OUTCOMES AND THEIR ASSOCIATED FACTORS IN PATIENTS ADMITTED WITH CLINICAL DIAGNOSIS OF HEART FAILURE AT MUHIMBILI NATIONAL HOSPITAL

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OUTCOMES AND THEIR ASSOCIATED FACTORS IN PATIENTS ADMITTED WITH CLINICAL DIAGNOSIS OF HEART FAILURE AT MUHIMBILI NATIONAL HOSPITAL

By

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A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Medicine (Internal Medicine) of the Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for submission a dissertation entitled, *Outcomes and their associated factors in patients admitted with clinical diagnosis of heart failure at Muhimbili National Hospital*, in fulfillment of the requirements for the degree of Master of Medicine (Internal Medicine) of the Muhimbili University of Health and Allied Sciences.

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Dr. Johnson M Lwakatare MB ChB, MRCP

(Supervisor)

Date: _____

DECLARATION AND COPYRIGHT

I, **Hanee Mehboob Mohamed**, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature ……………………………   Date …………………..

ACKNOWLEDGEMENT

DEDICATION

To my parents for always being there and supporting me

To my wife, Shighufta and my son, Abbasali

ABSTRACT

Background: Heart failure is a frequent cause of hospitalization with high morbidity and mortality.[3,51] Several factors affect the outcome after hospitalization for heart failure patients.These outcomes include New York Heart Association classification(NYHA)[35], morbidity and mortality[27,44,50,52] ,Quality of Life(QOL)[39,40,43] and duration of stay in ward[17,18]. Outcomes of patients admitted at MNH appear to be dismal. Studies done elsewhere have shown NYHA classification, medical co-morbidity, patient socio-economic status were associated with poor outcomes.[36] The outcome and associated risk factors for patients admitted at MNH with heart failure is unknown.

Broad Objective: To determine outcomes and their associated factors in patients admitted with clinical diagnosis of heart failure at Muhimbili National Hospital

Study Design and Methodology: This is a descriptive prospective study of consecutive patients newly admitted with diagnosis of heart failure in medical wards between July, 2010 and January, 2011. Only patients who met the Framingham's criteria for clinical diagnosis were included. Informed consent was obtained. A structured questionnaire was used to collect information on demographics, and co morbidities on admission, outcomes at discharge and at one month follow-up. Outcomes determined included heart failure symptoms and signs, NYHA classification, and QOL score. Duration of stay in ward and mortality was also determined. Ethical clearance was obtained from MUHAS Ethical Review Board.

Results: There were a total of 146 patients with a clinical diagnosis of heart failure by Framingham's criteria out of a total of 180 patients who were admitted during the study period. 41.1% of patients were above 50 years of age and 57.5% were females. Patients in NYHA class III / IV were 88.4%. Other findings indicated that 78.6% had poor to moderate QOL score at discharge, 51.4% could not afford medications, 47.9% had no drug availability, 24.7% had hypertension, 4.1% had diabetes mellitus, 46.7% had an ejection fraction $\leq 45\%$, and 11.8% patients had atrial fibrillation. It was also found that 32.1% had duration of stay in ward of more than seven days and, 99.3% were in NYHA class I / II at discharge. Common symptoms at discharge were cough (78.6%), bilateral ankle swelling (60.7%) and difficulty in breathing on exertion (41.4%). Out of 111 patients followed up in medical wards and medical clinic, 14.4% were in NYHA class III / IV, 73.9% had poor to moderate QOL score, common symptoms were cough (75.7%), bilateral ankle swelling

(57.7%) and difficulty in breathing on exertion (46.8%). Proportion of patients who died during study period was 5.4%.

Conclusion:

1. There is poor outcome, both at discharge and at one month, for patients admitted with heart failure at MNH.
2. 32.1% of patients admitted with heart failure stay longer than 7 days.
3. Patients in NYHA class III/IV had poor to moderate QOL score at one month.
4. 5.4% of patients admitted with heart failure died by one month.
5. Patients with poor to moderate QOL score at discharge had poor to moderate QOL score at one month.

Recommendations:

1. Patient education on drug use, their benefits, and side effects to improve QOL of patients.
2. Emphasis on patients follow-up to improve outcomes and drug availability in hospital.
3. It is recommended that MNH sets appropriate management guidelines for admitted patients.

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LIST OF ABBREVIATIONS

Bpm	-	Beats per minute
HFPEF	-	Heart failure with preserved ejection fraction
HFREF	-	Heart failure with reduced ejection fraction
NYHA	-	New York Heart Association
CHF	-	Congestive Heart Failure
ACEI	-	Angiotensin Converting Enzyme Inhibitor
QOL	-	Quality Of Life
ECG	-	Electrocardiography
ECHO	-	Echocardiography
PND	-	Paroxysmal nocturnal dyspnea
DIB	-	Difficulty in breathing
COPD	-	Chronic obstructive pulmonary disease
WBC	-	White blood cell
MNH	-	Muhimbili National Hospital

1. INTRODUCTION AND LITERATURE REVIEW

1.1 AGE AND PREVALENCE

Heart failure is a growing public health problem on a global perspective. Referring to Saba MM et al, clinical scenarios included in the Ebers papyrus may represent one of the earliest documented observations of the syndrome of heart failure from Africa.[1] This disease entity has remained largely unexplored in this part of the world.

Ashish V et al who studied CHF-related hospitalization outcomes in a large, multistage, inpatient dataset found that patient characteristics such as nature of insurance coverage, disease severity, race, age, as well as hospital characteristics such as location/teaching status, size, experience, and region affected patients outcomes.[2]

Heart failure accounts for 4.5% up to 6% of all hospital admissions.[3,4] The prevalence of heart failure was 15 per 1000, and high in those aged 65 and over.[5] In a study in Rotterdam by A. Mosterd et al, where the presence of heart failure was determined by assessment of symptoms and signs (shortness of breath, ankle oedema and pulmonary crepitations), the overall prevalence of heart failure was 3·9%. This did not differ between men and women.[6]

In developed countries, the prevalence of heart failure increases with age with a prevalence of 1 in 25 at around 40 years increasing to about 10 % at age of 80 years. In Africa, the age related increased prevalence tends to occur at around the 5th and 6th decade. Similarly, a study from Tanzania showed the peak prevalence was in age 50 to 59 years, with only 3% in age group 70 to 79 years.[8] The difference is explained by major contribution of rheumatic valvular disease and severity of hypertension among blacks at relatively young ages.[9] Studies have uniformly described a male predominance among those with heart failure in Africa with patients mean age 73 years old.[9] In another study in Dar es salaam, the mean age for patients with heart failure was 42±20.73.[10]

1.2 CLINICAL DIAGNOSIS AND SEVERITY OF HEART FAILURE

Heart failure is clinically diagnosed by using Framingham criteria which provides an acceptable clinical diagnosis tool.[11] In diagnosis of heart failure using the Framingham criteria, it requires that either two major criteria or one major and two minor criterions be present concurrently. Minor criteria are accepted only if they could not be attributed to another medical condition.

The major Framingham criteria include: paroxysmal nocturnal dyspnea, neck vein distention, rales, radiographic cardiomegaly, acute pulmonary edema, s_3 gallop, central venous pressure greater than 16 cm water, circulation time of 25 seconds, hepatojugular reflux, visceral congestion, or cardiomegaly at autopsy, and weight loss of 4.5 kg in 5 days in response to treatment.

Minor criteria include: bilateral ankle edema, nocturnal cough, dyspnea on ordinary exertion, hepatomegaly, pleural effusion, a decrease in vital capacity by one third the maximal value recorded, and tachycardia (rate of 120 bpm).

A study done to assess validity and clinical usefulness of the Framingham clinical criteria for the diagnosis of systolic heart failure, where most frequent major criteria were: lung rales (93%), megalocardia (85.9%) and paroxysmal nocturnal dyspnoea or orthopnea (75.8%), and most important minor criteria were: exertional dyspnoea (89.2%), pleural effusion (82.8%) and lower limb oedemas (70.1%), values that were considered as a sign of left ventricular systolic failure proved to have good sensitivity and positive predictive value (96.4% and 97%, respectively).[11]

The Framingham clinical criteria have excellent sensitivity but poor specificity.[11] The Framingham clinical criterion has a sensitivity of about 92% and moderate specificity of around 80%. The absence of the Framingham clinical criteria rules out the diagnosis of heart failure. However, the presence of these criteria does not necessarily confirm the diagnosis, which may then be confirmed by echocardiography.

Patients with heart disease are classified, based on the relation between symptoms and the amount of effort required to provoke them, by using the NYHA classification. The classes are as follows;

- o Class I: No limitations. Ordinary physical activity does not cause undue fatigue, dyspnea, or palpitations.
- o Class II: Slight limitation of physical activity. Such patients are comfortable at rest. Ordinary physical activity results in fatigue, palpitations, dyspnea, or angina.
- o Class III: Marked limitation of physical activity. Although patients are comfortable at rest, less-than-ordinary activity leads to fatigue, dyspnea, palpitations, or angina.
- o Class IV: Symptomatic at rest. Symptoms of CHF are present at rest; discomfort increases with any physical activity

1.3 QUALITY OF LIFE (QOL) SCORING IN HEART FAILURE

In patients with heart failure, their QOL includes their ability to; perform desired physical and social activities to meet their own and their family's needs; maintain happiness; and engage in fulfilling relationships with others.

