DRUG PRESCRIPTION PATTERN IN THE TREATMENT OF HEART FAILURE PATIENTS ADMITTED AT MUHIMBILI NATIONAL HOSPITAL

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DRUG PRESCRIPTION PATTERN IN THE TREATMENT OF HEART FAILURE PATIENTS ADMITTED AT MUHIMBILI NATIONAL HOSPITAL

By

Saleh Hamisi Mwinchete, MD

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

Muhimbili University of Health and Allied Sciences
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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences adissertation entitled, "**Drug Prescription Pattern in the treatment of Heart Failure Patients Admitted at Muhimbili National Hospital**" in fulfillment of the requirements for the degree of Master of Medicine (Internal Medicine) of Muhimbili University of Health and Allied Sciences.

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Dr. Johnson M. Lwakatare, MB ChB, MRCP

(Supervisor)

_____

Date

DECLARATION AND COPYRIGHT

I, **Saleh Hamisi Mwinchete**, 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** ……..

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DEDICATION

I dedicate this dessertation to my lovely wife, Zuwena and to my children Salha and Sahel as a challenge to them to always work hard and aim high in their lives. Thanks for your prayers.

ABSTRACT

Background

Heart Failure is one of the common causes of hospitalization in Tanzania and Africa at large. In a study by Kisenge et al. on Pattern of cardiovascular diseases among elderly patients admitted at Muhimbili National Hospital, it was found that 37% of elderly patients admitted were due Congestive Heart Failure.

Specific treatment for Heart Failure is crucial for determining outcome in terms of Morbidity and Mortality; however in Tanzania there are no existing evidence-based treatment guidelines to guide clinicians on the management of Heart Failure. Clinicians have adopted guidelines such as the National Institute for health and Clinical Excellence (NICE), American Heart Association (AHA) and European Society of Cardiology (ESC) in the management of patients with Congestive Heart Failure from which the cost and availability of drugs recommended may influence the prescription habits of prescribers.

Additionally there is no data on the drug prescription pattern in the treatment of Congestive Heart Failure. Availability of such information may help in the development of practical guidelines in Heart failure management in our setting.

Broad Objective

To describe the Drug Prescription pattern in the treatment of Heart Failure at Muhimbili National Hospital

Study design and Methodology

This was a Hospital based descriptive study of consecutive patients admitted in the cardiac unit with a diagnosis of Heart Failure in Mwaisela medical wards at Muhimbili National Hospital between May and October 2013. Patients aged 12 years and above with a diagnosis of Congestive Heart Failure were included in the study. A structured questionnaire was used to obtain information from Patients' files as recorded at admission and discharge. The information collected included socio-demographic characteristics and labeled cause/s of Heart Failure. Other information collected was named prescribed drugs inclusive of dose, and frequency of administration of drugs as used in the treatment of Heart Failure.

Results

A total of 150 patients admitted in the cardiac unit at Mwaisela wards with a clinical diagnosis

of Heart failure were included in the study. Of these, 54.7% were males and 42% were aged ≥60 years. Dilated Cardiomyopathy, Rheumatic heart disease and Hypertension constituted 75.6% of all the causes for Heart failure in this study. Only 22% of the study patients were re admitted with the same diagnosis of CHF. About 93% of the studied patients presented in severe form of Heart failure (Newyork Heart Association Class III/IV). This study reveals use of eight **different** pharmacological classes in the treatment of Heart failure at Muhimbili National Hospital. The classes includes Angiotensin converting enzyme inhibitors / Angiotensin receptor blockers (ACE-I/ARB), Beta Blockers(BB), Diuretics(DIUR), Digitalis(DIG), Minerocorticoid receptor antagonists(MRA), Phosphodiesterase type 5 inhibitors(PDE-5) and Vasodilators. Amongst the classes used Diuretics were mostly prescribed being used in 96% of all patients both at admission and discharge. Combination therapy was used in 96% and 98% at admission and at discharge respectively with a two to six combination regimen being in use. At least 3 to 5 drugs were mostly prescribed with 3-4 drugs mainly used at admission increasing to 4-5 drugs at discharge. Patients with severe Heart failure received a large number of drugs. Most combinations contained Enalapril, Aldactone and Isosorbide Mononitrate both at admission and at discharge. Cardiologists and specialist physicians appeared to have similar prescription of Heart failure drugs as recommended by various standard Heart failure treatment guidelines.

Conclusions

1. Majority of patients are admitted with severe Heart failure
2. Readmission rate is relatively low
3. Three to five drug therapy is mostly used by clinicians
4. Prescriptions containing key HF drugs(ACEI/ARB,BB and MRA) is low
5. Prescriptions containing Isosorbide dinitrate/hydrallazine combination was low

Recommendations

1. Establishment of a hospital based HF treatment guideline
2. It is high time to establish a heart failure auditing system at MNH
3. There is a need for senior physicians to review prescriptions at discharge so as to avoid single drug use in severely ill patients

