Health-related quality of life and clinical outcomes of adults with heart failure in Nigeria: A review of current literature

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Abstract

Background: Heart failure (HF) is a major public health problem due to its high prevalence, nature of morbidity and consequent socio-economic burden on individuals and societies. The established aims of the management are the prevention of disease progression and improving health-related quality of life (HRQoL). HF is a chronic illness known to have a negative impact on HRQoL with consequent adverse clinical outcomes. While there has been progress in reducing HF progression globally, not much has been achieved in improving HRQoL, particularly in Nigeria and other low-resource countries.

Methods: The available literature on the topic from PubMed, Medline, Google Scholar and other relevant internet sites were accessed, reviewed and inferences made.

Conclusion: Heart failure has a significant negative impact on HRQoL with consequent poor clinical outcomes. Periodic assessment of HRQoL, HRQoL goal setting and adherence to guideline-directed medical therapy (GDMT) are recommended as standard care for individuals with HF in Nigeria and across the world

Keywords: Health-related quality of life, heart failure, clinical outcomes

Introduction

Heart failure (HF) is a chronic complex syndrome that results from a structural or functional cardiac disorder that impairs the ability of the ventricle to fill with or eject blood.[1-5] In simple terms, it's defined as the inability of the heart to pump enough blood to meet the metabolic needs of the body or does so at an elevated filling pressure. It is the final common pathway for most cardiovascular diseases. Symptoms include dyspnea, fatigue and signs of congestion, which lead to frequent hospitalizations, poor quality of life, and shortened life expectancy.[6-9] Individuals with HF can experience severe physical limitations even at rest. This, along with the chronic nature of the disease, can have a significant negative impact on their quality of life (QoL) and overall well-being. The primary goal of managing HF is to prevent disease progression and improve health-related quality of life (HRQoL). Typically, individuals with HF prefer and prioritize improving their HRQoL rather than solely focusing on survival and longevity.[6-9] While there have been significant advancements in reducing HF progression globally, not much has been achieved in improving HRQoL. This is more pronounced in resource-limited economies such as Nigeria where there are limited studies on this important aspect of HF.

Classification of heart failure

Heart failure has been classified in various ways in the past. Currently, it is considered a chronic disease that gradually worsens over time, with acute exacerbations. The acute symptomatic phase, which is known as 'acute decompensated heart failure,' can occur as a worsening chronic HF, a new-onset HF, or an advanced HF. The current classification of HF is based on ejection fraction (EF), due to unique clinical characteristics and management needs. It is classified as HF with preserved ejection fraction (HFpEF), HF with reduced ejection fraction (HFrEF), HF with improved ejection fraction (HFimpEF), and HF with mildly reduced ejection fraction (HFmrEF).[1-4,9]

Epidemiology of heart failure

Heart failure is a global pandemic affecting millions of persons across the world, specifically 1-3% of the adult population which increases to over 6-10% in those aged 65 years and above.[1,2,6-9] It is a final common pathway for cardiovascular diseases which are the leading cause of mortality across the world.[5,6] The rising prevalence is predominantly of HFpEF pattern, the incidence rate remains stable at 1-20 cases per 1,000 person-years or 1,000 population. The 30-day mortality is 2-3%, rising to 15-30% by 1 year and 50-75% by 5 years. Despite significant progress in the prevention of HF and reducing HF-related mortality; the incidence, prevalence, hospitalizations and re-hospitalizations for HF continue to rise globally.[10-15] Heart failure is responsible for more hospitalizations than all types of cancer combined.[1,3-6] It is a leading cause of disability worldwide and has a significant economic burden on both individuals and economies. In developed countries, heart failure management consumes a significant portion of the health budget, with the government bearing most of the economic consequences. This is estimated to be about 25,500 euros per year per individual with HF. However, in low-resource economies such as Nigeria, individuals bear the economic burden of HF, resulting in devastating

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economic consequences.[1,4,6,8,9,16-22]

The HF epidemic is caused by a combination of new and existing risk factors for cardiovascular disease, better healthcare, a growing population, and an aging world population.[6-9] The risk continues to rise, making it the most common reason for hospitalization among people over 65 years old worldwide.[6,7-9,16-22] This trend highlights the significant burden of HF on healthcare systems. Over the past few decades, there have been changes in the causes, symptoms, and patterns of HF depending on the location.[6-9,16-22] The most common cause of HF in developed countries is ischaemic cardiomyopathy. However, in developing countries, HF is caused by hypertension, dilated cardiomyopathy, diabetes mellitus, valvular cardiomyopathy, cor-pulmonale, and Chagas disease due to the phenomenon of epidemiologic transition.[1,3-5,10,17-23,24-35] Although the incidence of HF is lower in women than men, women form about half of the cases because they tend to live longer.[1,2,6]

Assessment of health-related quality of life in heart failure

Health-related quality of life refers to an individual's perception of their illness and how they manage it within the context of their expectations, culture, and value systems.[22-27,33,34] It is a measure of the discrepancy between their satisfaction and dissatisfaction with certain areas of life due to their illness.[41-53] The assessments of HRQoL aim to focus on the patient's experience and interpretation of how they are functioning with their illness. This means that they define the patient's reality and point of view as opposed to the reality defined by professional medical knowledge. HRQoL is broader and specific to health-related issues than quality of life (QoL), which usually falls under the category of assessing HRQoL.[12,43-46,54]