In one study, it was found that patients perceive a variety of factors positively or negatively affecting quality of life: These were mainly; physical (symptoms and good or poor physical status), psychological (mood and positive or negative perspective), economic (financial status), and social (social support and ability for social activities), spiritual, and behavioral (self-care).[12]

Amongst the quality of life assessment tools for patients with heart failure, one of these is the Spitzer index for QOL. This is very simple and easy to use. It has five important components. These components are: activity, daily living, health, support, and outlook. Each component is determined by questions that give the component a maximum score of two and a minimum score of zero. The scoring is based on question asked over the last one week duration.

Spitzers quality of life index (QL-Index) measures the general well being of patients with chronic diseases that includes heart failure. It evaluates the effects of treatment and supportive programs such as palliative care.

According to Spitzer, measurement of QOL should consider physical, social, emotional functions, attitudes to illness, adequacy of family interactions and cost of illness to the patient.

Table 1: Spitzers QOL assessment tool

Component	During Last week;	Score
Activity	- able to work(small scale business/ household activities) with no assistance	2
	- working with assistance/ on sick leave	1
	- not working at all	0
Daily Living	- can eat food, wash hands/ take bath, go to toilet/ use toilet, dress/undress; can travel in car/bus with no assistance; no incontinence	2
	- requires assistance for above	1
	- can't do above ; is totally dependant; incontinent	0
Health	- feels well/ full of energy	2
	- lacking energy	1
	- ill/not feeling well at all	0
Support	- good relationship/ support from family member(s)/ friends; good financial support	2
	- poor support; financial insecurity	1
	- no support at all	0
Outlook	- calm, positive, in control of his/her surroundings; interest in community activities	2
	- not full control of above; lack of interest in community activities	1
	- no control at all	0

In a randomized study to assess the physiological and psychosocial effects of exercise training in chronic heart failure, there was an overall improvement of Spitzers QOL index scores after exercise.[13]

1.4 CAUSES OF HEART FAILURE IN AFRICA AND IN TANZANIA

The most important causes responsible for heart failure include hypertension, valve disease, prior stroke, cor pulmonale, cardiomyopathy, pericardial diseases, coronary heart disease, and metabolic problem (etiology unknown in 17% of cases).[5,7,9,14,62]

In a review of published studies, it was found that heart failure seems to occur as a major complication of high blood pressure in Africa.[15] Lessons from the changing epidemiology of heart failure in developed countries suggest that the burden of this disease will dramatically increase over this century.

According to one study in Dar es salaam, most common underlying causes of heart failure were valvular heart disease (55%), cardiomyopathy (42%), hypertensive heart disease (25%), congenital heart disease (6%), and ischemic heart disease (3%).[8]

Locally done studies have also noted that heart failure was mainly due to cardiomyopathy (59.8%) followed by hypertensive heart disease (38.1%), rheumatic heart disease (29.9%) and non-compliance (18.6%). [10,16]

1.5 DURATION OF STAY IN HOSPITAL AND OUTCOMES IN PATIENTS WITH HEART FAILURE

1.5.1 Duration of stay in hospital

Studies had showed that heart failure has been associated with prolonged length of stay, with a median length of stay in hospital of six days.[9,17,18] Peripheral congestion, concomitant acute medical problems, development of renal impairment, change in weight during stay, duration of treatment with intravenous diuretic, low left ventricular ejection fraction, specific heart failure aetiology and presence of social problems were related to longer than average length of hospital stay.[9,19-22] Other factors such as anemia, concurrent stroke, atrial fibrillation, chronic lung disease, ischemic heart disease, in-hospital progress and the development of iatrogenic complications had also been associated with prolonged length of hospital stay.[23-27]

In a local study, the duration of hospital stay of more than seven days was observed more in patients in NYHA class III/IV.[28]

The length of hospital stays dropped with better patient communication, tough anti-smoking efforts, improved heart monitoring, and use of angiotensin converting enzyme inhibitors as seen in other study by Gregg C et al.[29]

Multivariate models only partly explained variance in hospital stay and suggested the importance of pre-admission and post-discharge factors, including the healthcare environment, the availability of primary and secondary care resources, and threshold for hospital admission.[9]

1.5.2 NYHA classification

The NYHA class correlates with the outcomes in patients with heart failure. Most of the patients were in poor NYHA classification on presentation. At admission, more than 50% of patients presented late, being in stage III and IV.[9,30-33] This is supported by a local study in which the proportion of patients in NYHA class III/IV was 55.7%.[28] NYHA classification recorded on discharge remained unchanged for more than 80% of patients.[34] A study showed that patients in different NYHA classes (I, II, III, and IV) , had all cause mortality of 14.7%, 21.1%, 35.9%, and 58.3% respectively.[35] It is clear that higher NYHA classes were associated with poorer outcomes in patients with heart failure and preserved systolic function, and poor NYHA classes, II through IV were also associated with higher risk of all-cause hospitalization.[35]

Overall, NYHA classification is predictive of hospitalization, quality of life, and mortality among patients with heart failure.[36]

1.5.3 Quality of life and related factors

The self-reported QOL measure is a significant predictor of heart failure-related hospitalization for all age groups. Those with poorer self-report quality of life had a significantly greater risk of hospitalization.[37] A study assessing QOL found that patients had a significantly lower QOL score at follow-up compared with those without frequent readmission.[38]

According to one study that measured the quality of life in patients with coronary heart disease and heart failure at hospital admission, discharge, and one month after the discharge date, analysis indicated that the quality of life of coronary disease patients is quite low and improved very marginally between admission and one month post discharge. Heart failure patients had even lower quality of life scores.[39]

Proportion of patients with poor clinical state by NYHA classification correlated with poor QOL scores, being 10%, 60%, 30% for NYHA class III, II, I respectively.[40]

Factors predictive of poor QOL were; female sex, old age, NYHA functional class III or IV, evidence of depression, poor socio-economic status, and experiencing two or more co-morbidities.[41]

In a study on patients with heart failure using Spitzers QOL index, there was improvement in overall scores following exercise.[13] Different scoring indices are not different in detecting clinically important changes over time in patients with heart failure.[42]

Edelmann F et al looked at the impact on NYHA class and physical functioning scores amongst patients, and found that HFPEF patients had lower NYHA class and higher SF-36 PF score. Adjusting for age and gender; COPD, anemia, hyperuricemia, atrial fibrillation, renal dysfunction, cerebrovascular disease, and diabetes had similar negative effect on QOL.[43]

1.5.4 Clinical presentation and ejection fraction in heart failure

Patients with heart failure present with a variety of symptoms, most of which are non-specific. The common symptoms of congestive heart failure include fatigue, dyspnoea, swollen ankles, and exercise intolerance, or symptoms that relate to the underlying cause.[44]
In a local study, the common symptoms and signs were PND (100%), hepatojugular reflex (98%), tender hepatomegaly (98%), raised JVP (95%), cough (93%) and bilateral ankle edema (68%).[70] However, the accuracy of diagnosis by presenting clinical features alone is often inadequate, particularly in women and elderly or obese patients.[45]
Hospital stay greater than six days was associated with the presence at hospital admission of the symptoms of peripheral edema, chest pain, or fatigue; and the clinical findings of

elevated jugular venous pressure or a third heart sound; and weight gain during hospital stay.[9]

Patients with heart failure with reduced ejection fraction tend to be more symptomatic than with heart failure with preserved ejection fraction. However, several typical co-morbidities including hypertension, diabetes mellitus and renal failure in heart failure patients differentially affect symptoms in HFREF and HFPEF.[46]

Prevalence of left ventricular systolic dysfunction was approximately 2·5 times higher in men than in women, and 60% of persons with left ventricular systolic dysfunction had no symptoms or signs of heart failure at all.[6] More than one third (36%) of patients had preserved systolic function; and these patients were more likely to be older and female, and have less ischemic heart disease. Patients with preserved left ventricular function had fewer re-hospitalizations for heart failure.[47]

A study conducted to determine the symptoms and clinical signs at the time of the diagnosis of heart failure to predict hospitalization within the first month after diagnosis, and mortality within the first six months after diagnosis; it was seen that hospitalization within the first month after the diagnosis was best predicted by peripheral oedema (p = 0.001), nocturnal dyspnoea (p = 0.022) and pleural effusion (p = 0.032) at the time of the diagnosis. Mortality within the first six months after the diagnosis was best predicted by age (p < 0.001) and pulmonary rales (p = 0.001). Peripheral oedema, nocturnal dyspnoea, and pleural effusion were highly associated with hospitalization.[49]

1.5.5 Mortality in heart failure

There is a high level of morbidity and mortality among patients with heart failure. Hospital case fatality among those with heart failure in Africa ranges from 9% to 12.5%; total in-hospital mortality rate of 17.5%, and patients with coexisting co morbidity have a significantly increased mortality.[16,50]

Framingham study showed that overall, 1-year, and 5-year survival rates in patients with heart failure was 57% and 25% in men, and 64% and 38% in women, respectively.[51]

In a prospective study, the proportion of death resulting from heart failure had significantly increased.[3] With regard to NYHA class, it was found that among patients with heart failure NYHA classification of II, III and IV, mortality was 7·1%, 15·0% and 28·0%,

respectively.[44] And on follow-up, mortality in patients with heart failure was 46.4% (CI 95%: 36.7%-56.0%).[52]

On the contrary, rates of death or hospitalization after hospital discharge decreased from 38.2 percent to 34.8 percent in accordance with one of the recent studies due to better patient communication, tough anti-smoking efforts, improved heart monitoring, and use of ACEI.[29]

Male sex, old age, poor NYHA classification of III/ IV, recent hospital stay for heart disease, heart rate greater than 100/min, systolic blood pressure less than 100 mmHg, diastolic blood pressure less than 60 mmHg, reduced left ventricular ejection fraction, anemia, renal insufficiency, diabetes mellitus and atrial fibrillation were all predictors of total mortality in patients with heart failure.[27,44,,50,52,53]

1.6 ADDITIONAL RELATED FACTORS AFFECTING OUTCOMES IN HEART FAILURE

1.6.1 Drug prescription and polypharmacy

Three major trends emerge from few studies that have addressed the issue of management of heart failure in Sub Saharan Africa.

