

A survey study of the adherence to the 2020 ACC/AHA heart failure guideline in low-middle income countries (Gaza Strip as an example)

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Research Article

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Abstract

Background

Acute heart failure is associated with higher post-discharge mortality, especially in low-middle income countries (LMIC). There are limited studies on adherence to the recommended post-discharge care guidelines in these settings.

Objectives

To assess adherence to the 2020 ACC/AHA inpatient heart failure performance and quality measure in Gaza Strip, Palestine.

Methods

The study was a cross-sectional survey study. We chose a stratified random sample from the three different geographical areas across Gaza Strip with numbers proportional to the size of each region. Patients selected were adults (>18 years) admitted to the various hospitals for acute decompensated heart failure between 4/2021 and 12/2021. We collected data through chart review. Measures were β blockers, ACEi/ARB and MRA prescription, and outpatient follow-up. Results reported as proportion with 95% CI.

Results

The sample size was 155 patients. The mean age was 64 years. 59% were males. The mean length of stay was 2.8 days. β blockers were prescribed to 85.1% [79.5,90.8] of patients. For ACEi/ARB use, it was 42.7% [34.9,50.5]. For MRA, after excluding ineligible patients, it was prescribed in 48.5% [39.9, 57.2]. None of the patients were prescribed hydralazine/nitrate. Only 30.1% [23.6, 38.1] of patients had an outpatient appointment. The median time between discharge and appointment date was 22 days. Only 9.7% [5.0,14.3] of patients were discharged with all quality measures fulfilled.

Conclusion

There are considerable gaps in the post-discharge care of heart failure patients in the Gaza Strip. There is a need to develop local care guidelines to improve care.

Background

Heart failure is one of the most common diseases with significant morbidity, mortality, and economic burden. According to the last Global Burden of Disease (GBD) report, there are an estimated 37.7 million heart failure cases worldwide(1). Acute decompensated heart failure (ADHF) is the most common cause of unplanned hospital admission in patients >65 years of age(2). ADHF is associated with increased

morbidity and mortality(3, 4), especially in patients from low-middle income countries(LMIC)(5). In Gaza Strip, the most common cause of death is cardiovascular disease, accounting for 52% of deaths(6).

Multiple attempts were made to improve care for patients with heart failure, including performance and quality measures. The performance and quality measures aim to improve the quality of care by stimulating the delivery of evidence-based medicine, providing benchmarks for providers and administration, and enhancing accountability(7). Thus, these measures are expanding and receiving increasing interest(8). American college of cardiology(ACC) and the American heart association(AHA) recently published the clinical performance and quality measures for adults with heart failure(9). It included measures for inpatient and outpatient settings.

While there are several approved modalities of heart failure treatment, the application of these modalities in practice shows variations and gaps(10-12). For example, OPTIMIZE-HF enrolled patients hospitalized for heart failure at 259 academic and community hospitals in the United States. Left ventricular systolic function was evaluated in 87% of patients. 83% of the patients received a prescription for β blockers and angiotensin-converting enzyme inhibitors/angiotensin receptor blockers (ACEi/ARB)(13). In another study of eligible patients, 85% received ACEi/ARB, and 91% received β blockers (14). In LMIC, there are limited studies to assess heart failure care(15). REPORT-HF is one of the most significant studies that evaluated the post-discharge prognosis of patients admitted for heart failure worldwide. It showed a lower prescription rate of ACEi/ARB, β blockers, and mineralocorticoid receptor antagonists (MRA) in patients from LMIC as compared with higher income. In another study, only 40% of patients received all the performance and quality measures(16). In the Gaza strip, there are no studies to assess adherence to heart failure performance and quality measures.

Our study evaluated the adherence to the inpatient performance and quality measures among eligible patients in Gaza Strip hospitals.

Methods

2.1. Study Design and Population

The study is a cross-sectional survey study. We took a random sample from patients admitted for acute decompensated heart failure to the different Gaza Strip hospitals. Patients were diagnosed with heart failure, but there was no specification on the type of heart failure(reduced, mid-range, or preserved).