There are two types of tools to assess health-related quality of life (HRQoL): generic and specific instruments.[54] Generic instruments can detect changes in different aspects of a patient's health status and allow for comparisons across diverse conditions and interventions.[12,43-46,54] However, they may not be sensitive enough to measure specific problems of a disease. On the other hand, specific HRQoL instruments are created to assess certain aspects of HRQoL and disease in a given population.[12,43-46,54] These instruments are more responsive to changes in HRQoL that occur in a given period and are more sensitive in discriminating the range of impairment in HRQoL because of their focus on the most relevant aspects of HRQoL for the problem assessed.[12,43-46,54-59] A meta-analysis by Olatz et al concluded that the Minnesota Living with Heart Failure (MLHFQ) and Kansas City Cardiomyopathy Questionnaires (KCCQ) were the most appropriate and

widely used instruments for assessing HRQoL in patients with HF.[43] The Chronic Heart Failure Questionnaire (CHFQ) was also found to be useful. For generic assessments, the Medical Outcomes Study 36-Item Short-Form Health Survey is the most widely used.[14,43] The MLHFQ and KCCQ are extensively used and are validated across multiple cultures and translated into many languages while retaining their exactness.[12,14,43-46,29,31,49,54,55] It is essential to select the HRQoL questionnaire according to the objectives of the assessment because each instrument has its characteristics. For example, in situations where self-administration is preferred, MLHFQ or KCCQ would be ideal. For longitudinal studies, MLHFQ or CHFQ would be more appropriate.[43] Hence, while choosing an instrument to assess HRQoL in a patient with HF, several practical and methodological considerations must be made. The instruments should be validated in individual patients or a population of patients, be understandable, reproducible, valid, and sensitive to changes, as well as easy to administer promptly and be adapted for use by other researchers.[24-29,31,37,38,49,50,60-65]

Minnesota Living with Heart Failure Questionnaire

The MLHFQ, a self-administered questionnaire, was created in 1984 by Rector et al. in the USA. It is used to measure the impact of HF on a patient's HRQoL and comprises 21 items rated on a six-point Likert scale.[12,43-46,52] The scale ranges from 0 (no impact) to 5 (severe impact) and includes physical, emotional, and social aspects of life. The MLHFQ provides a total score ranging from 0-105, which indicates the patient's HRQoL. It also gives scores for two dimensions, which are: physical (8 items, range 0-40) and emotional (5 items, range 0-25). The other eight items are only considered for the calculation of the total score. To make a three-factor model, some researchers have proposed a third factor (social), with Muyombe's factor being the most recommended.[30] The MLHFQ is short, easy to understand, and can be self or interviewer-administered, taking only 5-10 minutes to complete.[12,44,52,54] It assesses the patient's perceptions of the effects of HF and its treatment on their daily life, including physical, socioeconomic, and psychological aspects. The questionnaire has high internal consistency, reliability, and validity, making it a widely used tool across the world.[12,44,52,60-63]

Kansas City Cardiomyopathy Questionnaire

The KCCQ is a questionnaire consisting of 23 items, which is specifically designed to measure the quality of life of individuals suffering from heart failure. This questionnaire is divided into seven domains, including physical limitation, symptom stability, symptom burden,

symptom frequency, self-efficacy, QoL, and social limitation.[14,43-46,64-67] The responses are given in a Likert scale, with clinically significant gradations between categories.[54] The questionnaire is scored by assigning an ordinal value to each response, starting with 1 for the response that implies the lowest level of functioning, and then summing up the items within each domain. If any value is missing, it is assigned the average of the answered items within that same domain. The scale scores are then transformed into a range of 0 to 100 by subtracting the lowest possible scale score, dividing by the range of the scale, and multiplying by 100. The questionnaire also calculates two summary scores, which are functional and clinical. The functional status score is calculated by combining the physical limitation and symptom domains (excluding symptom stability), while the clinical summary score is calculated by combining the functional status scores with the QoL and social limitation domains. This questionnaire has been extensively studied and used and has proven to have internal consistency, internal validity, and reliability. [14,43-46,60-67]

Factors associated with health-related quality of life in patients with heart failure

Sociodemographic profile: The relationship between the demographic profiles (such as age, gender, and race) and HRQoL of HF patients is not consistent across studies.[6,7,68-80] Some studies suggest that older age is associated with higher HRQoL, while others are not sure.[14,15,47,48,54,55,75-82] A recent study by Hoekstra et al found that poor HRQoL is associated with older age, female gender, longer duration of HF, and comorbidities. Similarly, Amusa et al. reported similar findings in Jos, Nigeria.[39,40] However, Mbakwem et al. in Lagos found no relationship between gender and HRQoL.[84] In Iran, men were found to have better HRQoL compared to women, especially in physical and mental function.[85] However, the American Heart Association reported that women with cardiovascular disease typically have poorer HRQoL status compared to men. Other studies have found a positive correlation between higher educational status, being married, and being employed with HRQoL.[79] Contrarily, a longer duration of cardiac disease, frequent hospitalizations, medical co-morbidities, and family history of cardiac diseases had a significant negative relationship with HRQoL.[7,52,85-88] Findings on race and ethnicity were found to be dependent on specific disease conditions. For coronary heart disease, Blacks and Hispanics had significantly worse HRQoL than whites. No relationship was found between ethnicity and HRQoL in patients with advanced HF.[52,88]

Moreover, low socioeconomic status (SES) is associated with increased morbidity, severe CVD, poor health-seeking behavior, poor access to healthcare, inability to afford medication, poor adherence to treatment, poor follow-up, and high rehospitalization rate and mortality in multiple studies.[49,50,89,90] Results from the Atherosclerosis Risk in Communities Study indicate that people with lower SES had a 50% greater risk of developing heart disease. Being poor or having a low level of education can be considered a risk factor for developing CVD.[49,50,86,88] Another study reported an association of low SES independently with the risk of readmission for HF, with a hazard ratio of 2.66, after controlling for confounders.[85] Spertus et al. investigated the effect of difficulty affording healthcare on health status.[61] The authors reported that HRQoL was significantly affected at the time of coronary revascularization, which persisted 6 months after the percutaneous coronary intervention in subjects who had difficulty in financing their healthcare.[61] Similarly, using the level of employment grade as an indicator for SES, the lower grade was associated with poor physical function.[73] The relatively heavy economic burden of HF was also reported from the Abeokuta HF registry, in which the total cost of care was estimated to be 190,000 USD, translating to 797.5 USD per patient per year.[35,74] In developed countries, HRQoL assessment has been used to predict the cost of treatment over 12 months, thereby guiding the allocation of scarce resources in the management of cardiac diseases.[61,72,73] In the HRQoL sub-study of the Eplerenone Post-Acute Myocardial Infarction HF Efficacy and Survival Study, health status assessment using the KCCQ to predict the cost of treatment over the next 12 months, with more than 300% additional cost incurred by the subjects with the worst health status.[72]