First, underutilization of medications with proven efficacy such as ACEI and beta-blockers has been reported. The available pharmacological treatments, such as ACEI, beta-blockers, and possibly angiotensin receptor blockers, as reported elsewhere, are effective for the treatment of heart failure if adequately used among people in Africa.[33,54]

Second, when medications were appropriately prescribed, it is not always followed by patient adherence.[55]

Also noted is that hospital physicians prescribed more ACE-inhibitors and beta-blockers of proven efficacy in heart failure (metoprolol, bisoprolol, carvedilol). Aldosterone antagonists were administered more frequently in the hospital setting compared to general practice (14.3% vs. 37.7%).[56]

According to one study, it was found that patients were on five medications at admission and six medications at discharge[9] with average of 6.3±2.3 drugs.[57] Polypharmacy was frequent: 74% were taking six or more pills per day and 28% 11 or more pills as found in another study.[58]

Mignon A et al showed that about half of patients (50 %) were using multiple medications, while nearly four-fifth were taking multiple mediations at hospital discharge.[59] Hospitalization had led to a significant increase in the number of drugs per patient [pre-hospital 5.4; hospital 6.6; post hospital 6.7].[60]

Polypharmacy prior to admission, cumulative co-morbidity and selected chronic conditions (diabetes, heart failure, chronic obstructive pulmonary disease, renal insufficiency, and depression) were significant correlates of polypharmacy at discharge.[61]

1.6.2 Co-morbidities and precipitating factors in heart failure

Cardiac involvement in human immunodeficiency virus infection, cor pulmonale, and pericarditis contribute to over 20% of cases of heart failure in Sub Saharan Africa reflecting the continuing impact of HIV and tuberculosis on heart disease on the continent.[62]

In another local study, proportion of heart failure patients with hypertension was 37%.[10] The most important precipitating factors in systolic heart failure were infections (38%), arrhythmias (35%), and vascular causes (24%), whereas the precipitating factors in diastolic heart failure were infections (50%), arrhythmias (46%), and uncontrolled hypertension (26%).[63] Moreover, co morbidities negatively affect prognosis more strongly in heart failure with preserved ejection fraction than with reduced ejection fraction.[43] According to Spencer S et al, common precipitating causes include anemia (26.8%), infections (26.1%), and arrhythmias (20.1 %).[8]

In a locally done study , the proportion of patients with heart failure in atrial fibrillation was 7%.[10] Study done in Uganda on heart failure found that 64.3% of patients had anemia while hospitalized with mean haemoglobin concentration ≤11.9 g/dl for women and ≤12.9 g/dl for men at admission. And, other study done in local setting found that 59.9% of pregnant patients with heart failure had anemia.[28] Increasing age and hypertensive heart disease were significantly associated with anaemia.[27]

It was also found in an observational study that variables significantly related to negative outcome included systolic blood pressure <100mmHg, pulse pressure ≥55mmHg, anaemia,

brain deficit, permanent bed rest, Barthel Index ≤30 (low well being of patient). By multivariable analysis, significant correlation was retained by anaemia and Barthel Index ≤30, the latter being the strongest predictor.[64]

1.6.3 Socio-economic factors

Heart failure guidelines recommend treatment with multiple medications to improve survival, functioning, and QOL. The increasing incidence and prevalence, the deterioration of QOL, the high mortality and the elevated costs related to chronic heart failure represent one of the most important problems of public health care.

Heart failure treatments can be costly, resulting in significant economic burden for some patients. McMurray et al in their study found that chronic heart failure placed a heavy burden not only on patients and their families, but also on society through enormous use of health care resources. [65]

Heart failure is currently the most costly cardiovascular disorder in the United States, with estimated annual expenditures in excess of 20 billion US dollars. Recent studies had shown that selected pharmacological agents, behavioral interventions, and surgical therapies are associated with improved clinical outcomes in patients with heart failure, but the cost implications of these diverse treatment modalities are not widely appreciated.[66] Patients, reporting difficulty affording their medical care, had lower perceived health status than those reporting little to no economic burden.[67]

The availability of community-based social support may offset any increased risk of early readmission if patients with medical and social co-morbidity were discharged too early.[9] Compared with affluent patients, socio-economically deprived patients were 44% more likely to develop heart failure and 23% less likely to see their general practitioner on an ongoing basis.[68]

Non-adherence increased mortality, morbidity, and the need for hospital care, but it is difficult to estimate the true scope of non-adherence in heart failure. Reviews had shown that medication adherence ranges between 10% and up to numbers above 90%, but the majority seems to be around 70%.[69,70] Five interacting dimensions have been determined

on non-adherence by Sabate E et al: patient-related factors, condition-related factors, therapy-related factors, health care team/system-related factors, and Social/economic factors .[71] It is the responsibility of the patient alone to follow the prescribed treatment; however, adherence is a multi-dimensional phenomenon. Costs of care, including the cost of the intervention, were lower in patients receiving the education intervention than in control subjects.[72]

Analyzing utilization for one year in an urban or suburban population of two different nurse-based management systems, in addition to usual care for outpatients with heart failure, with follow-up with a phone-nurse-based system or by nurse ambulatory system, it was found that improvement in NYHA class was observed in both groups, as well as in the QOL scores and ejection fraction. No significant differences were found between the two groups in mortality, hospital readmission, emergency room visits, and hospital admissions. Phone-nurse-based system requires minor staff and had a better flexibility than a nurse ambulatory system.[73]

1.6.4 Patient knowledge

Mitja et al reported that only eighty nine percent of interviewed patients were aware of their heart condition but only 61% were satisfied with the explanation of their clinical condition given by medical staff.[57]

Non-compliance and knowledge of prescribed medications are also studied in elderly heart failure patients where investigators found that; only 55% patients could correctly name what medication had been prescribed, 50% were unable to state the prescribed doses and, 64% could not describe when the medication was to be taken, i.e. at what time of day and when in relation to meals the medication was to be taken.[74] Another study found that half of the patients knew that beta-blockers and vasodilators decreased blood pressure, 88% knew that their drugs help to eliminate fluids; 38% recognized this effect with low dose spironolactone and 23% or less with other drugs.[58]

Analysis of other data by Angie Rogers et al also identified that patients; had little understanding of the purpose of their medications, were concerned about both the quantity

and combination of drugs they were prescribed, had difficulties in differentiating between the side effects of drugs and symptoms of heart failure, and had little knowledge to help them interpret and/or treat changing symptoms.[32] According to Todd et al, patients receiving the education intervention had lower risk of re-hospitalization or death. In one randomized controlled trial of heart failure patients, it showed that patients randomized to receive teaching session had fewer days hospitalized and lower mortality in follow-up period than did controls.[75] In-hospital educational nursing intervention benefited all HF patients in understanding their disease, regardless of telephone contact after discharge.[48]

2. STUDY

2.1 PROBLEM STATEMENT

Heart failure is a frequent cause of hospitalization with high morbidity and mortality.[3,51]

Heart failure leads to frequent readmissions and, this leads to costly treatment to families and nation at large.

Admission due to heart failure at MNH is common and previous studies have indicated prevalence ranging between about 4 to 8% and mortality of 17.5%.[8,16]

Several factors affect the outcome after hospitalization for heart failure patients, and these outcomes include NYHA classification[41], morbidity and mortality[27,44,,50,52], QOL[39,40,43] and duration of stay in ward[17,18].

Studies done elsewhere have shown NYHA classification, medical co-morbidity, patient socio-economic status were associated with these poor outcomes.[36]

However, outcomes of these admitted patients appear to be dismal. Yet, factors relating to this situation have not been addressed in Tanzania.

2.2 RATIONALE

Heart failure admissions are common at Muhimbili National Hospital.

There is no much information on the outcomes at discharge and on follow-up for patients with clinical diagnosis of heart failure in our local setting.

This study was also done to assess the factors associated with the outcomes.

The results of this study may help in setting of guidelines for management of heart failure patients at Muhimbili National Hospital

Proper follow-up of patients with co-morbidities may be critical as their risk for poor outcomes tend to be higher.

Muhimbili National Hospital had been chosen as study area as it receives patients with heart failure from peripheral hospitals, therefore patients present with multiple co-morbidities.

2.3 OBJECTIVES

2.3.1 Broad objective

To determine outcomes and their associated factors in patients admitted with clinical diagnosis of heart failure at Muhimbili National Hospital.

2.3.2 Specific objectives

1) To describe demographic and baseline characteristics of patients admitted with clinical diagnosis of heart failure.
2) To determine duration of stay in ward and outcomes at discharge in patients admitted with clinical diagnosis of heart failure.
3) To determine outcomes at one month follow-up in patients admitted with clinical diagnosis of heart failure.
4) To determine factors affecting outcomes at one month follow-up in patients admitted with clinical diagnosis of heart failure.

