ORIGINAL ARTICLE

Quality of Healthcare in Acute Heart Failure Management in a Tertiary Hospital

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Abstract

Background: Acute heart failure (AHF) often requires hospitalization for optimal management and the quality of healthcare (QOHC) depends on the implementation of key quality indicators (KQI). However, the QOHC in AHF patients is not established in our locale. We therefore sought to determine the QOHC in hospitalized AHF patients in a tertiary health center.

Methods: It was a retrospective study of hospitalized AHF patients in a tertiary center. Demographic, and clinical data were extracted from the records. The QOHC was determined by the frequency of implementation of KQI in cases recommended for the KQI. Suboptimal, and optimal QOHC were determined by a mean frequency of less than 100%, and 100% respectively.

Results: Seventy nine cases of AHF were managed in the general wards. The mean age was 60.49 ± 17.42 years, and 41 (51.9%) were males. Fifty cases (63.3%) had heart failure with reduced ejection fraction. The frequencies of KQI implementation were left ventricular ejection fraction assessment 70 (88.8%), use of Angiotensin converting enzyme inhibitors (ACEI)/Angiotensin receptor blockers (ARB) 39 (78%), Beta Blockers 36 (72%), anticoagulant 10 (90.9%), patient education 0(0%), and scheduled appointment 71 (89.9%). The mean frequency was 69.9%. Fifty-five (69.7%), and 24 (30.3%) of cases had optimal and suboptimal QOHC respectively. Blood pressure, and duration of hospitalization differed in both groups, p values of 0.000, and 0.016 respectively.

Conclusion: The QOHC in hospitalized AHF patients is suboptimal in terms of usage of guideline directed medical therapy (GDMT), lack of patient education, and poor infrastructure. Measures to address these problems should be initiated.

Keywords: Acute Heart failure, management, quality of healthcare, key indicators.

Introduction

Heart failure (HF) is a clinical syndrome consisting of cardinal symptoms (e.g. breathlessness, ankle swelling, and fatigue) that may be accompanied by signs (e.g. elevated jugular venous pressure, pulmonary crackles, and peripheral edema). It is due to a structural and/or functional abnormality of the heart that results in elevated intracardiac pressures and/or inadequate cardiac output at rest and/or during exercise.[1] AHF refers to rapid or gradual onset of symptoms and/or signs of HF, severe enough for the patient to seek urgent medical attention, leading to an unplanned hospital admission or an emergency department visit.[1] It constitutes 10 to 15 % of medical hospitalizations in Nigeria.[2,3] Despite the advances in HF management, outcomes still remain poor, particularly in the early post discharge period.[4] HF re-hospitalization, and in - hospital mortality of 35.6%, and 13.1% respectively were reported in southern Nigeria.[5] A 6 month mortality rate of 17.8% was reported in the Sub Saharan Survey of Heart Failure (THESUS)-HF registry.[6]

AHF often requires hospitalization for optimal management and care. The quality of health care (QOHC) is the likelihood that healthcare services will achieve the desired favorable outcomes.[7] Quality of healthcare is determined by the extent to which key quality indicators (KQI) are implemented. KQI are guideline directed measures developed for the assessment of QOHC. They are based on processes of care and useful for local quality improvement. Implementation of KQI are associated with favorable clinical outcomes.[8,9,10]

The QOHC in AHF management is not established in our practice, because the management of hospitalized AHF patients have not been fully evaluated. Indeed, to the best of our knowledge, this is the first study to investigate the QOHC in hospitalized AHF patients in Nigeria. Odunaiya, and others [11] evaluated the quality of care in the management of cardiac diseases in general, but this study focuses on AHF, because of its associated poor prognosis. Namukwaya et al [12] also investigated the QOHC in HF patients in Uganda, but they used a subjective method, (patient self-reported interview) as their metric for QOHC assessment. In China, Gupta et al, [13] studied the quality of inpatient care for AHF and reported substandard care. But their results cannot be extrapolated to our population because of racial differences. Information from this study should inform stakeholders on the interventions to initiate in quality assurance programs. QOHC improvement is one of the

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core principles of healthcare reforms in developed nations.[14]

We therefore sought to determine the quality of healthcare in AHF management in a tertiary health center in southern Nigeria.