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LIST OF ABBREVIATIONS

ACEI - Angiotensin Converting Enzyme Inhibitors

AF - Atrial Fibrillation

AHA - American Heart Association

ALD - Aldactone

ARBs - Angiotensin Receptor Blockers

BB - Beta Blockers

CAR - Carvedilol

CAP - Captopril

CHF - Congestive Heart Failure

CKD - Chronic Kidney Disease

CRT - Cardiac Resychronisation Therapy

DCM - Dilated Cardiomyopathy

DCM/HTN- Hypertensive Dilated Cardiomyopathy

DIG - Digoxin

DIUR - Diuretics

DM - Diabetes Mellitus

ENA - Enalapril

ESC - European Society of Cardiology

EF - Ejection Fraction

FRU - Frusemide

HF - Heart Failure

HFrEF - Heart failure with reduced Ejection Fraction

HFpEF- Heart Failure with preserved Ejection Fraction

HTN - Hypertension

ICD - Intracardiac Device

IHD - Ischemic Heart Disease

IPD - Inpatient Department

ISMN - Isosorbide Mononitrate

JVP - Jugular Venous Pressure

LOR - Lorsatan

MNH - Muhimbili National Hospital

MRA - Minerocorticoid Receptor Antagonist

MUHAS - Muhimbili University of Health and Allied Sciences

NYHA - New York Heart Association

NICE - National Institute for health and Clinical Excellence

OPD - Out Patient Department

PDE5 - Phosphodiesterase type 5

RHD - Rheumatic Heart Diseases

CHAPTER ONE

1.0.INTRODUCTION AND LITERATURE REVIEW

Congestive Heart Failure(CHF) is a complex syndrome that can arise from any structural or functional cardiac abnormality that impairs the ability of the Heart to function as a pump to meet the normal body physiological demands [1]. CHF is usually progressive and remains a major public health problem in developed world and in developing nations including Tanzania.

Globally CHF accounts for 4.5% up to 6% of all hospital admissions [2].The prevalence of heart failure was 15 per 1000, and high in those aged 65 and above [3].In a study in Rotterdam by Mosterd et al, where the presence of heart failure was determined by assessment of symptoms and signs (shortness of breath, ankle edema and pulmonary crepitations), the overall prevalence of heart failure was 3.9% [4].

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.[5]

In Africa, the age-related increase in prevalence of CHF tends to occur at around the 5th and 6th decade. Similarly, a study from Tanzania showed the peak prevalence of CHF occurred in the age 50 to 59 years, with only 3% in age group 70 to 79 years. [5]The difference is explained by major contribution of rheumatic valvular disease and severity of hypertension among blacks at relatively young ages. Studies have uniformly projected a male predominance among those with heart failure in Africa with patients' mean age being 73 years old. [6]In one study done **by** Mwandolela in Dar es salaam, the mean age for patients with heart failure was 42±20.73 [7].

Prescribers adherence to guidelines on the treatment of patients with CHF

Todate there is no Tanzanian or even an African evidence-based guideline on the management of HF. The prescribers in this region are presumed to follow the European/American guidelines in the management of HF. There is concrete evidence from land-mark trials of

disease-modulating and survival-promoting pharmacological treatment using ACEI [8, 9], ARB [10], BB [11] MRA [12], and hydralazine/isosorbide-dinitrate combinations [13]. Although majority of the studies performed in heart failure patients pertain mostly to Caucasian patients and patients in developed regions, there is no reason to believe that the results are not applicable to Africans and other human beings in general.[8,9,13] Physician-adherence to these guidelines is one way to enhance the dismal outcome in CHF [14-20]. There is no doubt that adherence to treatment guidelines influences CHF outcome positively [19, 20]. However, the adherence of some or all trial findings may be slow or incomplete [16-18]. In one study done in Nigeria on physician adherence to the key CHF drugs; an overall adherence of 59.6%was found compared to that reffered as a global adherence indicator of 60% in Europe [20,21]. Studies shows Mortality rates with key medical treatment (ACE Inhibitors/ ARBs, Beta Blockers, ARAs) are substantially lower than without such therapy.

Several factors have been implicated on the failure of the prescribers to adhere to these guidelines. This includes cost, availability of drugs, pressure from relatives/patients and the influence from drug company representatives[22].Sub-optimal knowledge among prescribers has been identified as a cause of poor adherence to evidence-based pharmacotherapy [16, 17, 23].

Prescription pattern of drugs used in the treatment of patients with clinical diagnosis of CHF

The National Heart Failure Audit (NHFA) in Europe showed Treatment rates of important pharmacological agents in the treatment of Heart failure as follows; diuretics (86%), Angiotensin- Converting Enzyme (ACE) inhibitors/Angiotensin receptor blockers (ARB) (81%) and Beta blocker prescription (65%)[1].

Only 36% of patients were prescribed Minerocorticoid receptor antagonists (MRA) [1].

In another study done in Nepal on prescription pattern of drugs, Diuretics accounted for 32.14%, ACE-I was 15.56%,Cardiac glycosides (CG) was 19.38% and Beta blockers was about 20%.[24]

In the African setting from a study done in Nigeria, the five anti-CHF drug classes were prescribed as follows: ACEI/ARB, Beta blockers, Aldosterone Antagonists (AA), diuretics, and CG were prescribed in 83%, 48%, 41%, 75%, and 82% respectively[21].

However Mortality rates remain high (33%) with key medical drugs according to NHFA.

In Africa hospital case fatality rate among those with HF ranges from 9 to 12.5% [25].

In a study done at MNH 5.4% of patients died at 1month after diagnosis of HF was made [26].

1.1.1 Clinical Diagnosis of Heart Failure

Heart failure is clinically diagnosed by using Framingham criteria which provides an acceptable clinical diagnosis tool [27]. In diagnosis of heart failure using the Framingham criteria, it requires that either two major criteria or one major and two minor criteria 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 dyspnoea, neck vein distention, rales, radiographic cardiomegaly, acute pulmonary edema, s3 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).