2.4 METHODS AND MATERIALS

2.4.1 Study design

Descriptive prospective study

2.4.2 Study area

Medical wards and outpatient clinic at Muhimbili National Hospital

MNH is a National Referral Hospital and University Teaching Hospital with about 1,500-bed facility.

2.4.3 Study population

Consecutive patients newly admitted with clinical diagnosis of heart failure in medical wards at Muhimbili National Hospital.

2.4.4 Study duration

July 2010 to January 2011 (7 months)

2.4.5 Inclusion criteria

Patients admitted with heart failure who then fulfilled the Framingham's criteria (Having two major criteria or one major and two minor criteria) for clinical diagnosis were included in the study.

2.4.6 Exclusion criteria

Patients below age 18 years

Patients who did not give consent

Patients already part of this study who were again readmitted during study period

2.4.7 Sample size

Sample size calculations for this research were performed on comparison of one month outcomes including QOL and mortalities.[35,40,44]

$$(z_{1-\alpha/2} + z_{1-\beta})^2 = \frac{n(\pi_2 - \pi_1)^2}{\pi_1(1 - \pi_1) + \pi_2(1 - \pi_2)}$$

Using a risk difference z-test (chi-square test formula) to detect a difference of this magnitude; π_2 and π_1 = estimated one month outcomes; n = sample size; Zx = point on standard normal distribution with area to the left = x; α= type I error rate = 0.05; β = type II error rate = 0.20.

Taking the largest sample size, the required sample size was 104 patients. Adding loss to follow up, the required study sample size came to 135. Total of 146 patients were recruited.

2.4.8 Study data collection

The investigator collected information on admission, at discharge, and at one month follow-up.

For the follow-up, all patients were given telephone contact, and telephone contacts were taken if available. Follow-up was done in medical wards or medical clinics. Patients who did not come for follow-up were traced by telephone if available.

Investigator visited the admitting wards every day and went through all the patients' files to identify those newly admitted with diagnosis of heart failure. The patients who were

identified were then assessed for inclusion into the study using the Framingham's criteria for clinical diagnosis. Informed consent was obtained.

A structured questionnaire was used for collecting information's at admission on demographics and co morbidities including history of hypertension and diabetes mellitus. Physical assessment was done on all patients, and patients classified according to NYHA classification.

Blood pressure was taken at admission using mercury sphygmomanometer with patient resting in bed. Average of three readings was recorded.

Patients body weights were taken using well-calibrated weighing scale, with patient wearing no shoes/slippers, at admission.

Blood investigations were done. Using 10cc syringe, venous blood (about 10cc) was drawn from each patient to measure the following: Serum creatinine level, Urea level, Hemoglobin level and White blood count using cell dyne and chemistry analyzers. Routine investigations on above were recorded from patients files.

Estimated GFR was calculated using Cock-Croft Gault equation.

Cock-Croft Gault equation for Estimating is as follows;

$$GFR = [(140 - Age) * weight]/(72 * Creatinine\ level)$$ If female multiply by 0.85

ECG was performed using MAC machine; results interpreted with assistance from consultant cardiologist.

For the study, ECHO either done during in-patient stay or done in past two months at MNH was accepted for the study.

The investigator did not interfere with the treatment plan of the admitted patients.

The investigator administered structured questionnaires to obtain information on outcomes at discharge, and on drug prescriptions related to heart failure at discharge. Physical assessment was done on all patients, and patients classified according to NYHA classification. QOL score was also determined. Patients were then given follow-up visit date.

The investigator administered structured questionnaires and collected information on common symptoms of heart failure, NYHA classification, and QOL at one month.

2.4.9 Outcomes assessment

The outcomes assessed at discharge included:

- Heart failure common symptoms and signs

- NYHA classification (Class I, II, III, or IV)

- Spitzers QOL score defined as follows;

(0 – 5=poor to moderate, 6 – 10=good to excellent)

The outcomes assessed at one month included:

- Symptoms of heart failure

- NYHA classification (Class I, II, III, and IV)

- Spitzers QOL score defined as follows;

(0 – 5=poor to moderate, 6 – 10=good to excellent)

- Mortality: Determined during period from admission up to one month follow-up.

2.4.10 Definitions used

Duration of stay in ward: Period from admission to discharge of patient.

Renal insufficiency was defined by estimated GFR less than 60ml/min; Hypertension was defined by blood pressure greater than or equal to 140/90 mm Hg or history of using anti-hypertensive drugs; Diabetes mellitus was defined by history of diabetes mellitus or random blood glucose > 11.1mmol/l from in-patient records; Anemia was defined by hemoglobin less than 12 and 13g/dl for females and males respectively; Atrial fibrillation defined by ECG finding of irregular heart rhythm, absent p-waves, normal QRS duration that is irregular; Raised WBC count was taken as greater than 11×10^9/L; Low left ventricular ejection fraction was taken as less than or equal to 45%.

2.4.11 Data analysis

The collected data was checked for quality, and coding was done prior to entering into the computer statistical program. Data cleaning was also performed.

Data was then analysed by SPSS for Windows version 15. A descriptive analysis of baseline parameters using proportions was done. Comparisons were performed to assess those who completed follow-up, as compared to those who were lost to follow-up using p-value. The chi squared test was used to test for association between categorical variable outcomes. Fisher`s exact test was used for tables with values less than 5. Stratified analysis was done for adjustment of factors with significant association (bivariate analysis).

The level of significance was set at $p < 0.05$, and a 95 % confidence interval was used for precision.

2.4.12 Ethical clearance

- Ethical clearance to conduct the study was obtained from Muhimbili University of Health and Allied Sciences Ethical Review Board.

- Permission to do the study was obtained from Muhimbili National Hospital management and Head of Department of Internal Medicine.

- Informed consent was obtained from study participants or parents/guardians of the participant if the participant was legally unable to make decision.

2.4.13 Disposal of Study patients

All findings (physical and investigations) were communicated to patients, during the follow-up visit, by the investigator.

All findings were discussed with doctors managing the patients.

The care of the patient both in-patient and out-patient was continued as per recommendations.

No patient information was revealed to any person related without prior consent from patient.

3. RESULTS

Table 2: Demographic and baseline clinical characteristics of patients admitted with clinical diagnosis of heart failure in MNH (N=146)

Characteristics	Frequency n (% of N)	Males (%)	Females (%)	P-value
Age (Years)				
18 – 33	51 (34.9)	18 (29.0)	33 (39.3)	
34 – 49	35 (24.0)	17 (27.4)	18 (21.4)	
50 – 65	43 (29.5)	20 (32.3)	23 (27.4)	
66+	17 (11.6)	7 (11.3)	10 (11.9)	0.604
NYHA class on admission				
I / II	17 (11.6)	8 (12.9)	9 (10.7)	
III / IV	129 (88.4)	54 (87.1)	75 (89.3)	0.796
Hypertension	36 (24.7)	12 (19.4)	24 (28.6)	0.246
Diabetes mellitus	6 (4.1)	1 (1.6)	5 (6.0)	0.308
Low haemoglobin level (g/dl)	114 (78.1)	51 (82.3)	63 (75.0)	0.319
WBC count ($\times 10^9$/L) > 11	18 (12.3)	10 (16.1)	8 (9.5)	0.309
Estimated GFR(ml/min)* < 60	70 (49.3)	22 (36.7)	48 (58.5)	0.011
Atrial fibrillation**	17 (11.8)	8 (13.3)	9 (10.7)	0.794
Ejection fraction (%)*** ≤ 45	42 (46.7)	20 (46.5)	22 (46.8)	1.000

* Creatinine values not available for 4 patients.

** Two patients died within 24 hours of admission, so ECG could not be done.

*** Total of ninety ECHO findings was included within past two months of admission that included all those done in-patient.

Figure 1:Proportions of different symptoms and signs of heart failure at admission
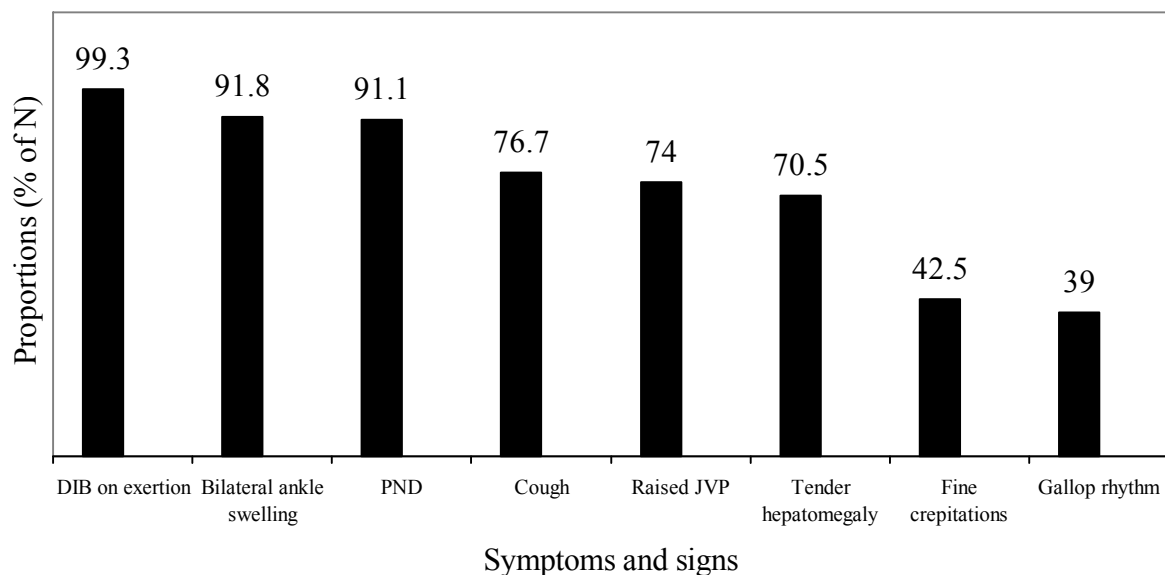
In this study, out of a total of 180 patients admitted with heart failure by admitting doctor, 146 patients fulfilled Framingham's criteria for clinical diagnosis as shown in Table 2. Females accounted for 57.5%. And, 41.1% were at least 50 years old. The proportion of patients in NYHA class III / IV was 88.4%.

