Causes of hospital readmission with heart failure at Muhimbili National hospital: Tanzanian experience

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Abstract

Background: Readmission rates for patients discharged with heart failure approaches fifty percent within six months. Identifying factors causing re-admissions in these patients would help clinicians to strategise ways to reduce the need for hospitalization.
Broad Objectives: To study the demographic characteristics, underlying , precipitating and facilitating causes among patients re-admitted with heart failure. Also to identify problems faced by the patients in the follow up programme.
Study Design: Descriptive prospective case study.
Study Setting: Muhimbili National Hospital, Dar-es-Salaam, Tanzania.
Measure of Outcome: Identify causes leading to re-admission among patients with heart failure.
Subject: Ninety seven consecutive patients re-admitted in the medical wards with heart failure.
Interventions: A detailed medical history, clinical examination, blood tests, ECG and echocardiographic evaluation were performed.
Results: A total of 97 patients [56 females and 41 males] were studied. Their mean age was 39.5 years with a range of 8 to 76 years. The major underlying clinical causes for readmission were: cardiomyopathies, hypertensive heart disease, rheumatic heart disease and pericardial disease. The common precipitating causes for readmission were: infections, anaemia hypertension and arrhythmias. The important facilitating causes were: inadequate medical treatment, poor compliance inadequate follow up and poor knowledge of the patients.
Conclusion: Extra efforts should be made by the clinicians and health care providers in improving their prescription habits as well as educating the patients about their disease, compliance and risk factor for cardiovascular disease so as to reduce readmissions.

Key words: Heart failure, Muhimbili Tanzania

Introduction

Heart failure is a worldwide problem and the principal complication of all heart disease [(1)]. Unfortunately both the prevalence and incidence of heart failure are expected to increase as the population continue to age and the pool of congenital and acquired heart disease successfully treated surviving childhood to adulthood increases [(2)]. Readmissions are important because they are common and costly both in terms of personnel, financial and material resources. O'Connel observed that more than 70% of the cost of care for heart failure patients goes to service admission and that irrespective of the length of hospital stay of a heart failure patient, 75% of all the costs for anyone admission is incurred in the first 48 hours[3].Thus hospital admissions and readmissions should be avoided.
Makene et al found heart failure readmissions accounted for 19.4% of all admissions in the medical wards at Muhimbili National Hospital three decades ago[4]. However, the factors that contributed to those readmissions were not studied. The objectives of our study were: (a) To study the demographic characteristics, treatment pattern and follow-up arrangements of patients readmitted with heart failure (b) To determine the underlying and precipitating causes of their illness and therefore readmissions (c) To assess the knowledge, attitudes and practice (KAP) qualities of the patients.

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Method and Materials

Study population and data collection

A hospital-based prospective descriptive case study was carried out at Muhimbili National Hospital, Dar es Salaam from October 2004 to March 2005. Patients aged eight years and above who were previously admitted for heart failure and currently readmitted for heart failure were studied**.** In the inclusion criteria, the authors used the Hillingdon criteria to screen patients for eligibility [5].. This comprises of: (a) Evidence of heart disease and either (b) Evidence of peripheral oedema and raised right internal jugular veins pressure above 4 cm of water with the subject reclining at 45 degrees. or (c) Pulmonary oedema on a chest x-ray confirmed by one radiologist. The exclusion criteria included patients who were previously admitted for heart failure who on this occasion were readmitted for another cause without heart failure.

Sampling

One thousand newly admitted patients' records were examined within 24 hours of admission and a shortlist of 400 patients who were re-admitted with a diagnosis or features suggestive of heart failure were selected for a preliminary clinical assessment. A total of 97 patients who satisfied the inclusion criteria were sampled on a consecutive basis. With this figure, an error of 8% was entertained to cover-changes in the readmission rate of 19.4% observed 30 years ago (4). The sample was calculated using the formula (6). $N=1.96^2p\ (100-p)/\sum^2$ where p=19.4% and $\sum$=8%.