The validity and clinical usefulness of the Framingham clinical criteria for the diagnosis of systolic heart failure have been studied, 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 edemas (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) [27].

The Framingham clinical criteria have excellent sensitivity but poor specificity [27]. The Framingham clinical criterion has a sensitivity of about 92% and moderate specificity of around 80%. The presence of the Framingham clinical criteria rules-in the diagnosis of heart failure though does not necessarily confirm the diagnosis, which may usually be confirmed by echocardiography.

Patients with heart failure are classified, based on the relationship between symptoms and the level of exertion needed to provoke them, by using the NYHA classification. The classes are as follows;

Class I: No limitations. Ordinary physical activity does not cause undue fatigue, dyspnea, or palpitations.

Class II: Slight limitation of physical activity. Such patients are comfortable at rest. Ordinary physical activity results in fatigue, palpitations, dyspnea, or angina.

Class III: Marked limitation of physical activity. Although patients are comfortable at rest, less-than-ordinary activity leads to fatigue, dyspnea, palpitations, or angina.

Class IV: Symptomatic at rest. Symptoms of CHF are present at rest; discomfort increases with any physical activity.

1.1.2 Causes of Heart failure in Africa and Tanzania

The most important causes responsible for heart failure include hypertension, valve disease, cor pulmonale, Cardiomyopathy, pericardial diseases, coronary heart disease, and metabolic problems (etiology unknown in 17% of cases)[5,28]

In a one study by Mayosi etal. it was found that heart failure seems to occur as a major complication of high blood pressure in Africa [29]. Lessons from the changing epidemiology of heart failure in developed countries suggest that the burden of this disease will dramatically increase over this century. [29]

In a study by Makene et al. in 1972 done 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%).[5]

Other studies done later showed that heart failure is mainly due to Cardiomyopathy (59.8%) followed by hypertensive heart disease (38.1%), rheumatic heart disease (29.9%) and non-compliance (18.6%) [25, 30].

1.1.3 Socio-Economic Factors in Heart Failure

Heart Failure accounts for approximately 1% of health budget in the developed countries. Such data are unavailable in Africa but it is estimated to be the same as for other parts of the world [31, 32].

The use of drugs, laboratory and imaging evaluation altogether impose a high burden of cost to the patients. Heart failure treatment requires multiple drugs for long periods in order to improve morbidity and mortality outcomes. These costs related to chronic heart failure represent one of the most important problems of public health care in low income countries.

Heart failure treatment is costly, resulting in significant economic burden for some patients. McMurray et al. 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, [33].

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 have 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, [34]. Patients, reporting difficulty affording their medical care, had lower perceived health status than those reporting little or no economic burden [35].

The availability of community-based social support may help to reduce early readmission if patients with medical and social co-morbidity were discharged early [6].

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 [36].

Heart failure treatment in Tanzania equally faces above mentioned social economic limitations. The majorities of patients have limited access to public health services and have to meet the treatment related costs out of their pockets.

1.1.4 Algorithm for the Treatment of Heart Failure

The goals of treatment in patients with established CHF is to relieve symptoms and signs, reduce hospital admissions and improve survival. CHF can often be successfully treated from medical therapies to surgical intervention and heart transplantation [24].

The medical management in clinical practice varies considerably within the medical specialty. Treatment usually requires a program of rest, proper diet, lifestyle modification and one or more of the prescription drugs including ACE-Inhibitors, Beta-blockers, Digitalis, Diuretics and Vasodilators [24].

To date diuretics and Angiotensin converting enzyme (ACE) inhibitors, when combined with non-pharmacological measures, remain the basis of treatment in patients with congestive heart failure [37].

Digoxin has a possible role in some of these patients, with the benefits of B-blockers and Spironolactone (an aldosterone antagonist) in chronic heart failure now being increasingly recognized.

Treatment guidelines have been developed by professional bodies in line with clinical experience and published research findings. Both the ESC and AHA recommends adding ACEI and BB in potentially all patients with stable CHF on top of Diuretics which is given to all patients to relieve symptoms/signs of congestion. MRA can then be added if the patient remains in NYHA II-IV. Following the results of the SHIFT study Ivabradine has been recommended in patients with CHF in sinus rhythm with heart rate >70bpm and an EF<35% [38].

For all patients who remain in NHYA II-IV after the above pharmacological interventions the ESC recommends invasive treatments such as Cardiac Resynchronisation Therapy (CRT) and Intra-Cardiac Device (ICD). However Digoxin can be added early in the treatment program for patients in AF while a combination of Hydralazine and ISDN is recommended to patients

who cannot tolerate ACEI/ARBS. H-ISDN combination is also recommended to patient of Africa-American origin based on their mortality and morbidity benefits in this population [13, 39].