With regards the baseline characteristics: 24.7% had hypertension and 4.1% had diabetes mellitus. As shown in Figure 1, most common symptom and sign were DIB on exertion and raised JVP respectively. Also, anemia was more common in females, 49.3% had estimated GFR less than 60ml/min, 46.7% had an ejection fraction less than or equal to 45%, 12.3% had raised white cell count and 11.8% had atrial fibrillation clinically or by electrocardiography.

Table 3 shows outcomes at discharge. It was found that 70.7% had duration of stay in ward of at least four days. Those in poor NYHA class on admission had increased length of stay in the ward (p<0.05) and, 139 (99.3%) of patients discharged were classified in NYHA class I / II.

The most common symptoms at discharge were cough (78.6%), bilateral ankle swelling (60.7%) and difficulty in breathing on exertion (41.4%).

Looking at the spitzer QOL index scores, individual components that contributed included the following: patients working with assistance for small scale business/household activities/on sick leave (87.7%), patients requiring assistance for eating food/taking bath/using toilet/undressing-dressing/traveling (78.8%), patients with lack of energy (65.8%), patients with poor support from families/friends and financial insecurity (71.2%) and patients not feeling positive or who have lack of interest in activities (80.1%).

Table 3: Duration of stay in ward and outcomes at discharge in patients admitted with clinical diagnosis of heart failure in MNH (N=140)

Outcomes	n(% of N)	Males,n(%)	Females,n(%)	P-value
Duration of stay in ward (Days)				
< 4	41 (29.3)	19 (32.2)	22 (27.2)	
4 – 7	54 (38.6)	21 (35.6)	33 (40.7)	
>7	45 (32.1)	19 (32.2)	26 (32.1)	0.786
NYHA class				
I	82 (58.6)	35 (59.3)	47 (58.0)	
II	57 (40.7)	24 (40.7)	33 (40.8)	
III	1 (0.7)	0 (0.0)	1 (1.2)	1.000
Symptoms and Signs				
Cough	110 (78.6)	47 (79.7)	63 (77.8)	0.837
Bilateral ankle swelling	85 (60.7)	33 (55.9)	52 (64.2)	0.382
DIB on exertion	58 (41.4)	24 (40.7)	34 (42.0)	1.000
PND	1 (0.7)	0 (0.0)	1 (1.2)	1.000
Fine crepitations	1 (0.7)	0 (0.0)	1 (1.2)	1.000
QOL score Poor to moderate	110 (78.6)	46 (78.0)	64 (79.0)	
Good to excellent	30 (21.4)	13 (22.0)	17 (21.0)	1.000
Total	**140 (100.0)**	**59 (100.0)**	**81 (100.0)**	

Table 4 shows a total of 111 patients were followed up at one month in the medical wards and medical out patient clinic. Twelve patients were traced by telephone because physical contact was not possible due to patients coming from outside Dar es salaam. There was no statistically significant difference found in baseline characteristics between those followed up and those who were lost to follow-up (p>0.05). This suggests no study bias.

The patients in NYHA class III / IV accounted for 14.4%, and 73.9% had poor to moderate QOL score on follow-up. Common symptoms were cough (75.7%), bilateral ankle swelling (57.7%) and difficulty in breathing on exertion (46.8%). The total number of patients who died during in-patient stay of study period was 6 (5.4%). Of these, 3 had died within 24 hours from admission.

Table 4: Outcomes at one month in patients admitted with clinical diagnosis of heart failure in MNH (N=111)

Outcomes		n (% of N)	Males,n(%)	Females,n(%)	P-value
NYHA class					
I / II		95 (85.6)	45 (88.2)	50 (83.3)	
III / IV		16 (14.4)	6 (11.8)	10 (16.7)	0.590
Symptoms					
Cough		84 (75.7)	35 (68.6)	49 (81.7)	0.125
Bilateral ankle swelling		64 (57.7)	28 (54.9)	36 (60.0)	0.700
DIB on exertion		52 (46.8)	19 (37.3)	33 (55.0)	0.086
PND		21 (18.9)	9 (17.6)	12 (20.0)	0.811
QOL score	Poor to moderate	82 (73.9)	36 (70.6)	46 (76.7)	
	Good to excellent	29 (26.1)	15 (29.4)	14 (23.3)	0.520
Mortality		6 (5.4)	3 (5.9)	3 (5.0)	1.000
Total		**111 (100.0)**	**51 (100.0)**	**60 (100.0)**	

On further analysis, 55.2% of the patients were not taking prescribed drugs daily, with duration off treatment ranging from 2 to 14 days. Among these, 62.1% were off treatment for more than four days. Also, 97.1% of patients did not know about the prescribed drugs, either the schedule or their side effects.

Overall reasons for no drug availability (which means not having all prescribed drugs) were that; drugs were out of stock in hospital (could be any anti-heart failure drugs), patients couldn't afford to purchase them from outside, and patients actually were not given medications by nursing staff. Main reasons for poor drug affordability were; patients had no money at all, drugs were expensive, or combination of both.

Table 5 shows that in this study, it was found that poor NYHA class on admission (class III/IV) contributed to poor to moderate QOL score at one month. There was a statistically significant association ($p<0.05$).

There was also significant association between QOL score at discharge and that at one month ($p<0.05$). Having poor to moderate QOL score at discharge actually contributes to poor to moderate QOL score at one month.

Results also showed that poor to moderate QOL score at one month was more in patients with hypertension, diabetes mellitus, no drug availability, renal insufficiency, atrial fibrillation, reduced ejection fraction less than or equal to 45% and anemia in females. These were not statistically significant ($p>0.05$).

Further sub-analysis showed that there was a significant association between duration off treatment on follow-up with the QOL score at one month ($p<0.05$). The main reasons for not taking prescribed medications daily at follow-up were; drugs are finished, no one was available to give medications, and some patients reported forgetting to take medications.

Table 5: Factors associated with QOL score at one month in patients admitted with clinical diagnosis of heart failure in MNH (N=111)

Factors			QOL score, n (%)		Total (%)	P-value
			0 – 5	6 – 10		
NYHA class on admission	I / II		5 (41.7)	7 (58.3)	12 (100.0)	
	III / IV		77 (77.8)	22 (22.2)	99 (100.0)	0.013
Hypertension	Yes		19 (79.2)	5 (20.8)	24 (100.0)	
	No		63 (72.4)	24 (27.6)	87 (100.0)	0.606
Diabetes mellitus	Yes		5 (83.3)	1 (16.7)	6 (100.0)	
	No		77 (73.3)	28 (26.7)	105 (100.0)	1.000
Drug availability	Yes		38 (70.4)	16 (29.6)	54 (100.0)	
	No		44 (77.2)	13 (22.8)	57 (100.0)	0.518
QOL score at discharge	Poor to moderate		67 (78.8)	18 (21.2)	85 (100.0)	
	Good to excellent		15 (57.7)	11 (42.3)	26 (100.0)	0.042
Haemoglobin (g/dl)	Males	< 13	28 (70.0)	12 (30.0)	40 (100.0)	
		≥ 13	8 (72.7)	3 (27.3)	11 (100.0)	1.000
	Females	<12	34 (79.1)	9 (20.9)	43 (100.0)	
		≥12	12 (70.6)	5 (29.4)	17 (100.0)	0.511
Estimated GFR (ml/min)		< 60	38 (80.9)	9 (19.1)	47 (100.0)	
		≥ 60	40 (66.7)	20 (33.3)	60 (100.0)	0.127
Atrial fibrillation	Yes		12 (80.0)	3 (20.0)	15 (100.0)	
	No		68 (72.3)	26 (27.7)	94 (100.0)	0.755
Ejection fraction (%)		≤ 45	26 (81.3)	6 (18.7)	32 (100.0)	
		> 45	30 (75.0)	10 (25.0)	40 (100.0)	0.580
Off treatment at one month (Days)	1–4		13 (59.1)	9 (40.9)	22 (100.0)	
	> 4		31(86.1)	5 (13.9)	36 (100.0)	0.028

Figure 2: Patients drug usage proportions at one month follow-up by number of drug types prescribed at discharge (N=105)
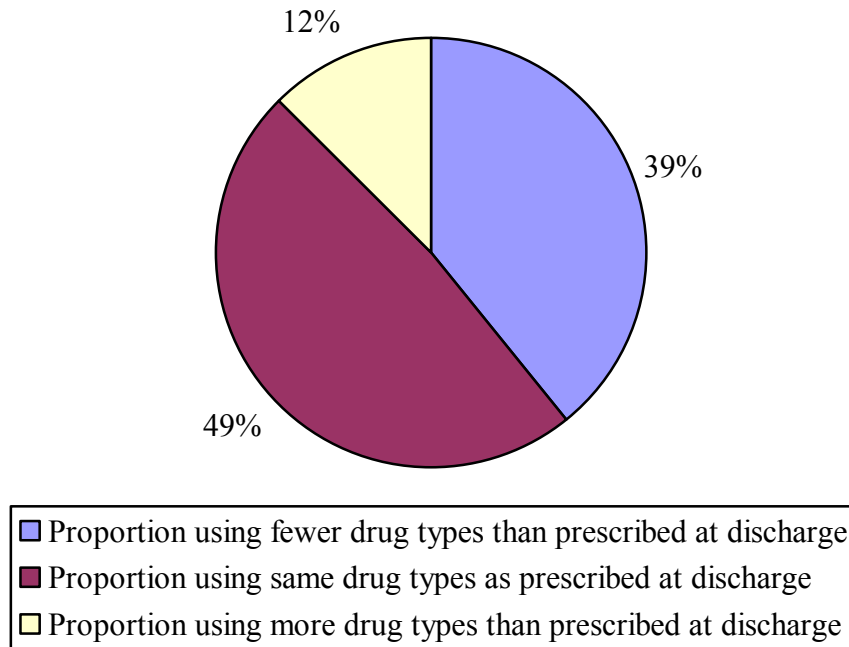
Figure 2 shows that at one month follow-up, only 49% of patients discharged were using the same number of drug types prescribed to them.