Health-related quality of life and direct markers of severity of heart failure: The New York Heart Association (NYHA) class and six-minute walk test (6MWT) are measures used to evaluate the severity of HF and indirectly assess the HRQoL of patients with HF.[75-90] Several studies have found that low HRQoL is linked to higher NYHA functional class and poor 6MWT performance.[75-90] For instance, Amusa et al. reported a significant association between poor HRQoL and poor values of NYHA class and 6MWT in a cohort of patients with HF in Jos, Nigeria.[39,40] Other studies have also shown that HRQoL decreases as the NYHA functional class worsens and that it correlates significantly with the distance covered in 6MWT. The longer the distance covered, the better the HRQoL.[77,88-91] However, the relationship with ejection fraction (EF) is not consistent, with some studies showing a correlation between HRQoL and EF, while others finding no correlation or a weak correlation with EF.[88-94]

Health-related quality of life and clinical outcomes in heart failure: Baseline HRQoL is a useful predictor of short-term mortality, early hospital readmission risk, and duration of hospital stay.[7,8,11,18,13,15,39,65] Various studies have shown that HRQoL assessment can provide additional predictive values for both mortality and HF-related hospitalizations, superior to the predictive power of variables such as EF, age, treatment, and the NYHA class. For instance, Konstam et al. found that in studies of left ventricular dysfunction, baseline HRQoL independently predicted mortality and HF-related hospitalizations in symptomatic and asymptomatic patients randomized to enalapril or placebo treatment.[15] In another study, a decrease of 10 points in MLHFQ scores assessed four weeks after discharge from hospital admission for HF was associated with a 23% increased risk of death and a 33% increased risk of rehospitalization or death during follow-up.[13] Mbakwem et al. also found a negative correlation between HRQoL and the number of hospital admissions.[84] A study by Hoekstra et al. found that HRQoL, independent of BNP values, predicted three-year mortality in patients with HF.[83] These findings suggest that domains of activities of daily living and general health predict mortality and HF-related hospitalizations in both univariate and multivariate analyses.[15]

Health-related quality of life in heart failure in Nigeria: There have been limited studies on the HRQoL of individuals with HF in Nigeria.[39,40,42,55,84,95-98] A review conducted in 2017 by Adebayo SO et al reported a limited number of studies on the subject, despite its importance in the management of HF.[42] Between 2017 and 2024, even fewer studies have been done. One of the earliest studies was conducted in 2006 by Ola et al, who investigated the relationship between depression and HRQoL in Nigerian patients with HF. The study found that individuals with major depressive illness, disability, younger age and longer duration of illness had poor HRQoL.[95] Another study, conducted in 2006 by Ikhidero J, reported poorer HRQoL in 150 patients with HF compared to controls using MLHFQ. The study also found a correlation of HRQoL scores with indirect markers of HF severity (6MWT, EF and pulse rate), but not with left ventricular hypertrophy.[96] In 2013, Mbakwem et al conducted a comparative analysis of the HRQoL of 190 individuals with HF using the WHO QoL and KCCQ. The study revealed poor HRQoL in 25% of the participants. The study also found a positive correlation between the KCCQ and WHO-BREF QoL scores in the physical health, psychological, social relationship, and environment domains.[84] In another study conducted in 2015 at Ibadan by Iseko et al, the relationship between functional status and HRQoL in

106 patients with HF was investigated.[55,97] The study found that 41.6% of the participants had suboptimal HRQoL. The study also found a significant relationship between the MLHFQ scores and the NYHA class, as well as indirect markers of severity such as 6MWT and ejection fraction.[55,97]

In a recent study conducted in Jos in 2021, Amusa et al. validated the MLHFQ for use in Nigerians with HF.[39,40] The study found that the scores significantly correlated with indirect markers of severity such as 6MWT distance and NYHA scores. The study also found that the MLHFQ was reliable, with acceptable Cronbach's alpha scores for the total, domains and inter-domains of the MLHFQ.[39,40] The study revealed a significant correlation between HRQoL scores and frequency and duration of hospitalization, pill burden and high Charlson's comorbidity index. The study also identified 6MWT distance, NYHA class and pill burden as significant predictors of HRQoL, as well as some gender differences in the domain scores.[39,40]

In summary, the Nigerian studies although few mostly report that a significant number of individuals with HF in Nigeria have sub-optimal HRQoL. Given the limited number of studies, there is a need for more research in the area of HRQoL in patients with HF in Nigeria.