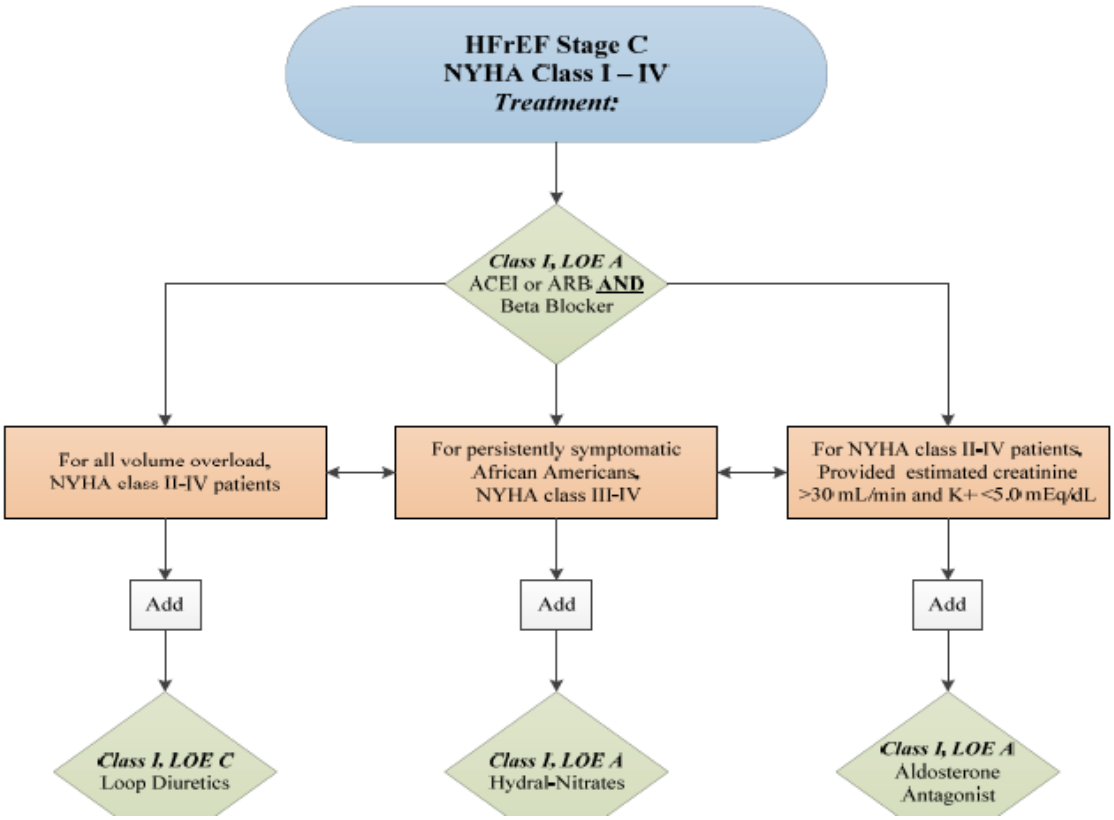

Figure 1: Pharmacologic Treatment for stage C HFrEF

***LOE: Level of evidence**

1.2. PROBLEM STATEMENT

CHF is a common reason for hospitalization in Tanzania. Congestive heart failure was a second common condition affecting 37% of elderly patients admitted at MNH between 2008-2009[40]. Specific drug treatment for Heart Failure is crucial as this relates to determining Morbidity and Mortality outcomes**.** In Tanzania as for the rest of the developing world, high cost and availability of HF drugs have a strong influence on how doctors prescribe. Yet in Tanzania there are no existing evidence-based treatment guidelines to guide clinicians on the management of CHF.

The majority of physicians are adopting guidelines developed by ESC, AHA, and NICE which have been prepared for use in the setting of the developed world. In the third world countries including Tanzania, majority of patients meet their own cost of drugs or are assisted by relatives.

Currently Tanzania has no national drug treatment guidelines for heart failure.

1.3. RATIONALE

There is no data on prescription patterns of drugs used in the treatment of CHF in Tanzania. This study therefore sought to determine the drug prescription patterns in the treatment of CHF at MNH.

The availability of this information may help in the development of practical guidelines in CHF treatment.

1.4.OBJECTIVES

1.4.1 Broad Objective

To describe Drug Prescription patterns in the treatment of CHF at Muhimbili National Hospital.

1.4.2. Specific Objectives

- To describe the socio-demographic and clinical characteristics of patients admitted with clinical diagnosis of CHF at Muhimbili National Hospital.

- To determine the pattern of drugs prescribed to treat patients with a clinical diagnosis of CHF at admission at Muhimbili National Hospital .

- To determine the pattern of drugs prescribed to treat patients admitted with a clinical diagnosis of CHF at discharge at Muhimbili National Hospital.

- To determine the prescription pattern of drugs used to treat patients admitted with a clinical diagnosis of CHF by clinicians at Muhimbili National Hospital.

CHAPTER TWO

2.0 METHODOLOGY

2.1. Study Design

This was a Hospital Based Descriptive Study of patients diagnosed with CHF admitted to MNH medical wards from May to2013 to October 2013.

2.2. Study Setting

The study was carried out at the Muhimbili National Hospital, in Dar-Es-salaam, Tanzania
The cardiac unit in the medical ward admits patients with CHF aged ≥12 years**.** Children younger than 12 years with CHF are admitted in the pediatric wards.

On average 25-30 patients with CHF are admitted monthly in the cardiac unit which is within the general Mwaisela medical wards. The number of patients with CHF was expected to increase after opening of the new cardiac center. All of the patients admitted are initially managed by an Intern Doctor, reviewed by Residents or registrars on call; and are later on reviewed by a Specialist Physician or cardiologists.

2.3. Target Population

All patients admitted in the cardiac unit in Mwaisela wards with a clinical diagnosis of CHF at Muhimbili National Hospital, Dar-Es-salaam, Tanzania.

2.4. Study Duration

Six months from May, 2013 to October, 2013.

2.5. Sample Size Estimation

The anticipated number of patients for this study was 150 patients based on the average number of patients admitted at MNH with a diagnosis of CHF being 25-30 per month.

2.6. Inclusion Criteria

All patients admitted in the cardiac unit with the diagnosis of CHF

- Aged 12 years and older.