2.2. Data Collection

We collected data through retrospective chart review. Demographic data included age, sex, and location. We also collected data regarding vitals and basic laboratory work (blood creatinine and potassium levels) to assess for contraindications for medication prescription.

We assessed adherence to inpatient performance and quality measures. We adapted our standards from the 2020 ACC/AHA clinical performance and quality measures for adults with a heart failure report.

Measures include ACEi/ARB, β blockers, and MRA for heart failure with reduced ejection fraction (HFrEF) and post-discharge follow-up appointments.

We have designed a questionnaire that includes all the relevant questions. A copy of the questionnaire is included in the annexes. Study data were collected and managed using REDCap electronic data capture tools hosted at SUNY Downstate Health Sciences University (17, 18). We had ethical approval from the Palestinian Ministry of Health.

2.3. Sample characteristics

Gaza Strip is located in Palestine and is divided into three geographical areas: north, middle, and south. Patients with ADHF are treated in government hospitals across the Gaza Strip. The participants were adult patients (>18 years) who were admitted to the hospital for ADHF (new onset or exacerbation) and got discharged between 4/1/2021 and 12/1/2021.

We chose our sample through two-stage stratified sampling. First, we stratified Gaza Strip into three geographical areas (north, middle, and south). Each area is represented by its main hospital. In the second stage, we reviewed records from each hospital and created a sampling frame that includes all patients admitted with ADHF. After that, we chose a random sample from each hospital. The number of patients selected from each geographical area was relative to its population size.

A fixed proportional sample size of 150 patients and a 95% confidence level gives a margin of error of 0.075. We used Neyman allocation to obtain optimal allocation for the different geographical areas. We used the "stratasamp" package to calculate the sample allocation (19).

The sample chosen is representative of the heart failure population in the Gaza Strip. Patients with ADHF are usually admitted to governmental hospitals. We chose the patients from the different hospitals in different geographical areas. In the second stage, we created a sampling frame and chose a random sample from it to ensure generalizability.

2.4. Data Analysis

Adherence to each performance measure was reported as a proportion alongside a 95% confidence interval. Continuous data were reported as mean \pm SD in case of a normal distribution or median and interquartile range in skewed data. The statistical analysis was performed using the "survey package" (20) in the statistical software R version 3.5.0 (R Foundation for Statistical Computing, Vienna, Austria) (21). There was minimal missing data; thus, there was no need to correct for missing data.

Results

We had 155 patients from different areas of the Gaza strip. The mean age was 64 years, and 59% were males. The mean length of stay was 2.8 days. Table 1 shows the patient characteristics.

Table 1: General patient characteristics

	Total (N=155)
Age	
Mean (SD)	64 (\pm 14)
Sex	
Female	63 (41 %)
Male	92 (59 %)
Diabetes Mellitus	76 (49 %)
Hypertension	93 (60 %)
Systolic Blood Pressure*	
Mean (SD)	120 (\pm 22)
Missing	1 (0.6%)
Diastolic Blood Pressure*	
Mean (SD)	70 (\pm 13)
Missing	1 (0.6%)
Heart Rate*	
Mean (SD)	80 (\pm 15)
Missing	1 (0.6%)
Ejection Fraction	
Mean (SD)	36 (\pm 10)
Missing	75 (48.4%)
Length of stay	
Mean (SD)	2.8 (\pm 2.4)

*On discharge

Table 2 shows the prescription adherence rate by providers for the different medication classes along with 95%CI. Adherence was the highest for β blockers. Types of β blockers used were bisoprolol and carvedilol. For MRA, it was the percent of patients who were prescribed MRA after excluding ineligible patients based on potassium and kidney function levels. None of our patients have been prescribed hydralazine/nitrate or angiotensin receptor-neprilysin inhibitor (ARNI).