Methodology
This was a retrospective, descriptive study of AHF patients hospitalized between April and October 2022. The study was conducted in a tertiary health center in southern region of Nigeria. It is a referral center with a capacity of 800 beds. It has no independent cardiology department, cardiac care unit or catheterization laboratory. The protocol was reviewed and approved by the hospital's research, and ethics committee, and a protocol number (ADM/E22/A/VOL.VII/14744) was assigned. All cases notes with a primary discharge diagnosis of AHF hospitalized within the study period were retrieved from the medical records, and screened for eligibility. The principles of Helsinki declaration were applied in the conduct of this study. [15]

Inclusion criteria. Cases with primary diagnosis of AHF who were discharged.

Exclusion criteria: Cases with primary diagnosis of AHF who died, or discharged against medical advice.

Data extracted from the case files included age, gender, blood pressure at presentation, the etiology of HF and comorbidities. Others were the left ventricular ejection fraction (LVEF), packed cell volume (PCV), New York Heart Classification Association (NYHA) class at presentation, serum creatinine, and the duration of hospital stay.

The QOHC was determined by the frequency of implementation of the KQI for hospitalized AHF patients developed by the American College of Cardiology/American Heart Association HF guidelines.[16] This criteria was also used in a previous similar study by Gupta et al. [13]

1. **Determination of left ventricular ejection fraction (LVEF) during hospitalization:** All cases were assessed for this measure.
2. **Use of evidence based Beta blockers (BB):** Cases with heart failure with reduced ejection fraction (HFrEF), but without contraindications to BB were assessed for this measure.
3. **Use of Angiotensin converting enzyme inhibitors or angiotensin receptor blockers:** Cases with HFrEF, but without contraindications to ACEI / ARB were assessed for this measure.
4. **Use of anticoagulants for atrial fibrillation:** Cases with atrial fibrillation, and high risk for thromboembolic events, but without contraindications to anticoagulants were assessed for this

measure.
5. **Documentation of patient education on HF and self-care practices:** All cases were assessed for this measure
6. **Scheduled clinic appointment at discharge:** All cases were assessed for this measure.

In each case, implementation and non-implementation of indicated measures were scored one and zero respectively. The mean score was derived for each case, and multiplied by 100.

Definition of Terms.
   Optimal quality of healthcare: This was defined by a score of 100%.
   Suboptimal quality of healthcare: This was defined by a score of less than 100%.
   Recommended cases for a specific measure: Were the cases with indications for that measure, and they were derived as a proportion of the total number of cases studied.
   Eligible cases for a specific measure: Were the proportion of the recommended cases without contraindications to the measure or therapy.

Data was entered into the International Business Machines Statistical Package for Social Sciences (IBM SPSS) version 22.0 software for analysis. Continuous data were described as means $\pm$ SD while, categorical data were described as proportions. The means in cases with optimal and suboptimal QOHC were compared with independent students' test.

Results
Seventy - nine (79) AHF patients were hospitalized and managed in the general medical wards during the six months studied. There were 41(51.9%) males, and 38 (48.1%) females. Forty- three (54.4%) were elderly, while 26 (32.9%), and 10 (12.2 %) were middle aged, and young respectively. Sixty one (77.2%), and 18 (22.8%) were cases of acute decompensated, and acute denovo HF respectively. The frequencies of heart failure with preserved, mildly reduced, and reduced ejection fraction were 21(26.6%), 8(10.1%), and 50 (63.3%) respectively. The prevalence of hypotension, normal blood pressure, and hypertension at presentation were 10 (12.7%), 62 (78.5%), and 7 (8.9%) respectively. Sixty three (79.7%), and 16 (20.3%) presented in NYHA class 4 and 3 respectively. The cardiovascular comorbidities were hypertension 7 (8.8%), stroke 2 (2.5%), atrial fibrillation 11 (13.9%), and valvular dysfunction 17 (21.5%). The non - cardiovascular comorbidities were anaemia 50(63.3%), diabetes mellitus 17 (21.5%), renal impairment 8 (10.1%). Others included chronic obstruction pulmonary disease (COPD) 3 (3.8%), and

Human immunodeficiency virus (HIV) 1 (1.3 %). The mean level of implementation of KQI was 69.9%.

