.* 2023;23(1):1023.
14. **Remme W,** Boccanelli A, Cline C, *et al.* Increasing awareness and perception of heart failure in Europe and improving care-rationale and design of the SHAPE study. *Cardiovascular drugs and therapy.* 2004;18:153-159.
15. **Oladapo O,** Salako L, Sadiq L, *et al.* Knowledge of hypertension and other risk factors for heart disease among Yoruba rural southwestern Nigerian population. *British Journal of Medicine and Medical Research.* 2013;3(4):993-1003.
16. **Kowalewska E,** Komnacka K, Wójcicki K, *et al.* Sources of patients' knowledge about cardiovascular disease prevention in Poland—a pilot study. *Advances in Interventional Cardiology/ Postępy w Kardiologii Interwencyjnej.* 2022;18 (1): 27-33.
17. **Kilkenny MF,** Dunstan L, Busingye D, *et al.* Knowledge of risk factors for diabetes or cardiovascular disease (CVD) is poor among individuals with risk factors for CVD. *PloS one.* 2017;12(2):e0172941.
18. **Slark J,** Bentley P, Majeed A, Sharma P. Awareness of stroke symptomatology and cardiovascular risk factors amongst stroke survivors. *Journal of Stroke and Cerebrovascular Diseases.* 2012;21(5): 358-362.