Strategies to improve health-related quality of life in heart failure: The established goals of HF management are to prevent disease progression and improve HRQoL.[1,2] Although there has been significant progress in reducing the progression of HF globally, little has been achieved in improving HRQoL, especially in resource-limited economies. This may be due to prevailing socio-economic conditions and competing needs. Heart failure is a chronic condition that is characterized by worsening symptoms and physical limitations which negatively impacts the HRQoL of individuals affected. The physical limitation ultimately affects the economic activities of affected individuals in addition to exhausting their financial resources on payments for their healthcare. Studies show that adherence to guideline-directed medical therapy (GDMT) significantly reduces HF progression and improves HRQoL.[1,2,98-101] GDMT for HF consists of four pillars of medications, namely, beta-blockers, angiotensin receptor-neprilysin inhibitors (ARNI), mineralocorticoid receptor antagonists (MRA) and sodium-glucose co-transporter 2 inhibitors (SGLT2i). The timely use of other necessary medications addressing comorbidities, appropriate cardiac devices and surgical interventions, and cardiac rehabilitation are also important components of GDMT. Adequate

management of HF involves the profiling of patients in terms of risk factors, heart failure patterns, cardiac status, and comorbidities.[1,2,98-101] Specific SGLT2i's such as Empagliflozin and Dapagliflozin are reported as reported to have the most effect in reducing heart failure progression and improving HRQoL among GDMT medications.[1,2] To achieve management goals in HF, researchers have recommended the implementation of GDMT HF clinics in hospitals with a multidisciplinary team of doctors, nurses, psychologists, nutritionists, cardiac physiotherapists, and physiologists, etc. There are reports of a significant reduction in disease progression and remarkable improvements in the HRQoL of patients in centers implementing this.[98-101] Furthermore, the provision of healthcare insurance and government programs to ameliorate the economic consequences of HF in low-resource economies such as Nigeria will go a long way in promoting adherence to GDMT for HF and thus achieving management goals in affected individuals.[1,2]

References

1. Heidenreich P, Bozkurt B, Aguilar D, et al. 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure. J Am Coll Cardiol. 2022; 79 (17) e263–e421. doi.org/ 10.1016/j.jacc.2021.12.012.

2. McDonagh TA, Metra M; ESC Scientific Document Group. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: Developed by the Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). With the special contribution of the Heart Failure Association (HFA) of the ESC. Eur J Heart Fail. 2022;24(1):4-131. doi:10.1002/ejhf.2 333.

3. Bozkurt B, Coats AJ, Tsutsui H, et al. Universal Definition and Classification of Heart Failure: A Report of the Heart Failure Society of America, Heart Failure Association of the European Society of Cardiology, Japanese Heart Failure Society and Writing Committee of the Universal Definition of Heart Failure. J Card Fail. 2021. 1:S1071-9164(21) 00050-6. doi:10.1016/j.cardfail.2021.01. 022.

4. Morris AA, Butler J. Updated Heart Failure Guidelines: Time for a Refresh. Circulation. 2022; 145:1371–1373. doi:10.1161/CIRCULATION AHA.122.059104.

5. McKee PA, Castelli WP, McNamara PM, Kannel WB. The natural history of congestive heart failure: the Framingham study. N Engl J Med. 1971;285 (26):1441-6. doi: 10.1056/NEJM197112232852 601.

6. Roger VL. Epidemiology of Heart Failure. Circulation Research. 2021;128:1421–1434. doi :10. 1161/circresaha.121.318172.

7. Savarese G, Becher PM, Lund LH, Seferovic P, Rosano GMC, Coats AJS. Global burden of heart failure: a comprehensive and updated review of epidemiology. Cardiovasc Res. 2023;118(17):3272-3287. doi:10.1093/cvr/cvac013. Erratum in: Cardiovasc Res. 2023;119(6) :1453.

8. Truby LK, Rogers JG. Advanced Heart Failure: Epidemiology, Diagnosis, and Therapeutic Approaches. J Am Coll Cardiol HF. 2020; 8:523–36. https://doi.org/10.10 16/j.jchf.2020.01.014.

9. Lippi G, Sanchis-Gomar F. Global epidemiology and future trends of heart failure. Ame Med J. 2020;5:15. http://dx.doi.org/10.21037/amj.2.

10. Damasceno A, Cotter G, Dzudie A, Sliwa K, Mayosi BM. Heart failure in sub-Saharan Africa: time for action. J Am Coll Cardiol. 2007;50(17): 1688-93. doi: 10.1016/j.jacc.2007.07.030.

11. Malki Q, Sharma ND, Afzal A, et al. Clinical presentation, hospital length of stay, and readmission rate in patients with heart failure with preserved and decreased left ventricular systolic function. Clin Cardiol. 2002;25(4):149-52. doi: 10.1002/clc.49602 50404.

12. Rector TS, Cohn JN. Assessment of patient outcome with the Minnesota Living with Heart Failure questionnaire: reliability and validity during a randomized, double-blind, placebo-controlled trial of pimobendan. Pimobendan Multicenter Research Group. Am Heart J. 1992;124(4):1017-25. doi: 10.1016/0002-8703(92)90986-6.

13. Rodríguez-Artalejo F, Guallar-Castillón P, Pascual CR, et al. Health-related quality of life as a predictor of hospital readmission and death among patients with heart failure. Arch Intern Med. 2005;165(11): 1274-9. doi: 10.1001/archinte.165.11.1274.

14. Zuluaga MC, Guallar-Castillón P, López-García E, et al. Generic and disease-specific quality of life as a predictor of long-term mortality in heart failure. Eur J Heart Fail. 2010;12(12):1372-8. doi: 10.1093/ eurjhf/hfq163.

15. Konstam V, Salem D, Pouleur H, et al. Baseline quality of life as a predictor of mortality and hospitalization in 5,025 patients with congestive heart failure. SOLVD Investigations. Studies of Left Ventricular Dysfunction Investigators. Am J Cardiol. 1996;78(8):890-5. doi:10.1016/s0002-9149(96)00463-8.

16. Sliwa K, Mayosi BM. Recent advances in the epidemiology, pathogenesis and prognosis of acute heart failure and cardiomyopathy in Africa. Heart. 2013;99(18):1317-22. doi:10.1136/heartjnl-2013-

303592.

17. Murray CJ, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global Burden of Disease Study. Lancet. 1997;349(9063):1436-42. doi: 10.1016/S0140 -6736(96)07495-8.