This study was explained to the 97 patients and verbal consent obtained. They all consented and agreed to participate except two patients who refused to give blood specimen for HIV testing. The two patients were studied for all the parameters of the study except their HIV status. A detailed medical history was taken and the important demographic characteristics were recorded in the standardizes questionnaire. These include age, sex, race, marital status, education, occupation and address. Their body weight and height were taken and body mass index calculated.

Each patient was examined physically and their current disease status along with a review of the investigations done in the previous 48 hours recorded. The following baseline investigations were done: urinalysis, chest x-ray, ECG, full blood picture and ESR, blood urea, creatinine, cholesterol, sugar, uric acid, sodium, potassium and chloride levels. Also blood HIV Elisa test and echocardiogram (using Sonos 1000 HP machine) were done.

Discharge treatment and follow:

The following information was recorded in the standardized questionnaire: (i) Medications prescribed at discharge and the duration of the supply (ii) Number of days in the wards and whether at discharge a follow up-

date was given (iii) Whether the patient was on a follow-up program; the problems encountered during follow up and what can be done to improve the program. (iv) Basic questions were asked on known risk factors for heart failure, about their expenditure on medication, health care and daily life. Also general education questions were asked to assess the patient's knowledge, attitude and practices.

Readmission causes were categorized into three groups as follows:[1] Underlying causes, that weakened the heart and spent its reserve rendering it susceptible to repeated failure and hence readmissions eg.valvular heart disease.[2] Precipitating causes which were, intervening illnesses leading to heart failure and hence readmission eg. anaemia[3].A facilitating cause was considered so, when it created the circumstance that allowed the precipitating one to operate or the underlying to deteriorate and thus cause failure eg. poor compliance

Hospital Outcome

During the index admission, 14 [14.4%] patients died while the rest 83 [85.6%] got well and were discharged..

Ethical considerations

The study and its protocol were cleared by the ethical committees of Muhimbili University College of Health Science [MUCHS] and the Ministry of Health. In addition, counselling was done both pre and post-testing HIV status.

Data Analysis

The data was entered into a computer using EPI Info 6 programme and analysis was done according to the computer friendly questionnaire used. Students t-test was used for numerical variables and the Chi-square test was applied for the categorical variables. P value of < 0.05 was considered statistically significant.

Results

A total of 97 patients [56 (57.7% females and 41 (43.3%) males] were studied. Their ages ranged from 8 to 76 years with the mean age of 39.5 years. Among the 97 patients 52 (52.6%) had completed primary education or were still in primary schools while one quarter (21.6%) had not attended any form of school. Twenty-nine (29.9) patients were peasants engaged in small scale subsistence farming and eleven (11.3%) patients were housewives.

Sixty one (62.9%) patients were readmitted within three months after discharge and 36 (37.1%) patients were readmitted in the first month alone. The rate of readmissions between male and females were not significantly different (p=0.48). The common clinical underlying causes of readmission were: cardiomyopathies, 58(59.8%) patients, hypertensive heart disease 37(38.1%), rheumatic heart disease, 29(29.9%), pericardial disease 11 (11.3%) and renal disease 7(7.2%) patients. Among the 75 (77.3%) patients who underwent echocardiography, the common underlying causes observed were similar to those observed clinically.[Table 1] Among the cardiomyopathies, 31 (81.6%) patients had dilated type, 4 (10.5%) hypertrophic type and 3 (7.9%) patients had restrictive type. The most common precipitating causes of readmissions with heart failure were: infections 61(62.9%) patients, hypertension 39 (40.2%) non-compliance 18(18.6%), anaemia 15(15.5%) and arrhythmias in 15(15.5%) patients. The common infections were pneumonias 12[19.7%], pulmonary and/or pericardial tuberculosis 18[29.5%], malaria 19[31.1%], HIV infection10 [16.4%] and infective endocarditis 2[3.3%] patients.. There was significant sex differences in hypertension and myocardial ischaemia in which there were more males (Table 2).

The facilitating causes of readmission were subdivided into three groups: severity of the disease; inadequate treatment and poor compliance and inadequate follow up. The severity of the disease was quantified clinically by classification on the New York Heart Association [NYHA], and the length of hospital stay (Table 3). Most of the patients, 61.8% were very sick, falling in NYHA functional class III, 27 (27.8%) patients and class IV, 34 (34.0%) patients. The mean hospital stay for all the patients was 16.5 days (range 1.to 120 days).