Table 1: Demographic and Clinical Characteristics of all AHF Cases.

Characteristics	Mean ± SD
Age (years)	60.49 ± 17.42
SBP (mmHg)	137.60 ± 30.87
DBP (mmHg)	87.42 ± 17.20
MAP (mmHg)	101.40 ± 25.57
Creatinine mg/dl	1.41 ± 0.89
Packed Cell Volume (%)	34.39 ± 7.3
LV Ejection Fraction (%)	37.30 ± 10.9
Duration of Hosp. (days)	10.28 ± 6.4

AHF – Acute heart failure, **SBP:** *Systolic blood pressure,* **DBP:** *Diastolic blood pressure,* **MAP:** *mean arterial pressure,* **LV: left ventricle, Hosp:** *Hospitalization.*
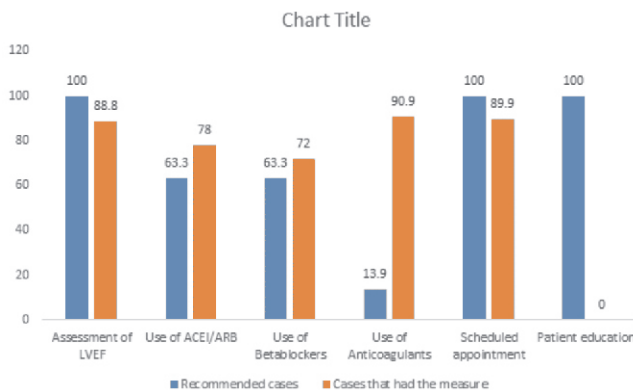
Recommended cases: Proportion of all cases with indications for the measure, **Cases that had the measure:** *Proportions of recommended cases that had the measure.* **LVEF-** *Left ventricular ejection fraction.*

Figure I: Level of Implementation of key Quality Indicators for Acute Heart Failure.

Discussion

This study has revealed that the quality of healthcare in the management of hospitalized AHF patients is suboptimal in our practice**.** This is not surprising, because the study center, though a tertiary health facility, is in a developing nation with poor health indices.[18] Nigeria is ranked 187th out of 191 countries based on WHO ranking of health system performance. [19] Sub-optimal QOHC impacts negatively on post discharge outcomes such as re-hospitalization for AHF, mortality, and health related quality of life.[20, 21.] Our finding concurs with that of IIksoy et al, in Georgia, USA. [22] Similarity in population studied (African Americans), and the observed less access to quality healthcare may explain this concordance in results.

Education of patients about HF, and self-care practices is the most deficient process of healthcare, because there is no dedicated program for HF education

in the study center. This is disappointing, because patient education is an essential component of HF care, as it has been shown to influence attitude and behaviors positively.[23]

Table 2: Differences between Optimal and Sub Optimal Quality of Healthcare in Acute Heart Failure.

Variables	Optimal QOHC Mean ± SD	Suboptimal QOHC Mean ± SD	P value
Age (years)	61.82 ± 16.12	56.04 ± 17.3	0.156
SBP (mmHg)	147.45 ± 28.81	118.46 ± 31.17	0.000
DBP (mmHg)	91.80 ± 14.12	78.17 ± 19.32	0.004
Cr (mg/dl)	1.44 ± 0.98	1.33 ± 0.66	0.573
HB (g/dl)	11.79 ± 2.70	10.95 ± 2.17	0.184
LVEF (%)	40.37 ± 10.96	30.26 ± 7.12	0.000
DOHS (days)	10.60 ± 6.86	17.33 ± 17.64	0.016

QOHC – Quality of healthcare, SBP – systolic blood pressure, DBP – diastolic blood pressure, Cr – Creatinine, HB Hemoglobin, LVEF – Left ventricular ejection fraction, DOHS – duration of hospital stay

Table 3: Reasons for Non-Implementaion of Key Quality Indicators for Acute Heart Failure