2.7. Sampling Technique

All consecutive patients admitted with a clinical diagnosis of CHF admitted in the cardiac unit within Mwaisela wards.

2.8. Data Collection Procedures

A structured pre-tested questionnaire was used to collect information from each patient's file. The information was collected as recorded at admission and later at discharge/death. The principal investigator reviewed all the patients' files to identify admitted patients with a clinical diagnosis of heart failure. These were then subjected to the pre-tested questionnaire and data collected included; socio-demographic data, symptoms, physical findings and the documented cause of CHF.

Other information collected included prescribed drugs (drug name, dose, class and frequency of drugs prescribed) and Prescriber's title. Decisions on management by Specialists/Cardiologist are given during the daily post admission ward round or during major joint ward rounds which are done at least twice in a week.

In the event basic information for the study was missing in the file, Patients / relatives / caretakers were questioned in order to obtain all necessary information for the study.

Definition of terms:

1. Drug Prescription pattern: The way HF drugs were used in terms of Class, individual drugs used, number of drugs, combination of drugs and dose of drugs used in the treatment of CHF as issued by clinicians at admission and at discharge.
2. HFrEF: Heart failure in which EF was <45% by ECHO.
3. HFpEF: Heart failure in which EF was >45% by ECHO.

4. Key HF drugs: Class of drugs recommended for all HF patients unless contraindicated (ACEI/ARB, BB and MRA).
5. Stage C HF: structural heart disease with prior or current symptoms of HF.
6. Comorbidity: conditions that may worsen the HF symptoms.
7. Peasants: Unemployed people involved in farming activities for their food needs.

2.9. Data Entry

All filled questionnaires were coded before entering into the computer using SPSS data Software version 20.0. Data cleaning was done by using consistence checks, and again SPSS (Statistical Package for Social Sciences) version 20.0 statistical software was used for data analysis.

2.10. Data Analysis

To address Objective 1; Descriptive statistics was used to summarize the characteristics of subjects.

Continuous variables were summarized into mean, median and ranges. Categorical data into frequencies and percentages.

To address Objectives 2 to 4; this was summarized as proportions, frequencies and percentages.

2.11 Ethical consideration

Ethical clearance to conduct the study was sought from Muhimbili University and Allied Sciences Ethical Review Board.

Permission to conduct the study was obtained from the Hospital management

Informed consent/assent to use information of patients in the study was sought from patients/care takers of patients who met criteria.

For ethical reasons:

Prescriptions that were obviously inadequate at any time of data collection were communicated and discussed with the specialist in charge of the ward.

CHAPTER THREE

3.0. RESULTS

During the study period May 2013 to October 2013, One hundred and seventy two (172) patients were recruited into the study. Twenty two (22) subjects were excluded because of incomplete data. The socio-demographic characteristics are shown in table 1. The data also includes 7 patients who died during the study period with most of death ocurring during the first 24 hours of admission.

Table 1: Socio-demographic characteristics of patients admitted with clinical diagnosis of CHF at MNH (N=150).

Variable	No. of Patients	Percentage
Sex:		
Male	82	54.7
Female	68	45.3
Age group:		
12-29	33	22.0
30-45	29	19.3
46-60	27	18.0
>60	61	40.7
Occupation:		
Peasant	71	47.3
Student	30	20.0
Business	25	16.7
Civil servant	10	6.7
Other	14	9.3
Total		

As shown in table 1, males were 54.7% (82/150). Majority of study patients were ≥60 years old 40.7% (61/150) while those ≤30 years were 22% (33/150). Most of the study patients were peasant farmers 47.3% (71/150). Other occupations recorded were; students, business personnel**,** and civil servants each contributing 20%, 16.7% and 6.7% respectively.

Table 2: Base line clinical characteristics of patients admitted with clinical diagnosis of CHF at MNH (N=150)

Variable	No. of patients	Percentage
Etiology: (n=150)		
DCM*	73	48.7
RHD	23	15.3
HTN	25	16.7
DCM-HTN	15	10.0
PHTN	6	4.0
Other	8	5.3
Co-morbidities		
CKD	11	20.3
Infections**	8	14.8
DM	7	12.9
Others	28	52.0
NYHA (n=150)		
I/II	10	6.7
III/IV	140	93.3
Previous admission (n=150)		
Yes	33	22.0
No	117	78.0

* Idiopathic DCM** Infections mostly encountered were HIV, Malaria, Pneumonia, PTB

Table 2 shows Clinical characteristics of patients indicating the commonly recorded underlying causes of CHF. Dilated cardiomyopathy (DCM) was the most commonly recorded underlying cause of CHF contributing 48.7% (73/150). Other underlying causes recorded included; rheumatic heart disease, hypertension contributing 15% and 16.7% respectively. Majority of the study patients (93.3%) presented with severe form of HF (NYHA class III/IV). Chronic kidney disease was the most common co-morbid condition contributing 20.3%, while an infection was present in 14.8% of the study patients.Table 2 also indicate majority of patients (78%) were admitted for the first time with a clinical diagnosis of CHF.