Table 6: Factors associated with mortality during follow-up in patients admitted with clinical diagnosis of heart failure in MNH (N=111)

Factors		Patients died, n (%) Yes	No	Total (%)	P-value
NYHA class on admission	I / II	0 (0.0)	12 (100.0)	12 (100.0)	
	III / IV	6 (6.1)	93 (93.9)	99 (100.0)	1.000
Hypertension	Yes	2 (8.3)	22 (91.7)	24 (100.0)	
	No	4 (4.6)	83 (95.4)	87 (100.0)	0.608
Diabetes mellitus	Yes	1 (16.7)	5 (83.3)	6 (100.0)	
	No	5 (4.8)	100 (95.2)	105 (100.0)	0.289
Drug availability	Yes	4 (7.4)	50 (92.6)	54 (100.0)	
	No	2 (3.5)	55 (96.5)	57 (100.0)	0.430
QOL score at discharge	Poor to moderate	5 (5.9)	80 (94.1)	85 (100.0)	
	Good to excellent	1 (3.8)	25 (96.2)	26 (100.0)	1.000
WBC count ($\times 10^9$/L)	> 11	3 (20.0)	12 (80.0)	15 (100.0)	
	$\leq$ 11	3 (3.1)	93 (96.9)	96 (100.0)	0.032
Haemoglobin (g/dl)	Males < 13	3 (7.5)	37 (92.5)	40 (100.0)	
	$\geq$ 13	0 (0.0)	11 (100.0)	11 (100.0)	1.000
	Females < 12	3 (7.0)	40 (93.0)	43 (100.0)	
	$\geq$ 12	0 (0.0)	17 (100.0)	17 (100.0)	0.551
Estimated GFR (ml/min)	< 60	0 (0.0)	47 (100.0)	47 (100.0)	
	$\geq$ 60	2 (3.3)	58 (96.7)	60 (100.0)	0.503
Atrial fibrillation	Yes	1 (6.7)	14 (93.3)	15 (100.0)	
	No	3 (3.2)	91 (96.8)	94 (100.0)	0.452

Table 6 shows raised WBC count was significant predictor of in-patient mortality (p<0.05). And, mortality was more in patients with poor NYHA class (class III/IV), hypertension, diabetes mellitus, poor to moderate QOL score at discharge, anemia, and atrial fibrillation. But, these were not statistically significant associations (p>0.05).

Table 7: Stratified analysis of significant factors associated with QOL score at one month (N=111)

Factors	Homogeneity	RD (95% CI)
NYHA class on admission	Yes	0.305 (0.05,0.57)
QOL score at discharge	Yes	0.167 (-0.021,0.356)

Table 7 shows that adjusting for QOL score at discharge gives about 30% greater chance of having good to excellent QOL score on follow-up if NYHA class on admission was I / II compared to III / IV. This was a statistically significant difference. NYHA class on admission was better predictor, than QOL score at discharge, of QOL score at one month.

4. DISCUSSION

This study was conducted in a tertiary hospital on patients admitted with a clinical diagnosis of heart failure. It was found that most patients admitted due to heart failure presented late with poor NYHA class III / IV. This result was similar to findings from other previous studies.[9,28,30-33] This could potentially be explained by the late referrals and by poor drug use at out-patient.[2,74]

Previous studies by Spencer S et al and others had shown greater proportion of patients were above 50 years old.[5,8,51] In this study, 41.1% were above this age cut off. Possible explanation could be that young patients accounted for a large proportion of sample size in this study.

Studies have shown that heart failure actually causes prolonged duration of stay in hospital.[9,17,18,27] This was supported by this study where 32.1% of patients had duration of stay in ward of above seven days.

Also, study had shown that patients in poor NYHA class III/IV had prolonged length of hospital stay[28]. This was supported by this study where greater proportion of patients admitted had poor NYHA class. Nearly half the patients had no drug availability and poor drug affordability that may also explain the increased duration of ward stay.[25]

Telephone interviews were used even to trace deaths and validated by previous studies on patients with heart failure.[73,75] In this study, follow-up at one month often coincided with the patients regular medical out-patient clinic visit that actually improved study follow-up.

On analysis, patients who were lost versus those followed up showed no difference in terms of baseline characteristics. Therefore, no biased follow up in this study. The reasons for loss of patients during follow-up included; patients not returning for interview and not traceable even by telephone if available and, patients from outside Dar es salaam who did not come for follow up.

Patients with poor NYHA classification on admission, poor to moderate QOL score at discharge, anemia and reduced ejection fraction made up large proportion of those not followed up. This was probably due to poor clinical and functional states of patients.

It was seen from previous study that poor outcomes of patients with heart failure were associated with poor NYHA class on admission, though patients were followed up for different periods.[35] In this study, poor NYHA class at one month follow-up was more common in patients with: poor NYHA class on admission, hypertension, diabetes mellitus, no drug availability, poor drug affordability, raised WBC count, renal insufficiency, atrial fibrillation and reduced ejection fraction. However, these findings were not statistically significant as known from previous studies.[43,64] These findings possibly have been affected by different durations of follow-up from previous studies, and by the loss to follow-up. Increasing the study sample size, that is, the study power, may have shown other significant associations.

Patients for whom prescribed medications were available, only 88% actually received medications according to schedule in wards. This can possibly be explained by poor hospital related factors including probably increased patients/nurse ratio as stipulated in previous study.[71]

Main reasons for poor drug affordability were; patients had no money at all, drugs were expensive, or combination of both as supported by previous studies.[65,67,68] Poor drug affordability contributes towards no drug availability.This can further be explained by the finding that majority of our local patients had actually poor to moderate quality of life score both at discharge and at one month follow-up.

Large proportion of patients with heart failure had poor knowledge of prescribed medications as supported by previous studies.[32,74]

Duration off drug treatment on follow-up was significantly associated with poor quality of life scores at one month and, is supported in previous studies.[41,68-70] Therefore, poor clinical outcomes can also be explained by poor drug adherence.

Studies have reported significant lower QOL score at follow-up[38,39], and this was supported by findings from this study that a large proportion of patients had poor to moderate QOL score at discharge as well as at one month follow-up.

Both, the poor NYHA class on admission and poor to moderate QOL score at discharge, were significantly associated with poor to moderate QOL score at one month follow-up. This was a similar finding as supported by Merryn Gott et al.[41]

Poor to moderate QOL score at one month was more common in those patients with hypertension, diabetes mellitus, no drug availability, anemia in females, renal insufficiency, atrial fibrillation and reduced ejection fraction. Though, this was not statistically significant as previously found.[41,43] This may be probably explained by the small study power.

Mortality proportion in this study was lower than that found in previous study at MNH in 2002 that showed mortality of 17.5%.[16]

Possible explanation for this could be that few patients died during this study period and, there was loss to follow-up probably due to patient dying in outpatient.

It was found that mortality was higher in patients with poor NYHA classification on admission compared to those with a better NYHA class.[36,44] This was also a consistent finding from this study whereby all patients who died were in NYHA class III / IV on admission.

Studies have shown several baseline characteristics contributing to poor outcomes, including mortality, in patients with clinical diagnosis of heart failure.[27,44,52,64] However in this study, there was lack of association. Other associated factors may probably be found if study power is increased.

Infection is a precipitating factor of heart failure. In this study, it was found that there is significant association between raised WBC count and mortality. These patients could be having infection. Though other laboratory work-up like c-reactive protein, erythrocyte sedimentation rate and blood cultures are important in identifying presence of infection.

5. CONCLUSION

1) There is poor outcome, both at discharge and at one month, for patients admitted with heart failure at MNH.
2) 32.1% of patients admitted with heart failure stay longer than 7 days.
3) Patients in NYHA class III/IV had poor to moderate QOL score at one month.
4) 5.4% of patients admitted with heart failure died by one month.
5) Patients with poor to moderate QOL score at discharge had poor to moderate QOL score at one month.

6. STUDY LIMITATION

This was a hospital based study at a single site so the results may not be generalized to the community; however they could potentially be generalized for secondary and tertiary level hospitals.

Only patients with heart failure diagnosed by admitting doctor were screened using Framingham's criteria, while those not diagnosed by admitting doctor may have been missed.

ECHO done in past two months may not represent the true clinical state of the patient.

Patients' body weights were only measured on admission.

There were no external controls for this study.