18. Dokainish H, Teo K, Zhu J, et al. Global mortality variations in patients with heart failure: results from the International Congestive Heart Failure (INTER-CHF) prospective cohort study. Lancet Glob Health. 2017;5(7):e665-e672. doi: 10.1016/S2214-109X(17)30196-1.. Erratum in: Lancet Glob Health. 2017:e664.

19. Barker WH, Mullooly JP, Getchell W. Changing incidence and survival for heart failure in a well-defined older population, 1970-1974 and 1990-1994. Circulation. 2006;113(6):799-805. doi: 10.1161/CIRCULATIONAHA.104.492033.

20. Kosiborod M, Lichtman JH, Heidenreich PA, et al. National trends in outcomes among elderly patients with heart failure. Am J Med. 2006;119(7):616.e1-7. doi: 10.1016/j.amjmed.2005.11 .019.

21. Baker DW, Einstadter D, Thomas C, Cebul RD. Mortality trends for 23,505 Medicare patients hospitalized with heart failure in Northeast Ohio, 1991 to 1997. Am Heart J. 2003;146(2):258-64. doi: 10.1016/S0002-8703(02)94784-8.

22. Polanczyk CA, Rohde LE, Dec GW, DiSalvo T. Ten-year trends in hospital care for congestive heart failure: improved outcomes and increased use of resources. Arch Intern Med. 2000;160(3):325-32. doi: 10.1001/archinte.160.3.325.

23. Cotter G, Cotter-Davison B, Ogah OS. The burden of heart failure in Africa. Eur J Heart Fail. 2013;15(8):829-31. doi: 10.1093/eurjhf/hft073.

24. Ntusi NB, Mayosi BM. Epidemiology of heart failure in sub-Saharan Africa. Expert Rev Cardiovasc Ther. 2009;7(2):169-80. doi: 10.1586/14779072.7.2.169.

25. Ogah OS, Stewart S, Falase AO, et al. Contemporary profile of acute heart failure in Southern Nigeria: data from the Abeokuta Heart Failure Clinical Registry. JACC Heart Fail. 2014;2(3):250-9. doi: 10.1016/j.jchf.2013.12.005.

26. Damasceno A, Mayosi BM, Sani M, et al. The causes, treatment, and outcome of acute heart failure in 1006 Africans from 9 countries. Arch Intern Med. 2012;172(18):1386-94. doi: 10.1001/archinternmed.2012.3310.

27. Sliwa K, Davison BA, Mayosi BM, et al. Readmission and death after an acute heart failure event: predictors and outcomes in sub-Saharan Africa: results from the THESUS-HF registry. Eur Heart J. 2013;34(40):3151-9. doi:10.1093/

eurheartj/eht393

28. Ojji D, Stewart S, Ajayi S, Manmak M, Sliwa K. A predominance of hypertensive heart failure in the Abuja Heart Study cohort of urban Nigerians: a prospective clinical registry of 1515 de novo cases. Eur J Heart Fail. 2013;15(8):835-42. doi: 10.1093/eurjh f/hft061.

29. Yancy CW, Jessup M, Bozkurt B, et al; American College of Cardiology Foundation; American Heart Association Task Force on Practice Guidelines. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. 2013;62(16):e147-239. doi: 10.1016/j.jacc.2013.05.01 9.

30. Mosterd A, Deckers JW, Hoes AW, et al. Classification of heart failure in population based research: an assessment of six heart failure scores. Eur J Epidemiol. 1997;13 (5):491-502. doi: 10.1023/a:1007383914444.

31. Wong CY, Chaudhry SI, Desai MM, Krumholz HM. Trends in comorbidity, disability, and polypharmacy in heart failure. Am J Med. 2011;124 (2):136-43. doi: 10.1016/j.am jmed.2010.08.017.

32. Ahluwalia SC, Gross CP, Chaudhry SI, Leo-Summers L, Van Ness PH, Fried TR. Change in comorbidity prevalence with advancing age among persons with heart failure. J Gen Intern Med. 2011; 26(10):1145-51. doi: 10.1007/s11606-011-1725-6.

33. Chong VH, Singh J, Parry H, et al. Management of Noncardiac Comorbidities in Chronic Heart Failure. Cardiovasc Ther. 2015;33(5):300-15. doi: 10.1111/1755-5922. 12141.

34. Brown AM, Cleland JG. Influence of concomitant disease on patterns of hospitalization in patients with heart failure discharged from Scottish hospitals in 1995. Eur Heart J. 1998;19(7):1063-9.

35. Ogah OS, Stewart S, Onwujekwe OE, et al. Economic burden of heart failure: investigating outpatient and inpatient costs in Abeokuta, Southwest Nigeria. PLoS One. 2014;9(11):e113032. doi: 10.1371/journal.pone.0113032.

36. Ansa VO, Ekott JU, Bassey EO. Profile and outcome of cardiovascular admissions at the University of Uyo Teaching Hospital, Uyo--a five-year review. Niger J Clin Pract. 2008;11(1):22-4. Erratum in: Niger J Clin Pract. 2008;11(3):290.

37. Karaye KM, Sani MU. Factors associated with poor prognosis among patients admitted with heart failure in a Nigerian tertiary medical centre: a cross-sectional study. BMC Cardiovasc Disord. 2008;8:16. doi: 10.1186/1471-2261-8-16.

38. Familoni OB, Olunuga TO, Olufemi BW. A clinical study of pattern and factors affecting outcome in Nigerian patients with advanced heart failure. Cardiovasc J Afr. 2007;18(5):308-11.

39. Amusa GA, Awokola BI, Shut GZ. Health-Related Quality of Life in Adults with Heart Failure in Nigeria: Reliability and Validity of Minnesota Living with Heart Failure Questionnaire. American Journal of Respiratory and Critical Care Medicine 2021;203:A 2843. doi: 10.1164/ajrccm-conference.2021.203.1_MeetingAbstracts.A2 843.