Table 3: Class and Individual drugs used to treat patients at admission with a clinical diagnosis of CHF at MNH (N=150)

Variable	No. Patients	Range of dose used	Most used dose
ACEI			
Enalapril	72	2.5-20	5(1)*
Captopril	7	6.25-12.5	12.5(2)
ARB			
Lorsatan	13	25-50	50(1)
Beta blockers			
Carvedilol	30	3.125-12.5	3.125(2)
Atenolol	3	25-50	50(1)
Diuretics			
Frusemide	144	20-120	80(2)
MRA			
Aldactone	116	25-100	25(1)
Vasodilators			
ISMN	95	5-20	10(3)
Hydrallazine	8	12.5-50	50(2)
PDE5 inhibitor			
Sildenafil	2	25-50	25(1)
Digitalis			
Digoxin	30	0.125-0.25	0.25(1)
Ionotropes			
Dopamine	7	200mg(5-10 drops/min)	Continuous infusions

*Numbers in blackets refers to the dose-frequency at which the drug was prescribed to the patient

Table 3 shows that Amongst the HF patients, 9 anti-CHF drug classes were prescribed in different proportions at admission. Patients' records show that the following drug classes were prescribed as follows: Diuretics: Frusemide (96.0%); ACE-I: Enalapril (48%); B-blocker: Carvedilol (20%); Vasodilators: ISMN (63.3%). MRA: Aldactone (77.3%), Digoxin (20%) and Among ARB only Losartan (8.7%) was used.

Diuretics were prescribed in almost all patients with HF with BB being least prescribed. Ionotropic support was only needed in 7 patients with HF. Other classes were prescribed in the following proportions ACEI/ARBs (61.3%), Vasodilators (68.7%), Digoxin (20%), and MRA (77.3%).

Dose of Frusemide ranged 20-120mg, most prescribed dose being 80mg twice a day, Dose of Aldactone ranged 25-100mg, most prescribed was 25mg once a day, Carvedilol dose ranged 3.125-25mg, most prescribed dose was 3.125mg twice a day, Enalapril dose ranged from 2.5-20mg, Most prescribed dose was 5mg once a day, ISMN was prescribed at dose range 5-20mg, the most frequent dose was 10mg given three times, while Digoxin dose ranged 0.125-0.25mg and the most prescribed dose was 0.25mg given once a day.

Table 4: Combination of drugs used to treat patients at admission with a clinical diagnosis of CHF at MNH (N=150)

Variable	No. of patients	Percentage
One drug		
FRU	4	2.7
ALD	2	1.3
Two drugs		
ALD+FRU	6	37.5
FRU+ISMN	5	31.2
FRU+CAP	3	18.8
FRU+HYD	2	12.5
Three Drugs		
FRU+ALD+ISMN	21	40.4
FRU+ALD+ENA	16	30.8
FRU +ALD+DIG	9	17.3
FRU+ALD+CAR	6	11.5
Four Drugs		
FRU+ALD+ENA+ISMN	37	63.8
FRU+ALD+ISMN+DIG	6	10.3
FRU+ALD+ENA+DIG	6	10.3
FRU+ALD+CAR+ISMN	9	15.6
Five Drugs		
FRU+ALD+CAR+ENA+ISMN	7	50.0
FRU+ALD+ENA+ISMN+DIG	3	21.4
FRU+ALD+CAR+ISMN+LOR	2	14.3
FRU+ALD+ISMN+DIG+LOR	2	14.3
Six Drugs		
FRU+ALD+CAR+ENA+ISMN+DIG	3	75.0
FRU+ALD+CAR+CAP+ISMN+DIG	1	25.0

Table 4 shows drug combinations of anti-CHF classes. Six individual patient's record showed a prescription of one single HF drug , thus 96% of patients received anti-HF drug prescriptions as combinations. Over three quatre of the patients (76.3%) received different combinations containing 3-4 drugs at admission. Frusemide and Aldactone were used in almost all the combinations prescribed.

Table 5: Class and Individual drugs used to treat patients at discharge with clinical diagnosis of CHF at MNH (N=150)

Variable	No. of patients	Range of dose used	Most used dose
ACEI			
Enalapril	90	2.5-10	5(1)*
Captopril	2	6.25-25	6.25(1)
ARB			
Lorsatan	18	25-50	50(1)
BB			
Carvedilol	68	3.125-25	3.125(2)
Atenolol	5	25-50	50(1)
Diuretics			
Frusemide	144	30-80	40(2)
MRA			
Aldactone	133	25-100	25(1)
Vasodilators			
ISMN	111	5-20	10(3)
Hydrallazine	11	12.5-50	50(3)
PDE5 Inhibitor			
Sildenafil	4	12.5-25	25(1)
Digitalis			
Digoxin	30	0.125-0.25	0.25(1)

* Numbers in blackets refers to the dose-frequency at which the drug was prescribed to the patient

Table 5 shows that Amongst the HF patients, 8 anti-CHF drug classes were prescribed in different proportions at discharge. Patients' records show that the following drug classes were prescribed as follows: Diuretics: Frusemide (96.0%); ACE-I: Enalapril (60.0%); B-blocker: Carvedilol (45.3%); Vasodilators: ISMN (81.3%). MRA: Aldactone (88.6%), Digoxin (20%) and Among ARB only Losartan (13.3%) was used.

Diuretics were prescribed in almost all patients with HF with BB prescription increasing to 48% at discharge. Other classes were prescribed in the following proportions ACEI/ARBs (73.3%), Vasodilators (81.3%), Digoxin (20%), and MRA (88.6%).