The common drugs prescribed at discharge in order of preference were: diuretics (mainly furosemide) to 85 (89.5%) patients, digoxin to 53 (44.6%), ACE inhibitors to 38 (39.2%), Aldactone to 20 (20.6%) and nitrates to 19 (19.6%) patients. Calcium channel blockers were prescribed to 15 (15.5%) patients while beta adrenergic blockers and hydrallazine were equally prescribed to 5(5.2%) patients each. Only 10 (34.5%) of the 29 patients with rheumatic heart disease were on penicillin prophylaxis.[Table 4]

Table 1. Comparison of the Clinical and Echocardiographic causes of readmission with heart failure

Condition	Clinical causes (n=97 n(%)	Echocardiography n=75 n(%)
Cardiomyopathy	58 (59.8)	38 (50.7)
Hypertensive heart disease	37 (38.1)	26 (34.7)
Rheumatic heart disease	29 (29.9)	23 (30.7)
Pericardial disease	11 (11.3)	17 (22.7)
Renal disease	7(7.2)	3 (4.0)
Ischaemic heart disease	5 (5.2)	3 (4.0)
Respiratory disease	5 (5.2)	4(5.3)
Endocrine disease	5 (5.2)	-
Congenital heart disease	3 (3.1)	4 (5.3)
Arrhythmias	1 (1.0)	4 (5.3)

Table 2: Precipitating causes of readmission with heart failure in 97 patients n (%)

Condition	Male (n=41)	Female (n=56)	P value
Infections	25 [61.0)	36 (64.3)	NS
Hypertension	22 (53.7)	17 (30.4)	0.033
Non-compliance	9 (21.9)	9(16.1)	NS
Anaemia	5 (12.2)	10 (17.9)	NS
Arrhythmias	4 (9.8])	11 (19.6)	0.05
Renal failure	2 (4.9)	4 (7.1)	NS
Ischaemia	5 (12.2)	0 (0.0)	0.009
Endocrine	0 (0.0)	1 (1.8)	NS
Others	12 (29.3)	8 (14.3)	NS

Table 3: Quantification of the severity of the heart failure n(%)

Characteristics	Male	Female	P value
NYHA Classification			
• Class 1	1 (2.4)	0 (0.0)	NS
• Class II	8 (19.5)	25 (44.6)	0.005
• Class III	17 (41.5)	12 (21.5)	0.01
• Class IV	15 (36.6)	19 (33.9)	NS
Hospital Stay			
• Less than Seven Days	13 [31.7	22 (39.3)	NS
• 8 – 14 days	12 (29.3)	13 (23.2)	NS
• 15 – 28 days	6 (14.6)	7 (12.5)	NS
• 29 – 120 days	7 (17.1)	9 (16.1)	NS
• Not recorded	3(7.3)	5 (8.9)	NS

Table 4 Medications prescribed to patients readmitted with heart failure

Medicine prescribed	Male	female	P value
• Diuretics	34 (82.9)	51 (91.1)	NS
• Digoxin	15(36.6)	38 (67.9)	0.01
• ACE inhibitors	17(41.5)	21 (37.5)	NS
• Spironotactone	6 (14.6)	14 (25.0)	0.03
• Nitrates	13 (31.7)	6 (10.7)	0.01
• Calcium channel blockers	10 (24.4)	5 (8.9)	NS
• Beta blockers	2 (4.9)	3 (5.4)	NS
• Hydrallazine	3 (7.3)	2 (3.6)	NS
• Others	28 (68.3)	32 (57.1)	NS

Among our patients compliance with medications was very poor. 49 (50.5%) patients admitted to irregular intake of medicines. 26 (26.8) patients missed treatment for a period between one to seven days while 33 (34.0%) patients missed treatment for one to four weeks. Eleven (11.4%) patients missed treatment for more than four weeks. Reasons given for irregular medications were the drugs were too expensive and they had no money.