40. Amusa GA, Awokola BI, Shut GZ. Gender Differences in Clinical Profile, Health-Related Quality of Life, and Clinical Outcomes in African Adults with Heart Failure. American Journal of Respiratory and Critical Care Medicine. 2022; 205: A4316. doi: 10.1164/ ajrccm-conference.2022.205.1_MeetingAbstracts.A4316.

41. Alta F, Guillemin F, Jullière Y, Mertès P, Villemot J. Self-rating of quality of life provides additional prognostic information in heart failure. Insights into the EPICAL study. Eur J Heart Failure. 2002; 4:337–43.

42. Adebayo SO, Olunuga TO, Durodola A, Ogah O.S. Quality of life in heart failure: A review. Nigerian Journal of Cardiology. 2017,14;1-8.

43. Garin O, Ferrer M, Pont A, et al. Disease-specific health-related quality of life questionnaires for heart failure: a systematic review with meta-analyses. Qual Life Res. 2009;18(1):71-85. doi: 10.1007/s11136-008-9416-4.

44. Rector TS, Anand IS, Cohn JN. Relationships between clinical assessments and patients' perceptions of the effects of heart failure on their quality of life. J Card Fail. 2006;12(2):87-92. doi: 10.1016/j.cardfail.2005.10.002.

45. Kelkar AA, Spertus J, Pang P, et al. Utility of Patient-Reported Outcome Instruments in Heart Failure. JACC Heart Fail. 2016;4(3):165-75. doi: 10.1016/j.jchf.2015.10.015.

46. Garin O, Herdman M, Vilagut G, et al. Assessing health-related quality of life in patients with heart failure: a systematic, standardized comparison of available measures. Heart Fail Rev. 2014;19(3):359-67. doi: 10.1007/s10741-013-9394-7.

47. Lewis EF, Johnson PA, Johnson W, Collins C, Griffin L, Stevenson LW. Preferences for quality of life or survival expressed by patients with heart failure. J Heart Lung Transplant. 2001;20(9):1016-24. doi: 10.1016/s1053-2498(01)00298-4.

48. Stanek EJ, Oates MB, McGhan WF, Denofrio D, Loh E. Preferences for treatment outcomes in patients with heart failure: symptoms versus survival. J Card Fail. 2000;6(3):225-32. doi: 10.1054/jcaf.2000.9503.

49. Spitzer WO. State of science 1986: quality of life and functional status as target variables for research. J Chronic Dis. 1987;40(6):465-71. doi: 10.1016/0021-9681(87) 90002-6.

50. Noori A, Shokoohi M, Baneshi MR, Naderi N, Bakhshandeh H, Haghdoost AA. Impact of socio-economic status on the hospital readmission of Congestive Heart Failure patients: a prospective cohort study. Int J Health Policy Manag. 2014;3(5):251-7. doi: 10.15171/ijhpm.2014.94.

51. Cvijic M, Rib Y, Danojevic S, Radulescu CI, Nazghaidze N, Vardas P. Heart failure with mildly reduced ejection fraction: from diagnosis to treatment. Gaps and dilemmas in current clinical practice. Heart Fail Rev. 2023;28(4):767-780. doi: 10.1007/s10741-022-10267-1.

52. Rumsfeld JS, Alexander KP, Goff DC Jr, et al; American Heart Association Council on Quality of Care and Outcomes Research, Council on Cardiovascular and Stroke Nursing, Council on Epidemiology and Prevention, Council on Peripheral Vascular Disease, and Stroke Council. Cardiovascular health: the importance of measuring patient-reported health status: a scientific statement from the American Heart Association. Circulation. 2013 4;127(22):2233-49. doi:10.1161/CIR.0b013e3182949 a2e.

53. Zotter-Tufaro C, Mascherbauer J, Duca F, et al. Prognostic Significance and Determinants of the 6-Min Walk Test in Patients With Heart Failure and Preserved Ejection Fraction. JACC Heart Fail. 2015;3(6):459-466. doi:10.1016/j.jchf.2015.01.010.

54. de Louredo AB, Leite AL, Salerno GR, Fernandes M, Blascovi-Assis S. Instruments to assess quality of life in patients with heart failure. Fisioterapia em Movimento 2015;28(4):851-8. doi: 10.1590/0103-5150.028.004.AR03.

55. Iseko II, Adebiyi AA, Falase AO. Reliability and validity of a disease-specific quality of life tool in Nigerian patients with heart failure. Nigerian Journal of Cardiology. 2019; 16:43-8.

56. Watanabe-Fujinuma E, Origasa H, Bamber L, Roessig L, Toyoda T, Pieske B, et al. Psychometric properties of the Japanese version of the Kansas City Cardiomyopathy Questionnaire in Japanese patients with chronic heart failure. Health Qual Life Outcomes. 2020;18(1):236. doi: 10.1186/s12955-020-01483-0.

57. Heo S, Moser DK, Riegel B, Hall LA, Christman N. Testing the psychometric properties of the Minnesota Living with Heart Failure questionnaire.

Nurs Res. 2005;54(4):265-72. doi: 10.1097/00006
199-200507000-00009.

58. Riegel B, Moser DK, Glaser D, et al. The Minnesota
Living with Heart Failure Questionnaire: sensitivity
to differences and responsiveness to intervention
intensity in a clinical population. Nurs Res.
2002;51(4):209-18. doi: 10.1097/00006199-200207
000-00001. Erratum in: Nurs Res 2002;51(5):291.

59. Naveiro-Rilo JC, Diez-Juárez DM, Romero Blanco
A, Rebollo-Gutiérrez F, Rodríguez-Martínez A,
Rodríguez-García MA. Validation of the Minnesota
living with heart failure questionnaire in primary
care. Rev Esp Cardiol. 2010;63(12):1419-27.
doi:10.1 016/s1885-5857(10)70276-0.