Dose of Frusemide ranged 20-120mg, most prescribed dose being 40mg twice a day, Dose of Aldactone ranged 25-100mg, most prescribed was 25mg once a day, Carvedilol dose ranged 3.125-25mg, most prescribed dose was 3.125mg twice a day, Enalapril dose ranged from 2.5-20mg, Most prescribed dose was 5mg once a day, ISMN was prescribed at dose range 5-20mg, the most frequent dose was 10mg given three times, while Digoxin dose ranged 0.125-0.25mg and the most prescribed dose was 0.25mg given once a day.

Table 6: Combination of drugs used to treat patients at discharge with clinical diagnosis of CHF at MNH (N=150)

Variable	No. of patients	Percentage
One drug		
FRU	2	1.3
Two Drugs		
ALD+FRU	3	42.8
FRU+ISMN	2	28.6
FRU+CAP	2	28.6
Three Drugs		
FRU+ALD+ISMN	6	20.0
FRU+ALD+ENA	11	36.7
FRU +CAR+ISMN	9	30.0
+ENA+ISMN	4	13.3
Four Drugs		
FRU+ALD+ENA+ISMN	20	37.8
FRU+ALD+CAR+ISMN	9	17.0
FRU+ALD+ISMN+DIG	7	13.2
FRU+ALD+CAR+ENA	6	11.3
FRU+ALD+ISMN+LOR	6	11.3
FRU+ALD+ENA+DIG	5	9.4
Five Drugs		
FRU+ALD+CAR+ENA+ISMN	32	64.0
FRU+ALD+ENA+ISMN+DIG	8	16.0
FRU+ALD+CAR+ISMN+LOR	6	12.0
FRU+ALD+CAR+ISMN+HYD	4	8.0
Six Drugs		
FRU+ALD+CAR+ENA+ISMN+DIG	5	62.5
FRU+ALD+CAR+ENA+ISO+HYD	2	25.0
FRU+ALD+CAR+ISMN+DIG+LOR	1	12.5

Table 6 shows drug combinations used in the treatment of CHF at discharge . Two individual patient's record showed a prescription of only frusemide being used in these patients at discharge, thus 98.7% of patients received anti-HF drug prescriptions as combinations. majority of patients received 4 drug combination at time of discharge 35.3% (53/150), those who recieved a 5 drug combination were 33% (50/150) while 5.3% (8/150) received a 6 drug combination at discharge. Of the study patients, the commonest drug combination prescribed for 32 study patients at discharge consisted of a 5 drug combination; furosemide, aldactone, carvedilol, enalapril and ISMN. More than two third of the patients (69.6%) received different combinations containing 4-5 drugs at discharge. Frusemide and Aldactone were used in almost all the combinations prescribed at discharge.