Twenty five (25.8%) patients were not scheduled for follow up at discharge. At readmission, 32 (33.0%) patients were not on any follow up program and the reasons for not attending follow up program were: 19 (59.4%) patients were not told or absence of a follow-up program in their home district hospital and 13 (40.6%) patients had no money for the fare and medications. Among the 65 (67.0%) patients who were on a follow-up program, 27 (41.5%) patients reported problems which were: long waiting periods at the clinics by 8 (29.6%) patients; the interval between appointments to attend the clinics was too long, by 5 (18.5%), absent doctors by 4 (14.8%) and 10 (37.0%) patients disliked other patients jumping the queue and mistreatment by records attendants. Regarding knowledge, 41 (42.2%) patients did not know any of the risk factors for cardiovascular disease and 18 (18.6%) patients did not know their disease or diagnosis.

Discussion

Heart failure is common and is associated with high morbidity and mortality. It has an extremely high rate of readmission after index hospitalisation with up to 50% of patients re-hospitalised within six months of discharge.[7] In our study 61 (62.9%) patients were re-admitted within three months of discharge. Deliberate extra efforts are required to identify the reasons and correct them so as to reduce the readmissions.

The pattern of underlying causes of readmission with heart failure was similar to findings done elsewhere in Africa.[8,9] However these findings disagree with studies done in the developed countries, where ischemic heart disease is the commonest cause of heart failure.[5] Also the findings in this study disagrees with Makene et al findings in the same hospital three decades ago, when rheumatic heart disease, hypertensive heart disease, congenital heart disease were the commonest causes of readmission with heart failure.[4] This trend suggests an upsurge of cases of cardiomyopathies and hypertensive heart disease accompanied by a decline or possibly stabilization in those of rheumatic heart disease and congenital heart disease. Change in life-style inspired by economic improvement in the past few decades along with westernisation and the advent of HIV infection are possibly the explanation.

Among the common precipitants of heart failure were infections. These infections were; malaria, pneumonias, HIV infection, tuberculosis and infective endocarditis. Among the 95 patients tested for HIV, 10 (10.5%] patients were positive. HIV infection was an associated factor in the occurrence of 7 (43.8%) of the 16 cases of dilated cardiomyopathy and three presented as peripartum cardiomyopathy. This pattern offers a true example of the changing pattern of disease in Sub-Sahara Africa prompted by the HIV pandemic.[10]

Treatment regimens for heart failure are increasingly complex and require considerable expertise and time on the part of physicians who are usually not heart failure experts. ACE-inhibitors, beta-adrenergic blockers and spironolactone are important drugs for the treatment of heart failure[11,12] These drugs are known to improve the quality of life as well as prolong the survival of these patients.. In our study very few patients were prescribed these drugs and the dosages and combinations were not correct. Poor or ill-informed prescription habits of the clinicians and care providers was emphasized by the over prescription of calcium channel blockers mainly Nifedipine and diltiazem [to 15 (15.5%) patients] which are contraindicated in heart failure and the prescription of penicillin to only 10 (34.5%) of 29 patients with rheumatic valvular heart disease.[11,12] Deliberate efforts to improve prescription for patients with heart failure are required.Patient education and information is the cornerstone of non-pharmacological management of heart failure.[11,13] Interventions focused on education and support is associated with a 39% decrease in the total number of readmissions.[14] A lot of the care of patients with heart failure has to do with modifying life-style and this is only possible if one is knowledgeable enough. Not being informed contributed to the 18 (18.6%) patients who did not know their disease or diagnosis and to the 42 (42,2%) patients who knew nothing about the risk factors for cardiovascular disease. One of the primary goals of clinicians is to teach the patients to recognize their symptoms, make healthy life-style choices and use their medications, all in the hope of keeping them out of hospital leading productive lives.

The grievances pointed by the patients should be addressed so as to improve follow-up and thus reduce readmissions. Thus problems of understaffing the clinics, long appointment intervals and impolite registry staff should be addressed. A health insurance program whereby families contribute a certain percentage and the rest is subsidised by the government is one way to solve the financial crutches faced by the patients in buying

medicines. This will improve their compliance and reduce readmission.

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