60. Spertus JA, Jones PG, Sandhu AT, Arnold SV.
Interpreting the Kansas City Cardiomyopathy
Questionnaire in Clinical Trials and Clinical Care:
JACC State-of-the-Art Review. J Am Coll Cardiol.
2020;76(20):2379-2390. doi: 10.1016/j.jacc.2020.
09.542.

61. Spertus J, Decker C, Woodman C, et al. Effect of
difficulty affording health care on health status after
coronary revascularization. Circulation. 2005;111
(20):2572-8. doi:10.1161/CIRCULATIONAHA.
104.474775

62. Greene SJ, Butler J, Spertus JA, et al. Comparison of
New York Heart Association class and patient-
reported outcomes for heart failure with reduced
ejection fraction. JAMA Cardiol. 2021;6(5):522-
531. doi:10.1001/ jamacardio.2021.0372.

63. Napier R, McNulty SE, Eton DT, Redfield MM,
AbouEzzeddine O, Dunlay SM. Comparing
Measures to Assess Health-Related Quality of Life
in Heart Failure with Preserved Ejection Fraction.
JACC Heart Fail. 2018;6(7):552-560. doi:
10.1016/j.jchf. 2018.02.006.

64. Gallagher AM, Lucas R, Cowie MR. Assessing
health-related quality of life in heart failure patients
attending an outpatient clinic: a pragmatic
approach. ESC Heart Fail. 2019;6(1):3-9. doi:
10.1002/ehf2.12363.

65. Yee D, Novak E, Platts A, Nassif ME, LaRue SJ,
Vader JM. Comparison of the Kansas City
Cardiomyopathy Questionnaire and Minnesota
Living with Heart Failure Questionnaire in
Predicting Heart Failure Outcomes. Am J Cardiol.
2019;123(5):807-812. doi:10.1016/j.amjcard.
2018.11.037.

66. Okello S, Abeya FC, Lumori BA, et al. Validation of
heart failure quality of life tool and usage to predict
all-cause mortality in acute heart failure in Uganda:
The Mbarara heart failure registry (MAHFER).
BMC Cardiovasc Disord. 2018;18(1):232. doi: 10.11

86/s12872-018-0959-1.

67. Bakas T, McLennon SM, Carpenter JS, et al.
Systematic review of health-related quality of life
models. Health Qual Life Outcomes. 2012;10:134.
doi: 10.1186/1477-75 25-10-134.

68. Nieminen MS, Dickstein K, Fonseca C, et al. The
patient perspective: Quality of life in advanced heart
failure with frequent hospitalisations. Int J Cardiol.
2015;191:256-64. doi:10.1016/j.ijcard.2015.04.235.

69. Doukky R, Mangla A, Ibrahim Z, et al. Impact of
Physical Inactivity on Mortality in Patients with
Heart Failure. Am J Cardiol. 2016;117(7):1135-43.
doi: 10.1016/j.amj card.2015.12.060.

70. Baert A, De Smedt D, De Sutter J, et al. Factors
associated with health-related quality of life in stable
ambulatory congestive heart failure patients:
Systematic review. Eur J Prev Cardiol. 2018;25(5):
472-481. doi:10.1177/2047487318755795

71. Lee CS, Chien CV, Bidwell JT, et al. Comorbidity
profiles and inpatient outcomes during
hospitalization for heart failure: an analysis of the
U.S. Nationwide inpatient sample. BMC Cardiovasc
Disord. 2014;14:73. doi: 10.1186/1471-2261-14-73.

72. Chan PS, Soto G, Jones PG, et al. Patient health
status and costs in heart failure: insights from the
eplerenone post-acute myocardial infarction heart
failure efficacy and survival study (EPHESUS).
Circulation. 2009;119(3):398-407. doi:
10.1161/CIRCULATION AHA.108.820472.

73. Ogah OS, Stewart S, Falase AO, et al. Short-term
outcomes after hospital discharge in patients
admitted with heart failure in Abeokuta, Nigeria:
data from the Abeokuta Heart Failure Registry.
Cardiovasc J Afr. 2014;25(5):217-23. doi:
10.5830/CVJA-2014-040.

74. Chamberlain AM, Boyd CM, Manemann SM, et al.
Risk Factors for Heart Failure in the Community:
Differences by Age and Ejection Fraction. Am J
Med. 2020;133(6):e237-e248. doi: 10.1016/j.
amjmed.2019.10.030.

75. Molla S, Yitayal M, Amare G. Health-Related
Quality of Life and Associated Factors Among
Adult Patients with Heart Failure in Wolaita Zone
Governmental Hospitals, Southern Ethiopia. Risk
Manag Healthc Policy. 2021;14:263-271. doi:
10.2147/RMHP. S288326.

76. Juenger J, Schellberg D, Kraemer S, et al. Health
related quality of life in patients with congestive
heart failure: comparison with other chronic
diseases and relation to functional variables. Heart.
2002;87(3):235-41. doi: 10.1136/heart.87.3.235.

77. Johansson I, Joseph P, Balasubramanian K, et al; G-
CHF Investigators. Health-Related Quality of Life

and Mortality in Heart Failure: The Global Congestive Heart Failure Study of 23 000 Patients From 40 Countries. Circulation. 2021;143(22):2129-2142. doi: 10. 1161/CIRCULATIONAHA.120. 050850.

78. Tarekegn GE, Gezie LD, Birhan TY, Ewnetu F. Health-Related Quality of Life Among Heart Failure Patients Attending an Outpatient Clinic in the University of Gondar Comprehensive Specialized Hospital Northwest, Ethiopia, 2020: Using Structural Equation Modeling Approach. Patient Relat Outcome Meas. 2021;12:279-290. doi: 10.2147/PROM.S322421.

79. Soriano N, Ribera A, Marsal JR, et al; IC-QoL study investigators. Improvements in health-related quality of life of patients admitted for heart failure. The HF-QoL study. Rev Esp Cardiol. 2010;63(6): 668-76. doi: 10.1016/s1885-5857(10)70141-9.