7. RECOMMENDATIONS

1) Patient education on drug use, their benefits, and side effects to improve QOL of patients.

2) Emphasis on patients follow-up to improve outcomes and drug availability in hospital.

3) It is recommended that MNH sets appropriate management guidelines for admitted patients.

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APPENDICES

APPENDIX I

A. Study Questionnaire

1. Questionnaire No. : …………………..

2. Date of admission: ……………………..

Demographic Information

3. Name of patient: …………………………………………….

4. Age: ……… (Years)

5. Sex (Circle)

   a. Male

   b. Female

6. Address: ……………………….

7. Telephone number: ………………..

8. Telephone No. of relative or next of kin: ………………………..

Baseline information

9. History of hypertension (Circle)

   a. Yes

   b. No

   c. Don`t know

10. History of Diabetes Mellitus (Circle)

   a. Yes

   b. No

   c. Don`t know

11. Other medical problems (Circle)

   a. IHD

   b. Thyroid problem

   c. Others: ………………, …………………., ………………..,
      …………………..

12. Were you previously admitted with similar condition? (Circle)

   a. Yes

   b. No

   If yes; when was last admission?

a. Within last 1 month

b. 1 to 6 months

c. Greater than 6 months

13. NYHA classification on admission (Circle)

a. I

b. II

c. III

d. IV

14. Symptoms/ signs of Heart Failure on admission (Circle):

a) Cough

b) DIB on exertion

c) Paroxysmal Nocturnal Dyspnea

d) Tender Hepatomagaly

e) Bilateral ankle edema

f) Raised JVP

g) Gallop Rhythm

h) Other: ……………………………………….

15. List of drugs at admission and dosage (Circle)

a. Furosemide

b. Aldactone

c. Captopril

d. ISMN

e. Digoxin

f. Others: ……………., ………………., ……………….

16. List of drugs during ward stay and dosage (Circle)

a. Furosemide

b. Aldactone

c. Captopril

d. ISMN

e. Digoxin

f. Others: :………………, …………..., …………………

Information as at discharge

17. Discharge main diagnosis: ………………..

18. Other diagnosis: ……………………, …………………, ……………………

19. Does patient know main diagnosis at discharge? (Circle)

      a. Yes

      b. No

20. Are drug(s) available to patient when prescribed in medical ward? (Circle)

      a. Yes

      b. No

    If yes, go to Qn 21

    If No, go to Qn 22 & 23

21. Does the patient get the drug(s) according to dosage schedule? (Circle)

      a. Yes

      b. No   (Go to Qn 23)

22. Why not available? (Circle)

      a) Out of stock

      b) Not given by nurse

      c) Not affordable

      d) Others: …………, ………………., ………………..

23. Can the patient afford to purchase the drugs?

      a. Yes

      b. No

    If yes, go to Qn 25

    If No, go to Qn 24

24. What hinders patient from purchasing drug?

    a. No money

    b. Expensive

    c. Not available in locality

    d. Others: …………, ………….., ……………..

25. Number of drugs prescribed on discharge: …………….

26. Drug and dosage at discharge (from prescription)

a. Furosemide …………………

b. Aldactone ………………….

c. Captopril…………………..

d. ISMN………………………

e. Digoxin……………………..

f. Others: ……………., ……………….., ……………….

27. Duration of hospital stay: ………. (Days)

28. What is quality of life by discharge? (Circle)

The Quality of Life Index (modified version) at discharge

Component	During Last week;	Score
Activity	- able to work(small scale business/ household activities) with no assistance	2
	- working with assistance/ on sick leave	1
	- not working at all	0
Daily Living	- can eat food, wash hands/ take bath, go to toilet/ use toilet, dress/undress; can travel in car/bus with no assistance; no incontinence	2
	- requires assistance for above	1
	- can't do above ; is totally dependant; incontinent	0
Health	- feels well/ full of energy	2
	- lacking energy	1
	- ill/not feeling well at all	0
Support	- good relationship/ support from family member(s)/ friends; good financial support	2
	- poor support; financial insecurity	1
	- no support at all	0
Outlook	- calm, positive, in control of his/her surroundings; interest in community activities	2
	- not full control of above; lack of interest in community activities	1
	- no control at all	0

Total score: …………..

29. NYHA classification at discharge (Circle)

    a. I

    b. II

    c. III

    d. IV

30. Symptoms/ signs of Heart Failure at discharge (Circle)

    a. Cough

    b. DIB on exertion

    c. Paroxysmal Nocturnal Dyspnea

    d. Tender Hepatomagaly

    e. Bilateral ankle edema

    f. Raised JVP

    g. Gallop Rhythm

    h. Other: ……………………………………….

Information at one month

31. How many drug(s) are you using? (Circle)

    a. None

    b. 1 – 2

    c. 3 – 4

    d. > 4

32. Do you know about your disease? (Circle)

    a. Yes

    b. No

33. Do you know about your drug(s) or been told about them? (Circle)

    a. Yes

    b. No

    If yes, go to Qn 34

    If No, go to Qn 35

34. Then can you tell me about your drug(s):

………

……

……

35. Are you taking medications daily?

        a. Yes   (go to Qn 38)

        b. No

    If No, go to Qn 36 and Qn 37

36. Then why? (Circle)

    a. Forgetting

    b. Drug(s) are finished

    c. No one available to give me

    d. Gives me problems (side effects)

    e. Others: …………………………….

37. How long have you been without medications? ……….. Days/ Weeks

38. Do you get problem in getting regular supply of your medications?

    a. No money

    b. Expensive

    c. Not available in locality

    d. Others: ………………………………………

39. What quality of life at one month? (Circle)

The Quality of Life Index (modified version) at one month

Component	During Last week;	Score
Activity	- able to work(small scale business/ household activities) with no assistance	2
	- working with assistance/ on sick leave	1
	- not working at all	0
Daily Living	- can eat food, wash hands/ take bath, go to toilet/ use toilet, dress/undress; can travel in car/bus with no assistance; no incontinence	2
	- requires assistance for above	1
	- can't do above ; is totally dependant; incontinent	0
Health	- feels well/ full of energy	2
	- lacking energy	1
	- ill/not feeling well at all	0
Support	- good relationship/ support from family member(s)/ friends; good financial support	2
	- poor support; financial insecurity	1
	- no support at all	0
Outlook	- calm, positive, in control of his/her surroundings; interest in community activities	2
	- not full control of above; lack of interest in community activities	1
	- no control at all	0

Total score: …………..

40. NYHA classification at one month (Circle)

      a. I

      b. II

      c. III

      d. IV

41. Symptoms of Heart Failure at one month (Circle)

      a. Cough

      b. DIB on exertion

      c. Paroxysmal Nocturnal Dyspnea

      d. Bilateral ankle swelling

      e. Fatigue

      f. Palpitations

      g. Other: ……………………………………….

In the event of death

42. Date of death (No of days post admission/post discharge) ………………………………………………………………….

43. Mode of death (Verbal autopsy)………………………………..

Other information

44. Weight in Kg:

      On admission: ……………

45. Blood pressure in mm Hg:

      On admission: ………………

46. Laboratory findings

   A. Serum creatinine (micromol/l): ……….

   B. Serum urea (mmol/l): ……………..

   C. Hemoglobin (g/dl): ……….

   D. White Blood Cell count ($\times 10^9$/L): …………………

Other investigations

47. ECG main findings; ……

48. ECHO findings;

Main diagnosis: ………………………

Ejection fraction (%): ………………….

APPENDIX II

Swahili Questionnaire

   1. Namba ya dodoso: …………………..

   2. Tarehe ya kulazwa wodini: ……………………..

   3. Jina la mgonjwa: ………………………………………………….

   4. Umri: ……… (Miaka)

   5. Jinsia

       a. Mwanaume

       b. Mwanamke

   6. Anuani unapoishi: ……………………….

   7. Simu: ………………..

   8. Namba ya simu ya ndugu: ………………………..

   9. Historia ya msukumo wa juu wa damu

       a. Ndio

       b. Hapana

       c. Sijui

   10. Historia ya kisukari

       a. Ndio

       b. Hapana

       c. Sijui

   11. Matatizo mengine ya afya

       a. IHD

       b. Goita

       c. Mengineyo: ………………, …………………, ……………..…

   12. Je, ulilazwa kwa tatizo hili?

       a. Ndio

       b. Hapana

    Kama ndio, ilikuwa lini;

       a. Katika mwezi mmoja

       b. Miezi 1 hadi 6

       c. Kabla miezi 6

13. NYHA siku ya kulazwa

        a. I

        b. II

        c. III

        d. IV

14. Dalili ya tatizo la moyo

        a. Kikohozi

        b. Kuhema

        c. Kuhema kwa shida usiku

        d. Ini kuvimba

        e. Miguu kuvimba

        f. Raised JVP

        g. Gallop Rhythm

        h. Other: ………………………………………….

15. Dawa ulizotumia kabla ya kulazwa na kiasi

        g. Furosemide

        h. Aldactone

        i. Captopril

        j. ISMN

        k. Digoxin

        l. Mengineyo: ……………., ………………., ……………….