Indicators	Reason Non implementation of KQI	Frequency (100%)
Assessment of LVEF	Recent assessment of LVEF prior to hospitalization	9 (11.4%)
Patient education	Lack of trained HF nurses	100%
Use of ACEI	Hypotension	8 (16%)
	Renal dysfunction	3 (6%)
Use of Beta Blockers	Hypotension	8 (16%)
	History of Asthma	1 (2%)
	Bradycardia	3 (6%)
	Omission	2 (4%)
Use of Anticoagulant	Upper GIT hemorrhage	1 (9.01)

LVEF: *Left ventricular ejection fraction,* **ACEI:** *Angiotensin Converting Enzyme inhibitors* **KQI:** *Key quality indicators,* **GIT:** *Gastro intestinal tract*

Lack of nurses trained in HF education is a major contributory factor, because patient education is primarily in the purview of nursing services. Clinicians, do not have adequate time to deliver comprehensive health education. HF patients are therefore not knowledgeable enough for proper self-care and management. Indeed, inadequate knowledge has been documented as a predictor of poor self-care in HF patients in Addis Ababa Ethiopia, [24]

Beta Blockers (BB) are the least implemented guideline recommended medical therapy (KQI) in this study, because of the therapeutic inertia associated with the usage of BB. BB were initially contraindicated in HF due to their negative chronotropic and inotropic

myocardial effects. It is however a class 1A recomendation for HFrEF. Previous studies have also reported low usage of BB in HF management. [25, 26]

The systolic blood pressure at presentation is significantly higher in cases with optimal QOHC (table 2), because their LVEF is also higher than the suboptimal subgroup (Table 2). Left ventricular systolic function determines cardiac output, which is turn influences blood pressure. Usage of GDMT is not a challenge in cases with higher BP because the risk of hypotension is low.. The duration of hospitalization is significantly lower in cases with optimal care (table 2). This is not surprising, because patients who receive optimal healthcare are expected to respond faster to therapy than those managed sub optimally.

Table 3 shows that hypotension is the most common reason for non - implementation of medical therapy KQI (ACEI and BB). This is not unexpected, because blood pressure is an index of cardiac function, as mentioned above, it therefore declines as HF progresses. Furthermore, GDMT has a BP lowering effect which limits their use in this setting. Hypotension is a poor prognostic sign, early detection, and prompt management are therefore necessary for good outcomes. Martin Perez et al, documented a similar finding.[27]

The results in text form show that HF with reduced ejection fraction (HFrEF) is the most common HF phenotype based on LV ejection fraction. Late detection/presentation to hospital may explain this observation. Acute decompensation of chronic heart failure (ADCHF) is the most common clinical presentation. This may reflect the high rate of HF re – hospitalization, and initial management of de novo cases in peripheral centers, before referral to tertiary hospitals like the study center. Ogbemudia et al reported similarly in recent study.[28]

Limitations include the fact that medical therapy quality indicators are not universally applicable to all HF patients, because of guideline recommendations, and the presence of contraindications to their use. The KQI by the ACC/AHA may not have captured all the domains of AHF management, but it is useful for preliminary assessment. Nevertheless, the main objective of this study, which is to determine the quality of healthcare in AHF management in a tertiary health center has been achieved.

Implications for future research include investigation of the impact of QOHC on outcomes, and health related quality of life. Comparison of AHF QOHC in other centers (academic and non-academic) for quality assurance programs. Assessment of QOHC in stable HF patients in the outpatient setting, and assessment of knowledge and practice of HF self- care practices should also yield useful information for policy makers.

In conclusion, acute heart failure is a common medical emergency in our practice, and it often requires hospitalization for optimal management and care, but this study has shown that the quality of healthcare is suboptimal in terms of lack of patient education, inadequate usage of GDMT, and lack of infrastructure. Provision of trained nurses skillful in HF education, increased usage of guideline directed medical therapy, and development of well-equipped cardiac care units, should improve quality of care, and outcomes in AHF patients. Other recommendations include the adoption of multidisciplinary approach in HF management. Participation of hospitals in quality improvement initiatives including patient registries, are beneficial in improving QOHC in AHF patients.

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