80. Kraai IH, Vermeulen KM, Luttik ML, Hoekstra T, Jaarsma T, Hillege HL. Preferences of heart failure patients in daily clinical practice: quality of life or longevity? Eur J Heart Fail. 2013;15(10):1113-21. doi: 10.1093/eurjhf/hft071.

81. Freedland KE, Rich MW, Carney RM. Improving Quality of Life in Heart Failure. Curr Cardiol Rep. 2021;23(11):159. doi: 10.1007/s11886-021-01588-y.

82. Hoekstra T, Jaarsma T, van Veldhuisen DJ, Hillege HL, Sanderman R, Lesman-Leegte I. Quality of life and survival in patients with heart failure. Eur J Heart Fail. 2013;15(1):94-102. doi: 10.1093/eurjhf/ hfs148.

83. Mbakwem AC, Aina FO, Amadi CE, Akinbode AA, Mokwunyei J. Comparative analysis of the quality of life of heart failure patients in South Western Nigeria. World Journal of Cardiovascular Diseases. 2013,3,146-153.

84. Yaghoubi A, Tabrizi JS, Mirinazhad MM, Azami S, Naghavi-Behzad M, Ghojazadeh M. Quality of life in cardiovascular patients in Iran and factors affecting it: a systematic review. J Cardiovasc Thorac Res. 2012;4(4):95-101. doi: 10.5681/jcvtr.2012.024.

85. Winkleby MA, Jatulis DE, Frank E, Fortmann SP. Socioeconomic status and health: how education, income, and occupation contribute to risk factors for cardiovascular disease. Am J Public Health. 1992;82(6):816-20. doi: 10.2105/ajph.82.6.816.

86. Tran BX, Moir MP, Thai TP, et al. Socioeconomic Inequalities in Health-Related Quality of Life among Patients with Cardiovascular Diseases in Vietnam. Biomed Res Int. 2018;2018:2643814. doi: 10.1155/2018/2643814.

87. Khariton Y, Nassif ME, Thomas L, et al. Health Status Disparities by Sex, Race/Ethnicity, and Socioeconomic Status in Outpatients with Heart Failure. JACC Heart Fail. 2018;6(6):465-473. doi: 10.1016/j.jchf.2018.02.002.

88. Di Mauro M, Petroni R, Clemente D, et al. Clinical profile of patients with heart failure can predict rehospitalization and quality of life. J Cardiovasc Med (Hagerstown). 2018;19(3):98-104. doi: 10.2459/JCM.0000000000000619.

89. Agbor VN, Essouma M, Ntusi NAB, Nyaga UF, Bigna JJ, Noubiap JJ. Heart failure in sub-Saharan Africa: A contemporaneous systematic review and meta-analysis. Int J Cardiol. 2018;257:207-215. doi: 10.1016/j.ijcard.2017.12.048.

90. Tsigkas G, Apostolos A, Aznaouridis K, et al. Real-world implementation of guidelines for heart failure management: A systematic review and meta-analysis. Hellenic J Cardiol. 2022;66:72-79. doi: 10.1016/j.hjc.2022.04.006.

91. Shih ML, Tsai ST, Chen HM, Chou FH, Liu Y. Gender differences? Factors related to quality of life among patients with Heart failure. Women Health. 2020;60(4):382-395. doi:10.1080/03630242. 2019.1662868.

92. Garay A, Tapia J, Anguita M, et al. Multicenter Study Investigators OBO. Gender Differences in Health-Related Quality of Life in Patients with Systolic Heart Failure: Results of the VIDA Multicenter Study. J Clin Med. 2020;9(9):2825. doi: 10.3390/jcm9092825.

93. Truby LK, O'Connor C, Fiuzat M, et al. Sex Differences in Quality of Life and Clinical Outcomes in Patients with Advanced Heart Failure: Insights From the PAL-HF Trial. Circ Heart Fail. 2020;13(4):e006134. doi: 10.1161/CIRCHEART FAILURE.119 .006134.

94. Ola BA, Adewuya AO, Ajayi OE, Akintomide AO, Oginni OO, Ologun YA. Relationship between depression and quality of life in Nigerian outpatients with heart failure. J Psychosom Res. 2006;61(6):797-800. doi: 10.1016/j.jpsychores.2006.04.022.

95. Ikhidero JI. Quality Of Life Assessment in Heart Failure: Correlation with Clinical and Some Measured Indices of Severity in Patients Seen in Heart Failure. National Postgraduate Medical College of Nigeria Fellowship Dissertation; 2006:1-83.

96. Iseko II. Relationship between functional status and health-related quality of life in patients with heart failure. NPMCN Fellowship Dissertation; 2015:1-98.

97. Amusa GA. Profile, Health-related Quality of Life and Clinical Outcomes in Adults with Heart Failure in North-central Nigeria. National Postgraduate

Medical College of Nigeria Doctor of Medicine Dissertation; 2022:1-119.

98. Diederich T, Lundgren S, Pozehl B, et al. Heart Failure Optimize Clinic: Improving Quality of Care in Heart Failure Patients in an Academic Medical Center. Journal of Cardiac Failure. 2020,26:10; S131-S132. doi:10.1016/j.cardfail.2020.09. 381.

99. Kim SE, Yoo BS. Treatment Strategies of Improving Quality of Care in Patients with Heart Failure.

Korean Circ J. 2023;53(5):294-312. doi: 10.4070/kcj.2023.0024.

100. Kyriakou M, Middleton N, Ktisti S, Philippou K, Lambrinou E. Supportive Care Interventions to Promote Health-Related Quality of Life in Patients Living with Heart Failure: A Systematic Review and Meta-Analysis. Heart Lung Circ. 2020;29(11):1633-1647. doi: 10.1016/j.hlc.2020.04.019.