16. Dawa ulizotumia wodini na kiasi

        m. Furosemide

        n. Aldactone

        o. Captopril

        p. ISMN

        q. Digoxin

        r. Mengineyo: ………………, ………….., …………………

17. Matatizo yaliyopo siku ya ruhusa: ………………..

18. Matatizo mengineyo: ………………, ……………………., ………………..

19. Je, unajua kuhusu matatizo kuu?

      a. Ndio

      b. Hapana

20. Je, ulipata dawa wodini?

      a. Ndio

      b. Hapana

         Kama ndio, nenda swali 21

         Kama hapana, nenda swali 22 & 23

21. Je, unapata dawa inavyotakiwa?

      a. Ndio

      b. Hapana

22. Kama hupati, kwa nini?

      a. Hakuna dawa

      b. Hapewi na muuguzi

      c. Hawezi kununua

      d. Mengineyo: …………, ……………….., ………………..

23. Je, unaweza kununua dawa?

      a. Ndio

      b. Hapana

         Kama ndio, nenda swali 25

         Kama hapana, nenda swali 24

24. Kwa nini huwezi kununua?

      a. Hana pesa

      b. Bei kubwa

      c. Hakuna dawa

      d. Mengineyo: …………, ………….., ……………..

25. Namba ya dawa siku ya ruhusa: ……………

26. Dawa na kiwango siku ya ruhusa (kutoka karatasi ya dawa)

      a. Furosemide …………………

      b. Aldactone …………………

    c. Captopril………………….

    d. ISMN………………………

    e. Digoxin……………………..

    f. Mengineyo: ……………., ………………..., ……………….

27. Namba ya siku za kukaa wodini: ………. (siku)

28. Ubora wa maisha kwa siku ya ruhusa?

Sehemu	Katika wiki iliopita;	Uzito
Kazi	- Nafanya kazi bila kusaidiwa	2
	- Nafanya kazi kwa kusaidiwa	1
	- Sifanyi kazi	0
Maisha kilasiku	- Naweza kula, kuosha mikono, kuoga, kuenda chooni, kuvaa nguo, kusafiri bila kusaidiwa	2
	- Nahitaji kusaidiwa kwa hapo juu	1
	- Siwezi kufanya	0
Afya	- Nzuri	2
	- Kukosa nguvu	1
	- Naumwa/ siji sikii vizuri	0
Msaada	- Vizuri	2
	- Sio nzuri	1
	- Sina msaada	0
Mwelekeo	- Shwari, mzuri wa mazingira	2
	- Kiasi mzuri	1
	- Hakuna	0

Jumla: …………..

29. NYHA siku ya ruhusa

    a. I

    b. II

    c. III

    d. IV

30. Dalili ya tatizo la moyo siku ya ruhusa

   a. Kikohozi

   b. Kuhema

   c. Kuhema kwa shida usiku

   d. Ini kuvimba

   e. Miguu kuvimba

   f. Raised JVP

   g. Gallop Rhythm

   h. Mengineyo: ……………………………………….

31. Idadi ya dawa unazotumia?

   a. Situmii/ zimekwisha

   b. 1 – 2

   c. 3 – 4

   d. > 4

32. Je, unajua matatizo yako?

   a. Ndio

   b. Hapana

33. Je, umeelekezwa kuhusu dawa zako?

   a. Ndio

   b. Hapana

      Kama ndio, nenda swali 34

      Kama hapana, nenda swali 35

34.   Niambie   kuhusu   dawa   zako:

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

35. Je, unatumia dawa kili siku?

   a. Ndio   nenda swali 38

   b. Hapana

      Kama hapana, nenda maswali 36 & 37

36. Kwa nini?

      a. Nina sahau

      b. Dawa zimekwisha

c. Hakuna mtu kunipatia dawa

d. Napata madhara ya dawa

e. Mengineyo: …………………………….

37. Hujatumia dawa tangu lini? ……….. Siku/ Wiki

38. Je, unapata matatizo gani kupata dawa?

    a. Hana pesa

    b. Bei kubwa

    c. Hakuna dawa

    d. Mengineyo: ……………………………………

39. Ubora wa maisha wiki nne baada ya ruhusa?

Sehemu	Katika wiki iliopita;	Uzito
Kazi	- Nafanya kazi bila kusaidiwa	2
	- Nafanya kazi kwa kusaidiwa	1
	- Sifanyi kazi	0
Maisha kilasiku	- Naweza kula, kuosha mikono, kuoga, kuenda chooni, kuvaa nguo, kusafiri bila kusaidiwa	2
	- Nahitaji kusaidiwa kwa hapo juu	1
	- Siwezi kufanya	0
Afya	- Nzuri	2
	- Kukosa nguvu	1
	- Naumwa/ siji sikii vizuri	0
Msaada	- Vizuri	2
	- Sio nzuri	1
	- Sina msaada	0
Mwelekeo	- Shwari, mzuri wa mazingira	2
	- Kiasi mzuri	1
	- hakuna	0

Jumla: …………..

40. NYHA kwa wiki nne

    a. I

      b. II

      c. III

      d. IV

41. Dalili ya tatizo la moyo wiki nne

      a. Kikohozi

      b. Kuhema

      c. Kuhema kwa shida usiku

      d. Miguu kuvimba

      e. Kuchoka

      f. Moyo huenda kwa kasi

      g. Mengineyo: ………………………………………….

42. Tarehe ya kifo (Namba ya siku baada kulazwa/ ruhusa) ……………………………………………………………

43. Chanzo cha kifo …………………………………..

44. Uzito (Kg):

        Siku ya kulazwa: ……………

45. Mzunguko wa damu (mm Hg):

        Siku ya kulazwa: ………………

46. Maabara

  A. Serum creatinine (micromol/l): ……….

  B. Serum urea (mmol/l): ……………..

  C. Hemoglobin (g/dl): ……….

  D. White Blood Cell count ($\times 10^9$/L): …………………

Vipimo vingine

  47.   ECG

………

…………………………………………………………

  48. ECHO

Tatizo la moyo: ………………………….

Kusukuma damu (%): ……………………

APPENDIX III

Consent Form

CONSENT FORM FOR STUDY PARTICIPANTS

TITLE: OUTCOMES AND THEIR ASSOCIATED FACTORS IN PATIENTS ADMITTED WITH CLINICAL DIAGNOSIS OF HEART FAILURE AT MUHIMBILI NATIONAL HOSPITAL

Following greetings, introducing, as I am Dr Mohamed, H. Mehboob, resident in the department of Internal Medicine. I would like to conduct the study above as a necessary requirement for fulfillment of my postgraduate studies

This study requires you to participate so that important information can be obtained regarding your health.

This study aims to determine outcome in patients admitted with clinical diagnosis of heart failure and associated factors at Muhimbili National Hospital and this will help in care of patients with heart failure and hence, reduction in admission rates.

Patients who meet the inclusion criteria will participate in the study and interviewed using a questionnaire that will include their social demographic characteristics, medical history and physical examination.

Some necessary blood tests, ECG and ECHO will be performed. There are no risks associated. Patient's findings won`t be disclosed to anybody except the attending doctors and patient him/herself.

The participant won`t be asked any fee during the study.

Person to contact in case of questions or problems;

Dr J. Lwakatare, Consultant Cardiologist, Department of Internal Medicine

Dr Mohamed, H. Mehboob, Post-graduate student, Department of Internal Medicine

THE CHAIRMAN, SENATE RESEARCH AND PUBLICATIONS COMMITTEE. MUHAS

I, _____have been told of the contents of this research form and understood it; and I do agree to participate in this Research study.

Signature_____ (Participant), Date_____

Signature_____ (Researcher), Date_____

APPENDIX IV

(SWAHILI VERSION)

KARATASI YA IDHINI YA USHIRIKI KATIKA UTAFITI

AINA YA UTAFITI: MATOKEO NA SABABU ZINAZOATHIRI MATOKEO KWENYE WAGONJWA WALIOLAZWA KWA TATIZO LA MOYO HOSPITALI YA TAIFA MUHIMBILI

Salaamu; Mimi naitwa Dr Mohamed, H. Mehboob, mwanafunzi wa stashahada ya pili katika idara ya uchunguzi. Utafiti huu ni sehemu muhimu ya mahitaji yangu ya kutunukiwa stashahada

Lengo la utafiti huu ni kuangalia matokeo na sababu zinazoathiri matokeo kwenye wagonjwa waliolazwa na tatizo la moyo. Hii itasaidia kupanga mipango sahihi ya kuboresha huduma kwa wagonjwa.

Wagonjwa ambao wanafikia vigezo vya ushiriki katika utafiti huu watahojiwa maswali yanayohusisha mambo ya kijamii, hitoria , kisha watapimwa na kufanyiwa vipimo vya maabara pamoja na ECG, ECHO.

Hakuna madhara kutokana na kuchukua vipimo vya maabara au kwa namna yoyote wakati wa ushiriki kwenye utafiti huu.

Taarifa za mgonjwa na majibu ya vipimo hayatatolewa isipokuwa kwa madaktari wanaomtibu mgonjwa na mgonjwa mwenyewe tu

Mgonjwa hatahitajika kuchangia gharama yoyote wakati wa utafiti

WATU WA KUWASILIANA NAO KUKIWA NA TATIZO

Dr J. Lwakatare, Daktari Bingwa wa Matatizo ya moyo, Idara ya magonjwa ya Uchunguzi

Dr Mohamed, H. Mehboob, mwanafunzi wa stashahada ya pili katika idara ya uchunguzi, Idara ya magonjwa ya Uchunguzi

Mkurugenzi wa kamati ya utafiti na matoleo chuoni

Mimi, _____nimesoma/nimeambiwa maelezo yaliyopo katika karatasi hii,nimeyaelewa na ninakubali kushiriki kwenye utafiti

Sahihi_____ (Mshiriki), Tarehe_____

Sahihi_____ (Mtafiti), Tarehe_____