Table 2: Medication adherence rate

Medication	Rate[95%CI]
β blockers	85.1[79.5,90.8]
ACEi/ARB	42.7[34.9,50.5]
MRA	48.5[39.9, 57.2]

*ACEi/ARB: angiotensin-converting enzyme inhibitors/angiotensin receptor blockers, MRA: mineralocorticoid receptor antagonists

Only 28% [21.5, 35.5] have a follow-up appointment mentioned in the discharge paper. On chart review of the outpatient clinic system, 30.1% [23.6, 38.1] of patients had an appointment. The median time from discharge to appointment was 22 days IQR [7,33].

With all quality and performance measures combined, only 9.7% [5.0,14.3] of patients had all criteria fulfilled. Figure 1 summarizes the finding of our study.

Discussion

Our study was the first to assess adherence to heart failure care performance and quality measures post-discharge in the Gaza strip, Palestine. Adherence with prescribing β blockers was high (85%), followed by MRA and ACEi/ARB. 30% of patients had an outpatient appointment. Only 10% of patients received all measures.

In LMIC, the leading cause of morbidity and mortality is switching from infectious diseases to chronic medical conditions, especially cardiovascular. Multiple studies showed that outcomes are worse in these settings(22-24). Despite that, there is limited research on the quality of care delivered in such settings. Studies like ours that assess the care of chronic medical conditions are essential, especially in LMIC.

We found a gap between the recommendations and what is applied. Several factors are contributing. There is no official national guideline for heart failure care in Palestine. Each center and physician was practicing according to personal knowledge and expertise. Besides, a limited number of qualified practicing cardiologists in the Gaza Strip hinder the quality of care delivered. Third is the challenging

economic and political situation in Gaza Strip. Resources are limited, restricting hiring new personnel, updating infrastructure, and providing required medication and treatments, costly ones such as ARNI(25).

β blockers, ACEi/ARB, and MRA significantly improve survival in patients with HFrEF(26-29). In-hospital initiation has been shown to increase the long-term use of these medications (30-33). In our population, there was high adherence to prescribing β blockers. However, several patients were discharged not on ACEi/ARB and MRA. The exact cause was not clear. It might be related to the concern over potassium level or renal function. There is a need for initiatives to understand the concerns of the treating physician and facilitate prescribing these medications to patients on discharge. None of the patients were prescribed hydralazine/nitrate. The population in Gaza Strip is Caucasian which is likely the cause of the low prescription of hydralazine/nitrate.

Adherence to outpatient follow-up appointments was poor. Only 30% of patients had an appointment with a median time of 22 days, longer than the recommended seven-day period. The extent and quality of outpatient care are limited, especially in LMIC(34), which leads to fragmentation of care, poor patient outcomes, and an increased burden on acute care settings. Initiatives to improve outpatient care of chronic disease, particularly cardiovascular disease, are vital to improving care and outcomes.

We faced several obstacles while conducting our research. First, there was no national dataset with heart failure patients. We had to visit each center, create a list of patients admitted for heart failure and choose a random sample. In addition, currently, the health records are handwritten and then scanned to be archived. Data had to be extracted manually from the paper chart. Besides, several charts had poor documentation and handwriting, which made data extraction more difficult. Employees helped try to explain and clarify what was written.

We could not precisely identify patients with HFrEF. Not all patients had an echocardiogram(echo) done during their visit. For whom it was done, the previous records of ejection fraction were not available. As a result, we could not classify patients with an ejection fraction of more than 40% as HF with improved ejection fraction(HFiEF) or HF with preserved ejection fraction(HFpEF). We had the option to include only patients in whom echo was done and showed EF of less than 40%; however, this might introduce bias. Patients who did not have an echo done likely received inferior care. As a result, we decided to include all patients admitted for heart failure.

Our study was the first to assess adherence to inpatient performance and quality measures in Gaza Strip, Palestine. It adds to the body of literature regarding the care of chronic diseases, cardiovascular in particular, in LMIC. In addition, we collected our sample in stratified random sampling, which aids in generalizing the results of our study.

The study was in only one geographical area of Palestine. We aim in the next project to get an estimate from other parts of the country to provide a comprehensive assessment of the quality of care for heart

failure patients in Palestine. Our study assessed adherence with the inpatient performance and quality measures. In the next project, we aim to estimate adherence to the outpatient performance measures.

Conclusion/clinical Perspectives

Our study assessed adherence to inpatient heart failure performance and quality measures in Gaza Strip. There is a considerable gap between the recommendations and the actual care, especially in outpatient settings. There is a need to develop a national guideline and train providers in heart failure care. Studies to assess and track adherence are essential to improve the care of heart failure patients.

Abbreviations

LMIC

Low-Middle Income Countries

ACC/AHA

American College of Cardiology/American Heart Association

βblockers

Beta-Blockers

ACEi/ARB

Angiotensin-Converting Enzyme Inhibitors/ Angiotensin II Receptor Antagonists

MRA

Mineralocorticoid receptor antagonist

95% CI

95% confidence interval

Declarations

Ethics approval and consent to participate

Study have been performed in accordance with the Declaration of Helsinki and have been approved by the Palestinian Ministry of Health and the Islamic University of Gaza, Gaza, Palestine. Informed consent was waived as the study is retrospective chart review with minimal risk on patients. A copy of the ethical approval is available upon request.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare no conflict of interest.

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This research received no external funding.

Authors' contributions

Alsaqali: Conceptualization,

Al-Saikaly, AboAbdo, Mezead, Mansour and AlZaharna: data collection

Alsaqali, Al-Saikaly, AboAbdo, mezead, Mansour and AlZaharna: Writing - Original Draft

Al-Sadawi and Mhanna: Conceptualization, Writing - Review & Editing

Habib: Supervision authors' contributions

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Figures

Adherence to the 2020 ACC/AHA heart failure guideline in Gaza Strip

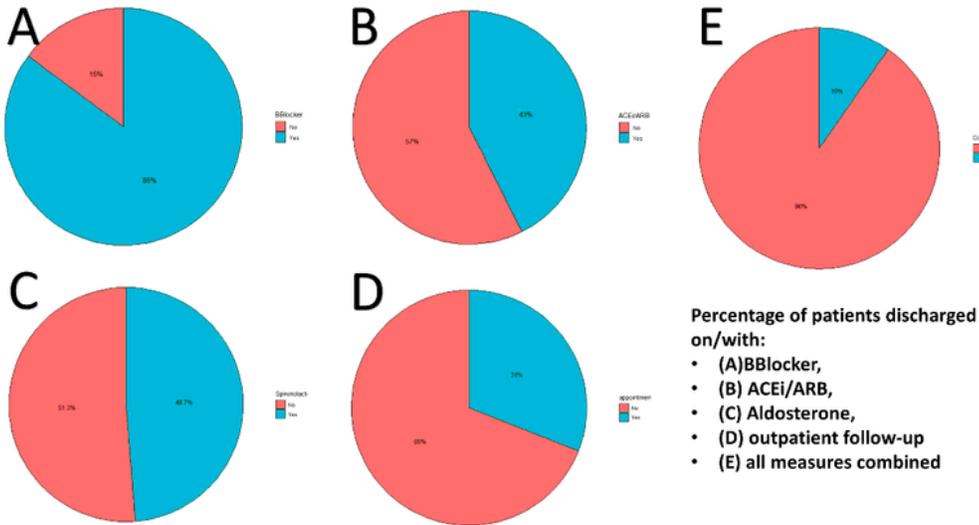
Population

A stratified random sample from patients admitted with acute decompensated heart failure across Gaza Strip hospitals.



Findings

155 patients. The mean age was 64 years. 59% were males.



Conclusion



There is a considerable gap between recommendations and practice



We need to develop a national guideline



We need trained providers in heart failure care.

Figure 1

Central illustration: Compliance with post-discharge heart failure recommendations