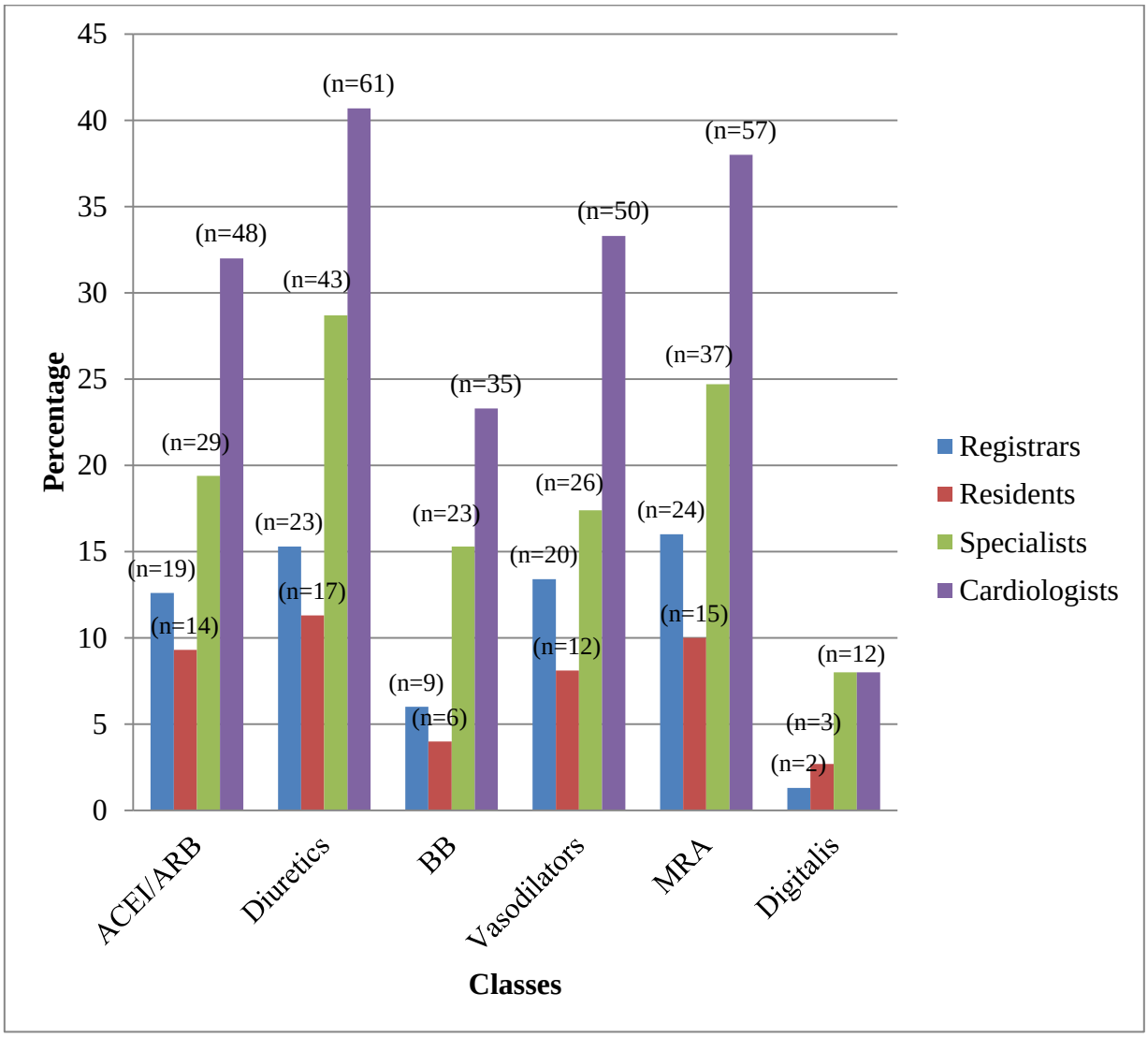

Figure 2. Distribution of drug class as prescribed by different prescribers

Figure1. Shows distribution of drugs used to treat HF in terms of class as used by the prescriber at discharge. The prescribed drugs were issued by Registrars, Residents, Specialists and Cardiologists. This figure shows Cardiologists and specialist physicians matched in their prescription of HF drugs across all the different classes used.

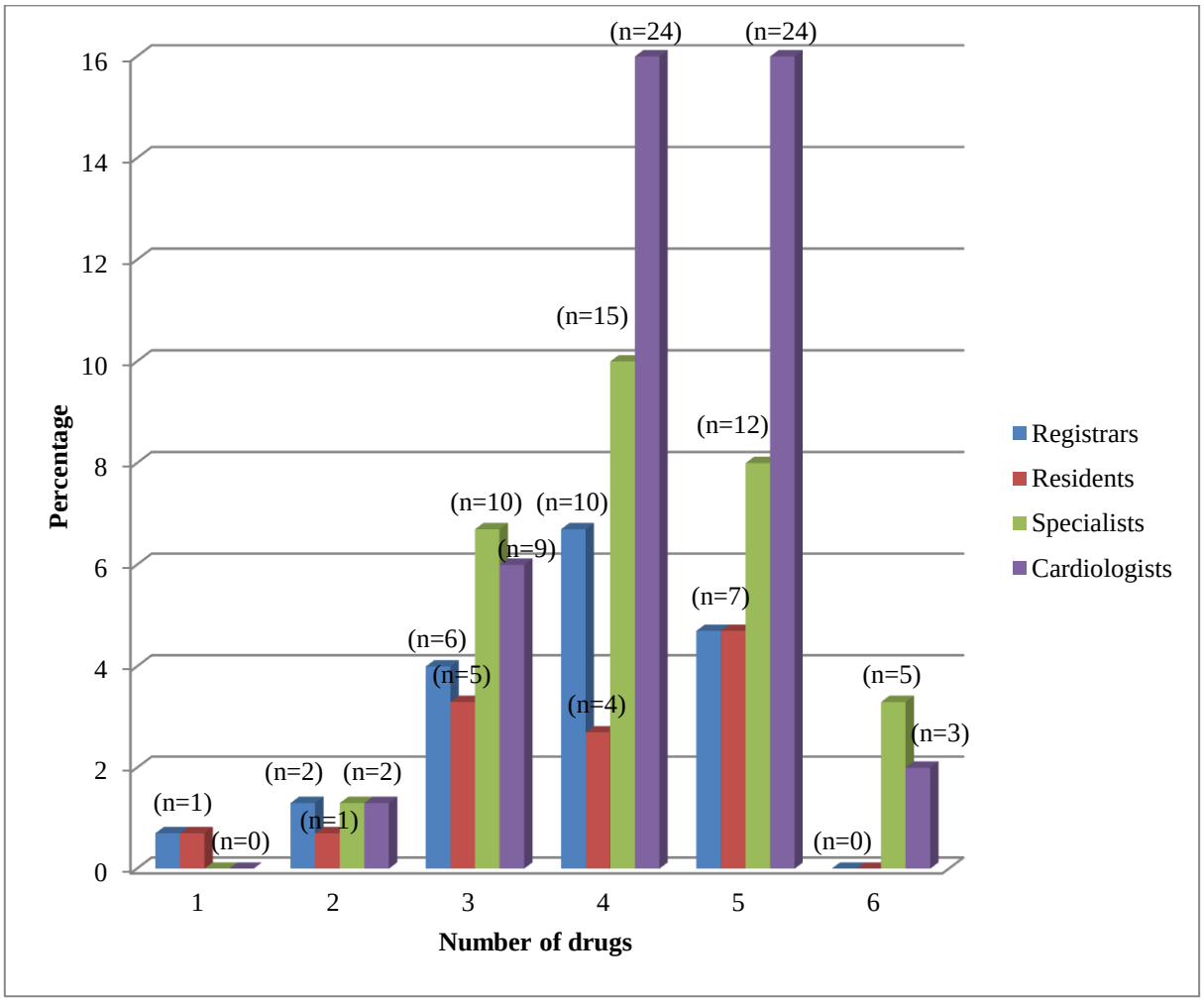

Figure 3. Distribution of number of drugs as prescribed by different prescribers

Figure.2 shows distribution of HF drugs in terms of number of drugs as issued by different prescribers at discharge. This illustrates that 3 to 5 drugs were mostly prescribed to treat HF. It also shows that cardiologists and specialist physicians had a similar prescription in terms of number of drugs they used to treat HF.

CHAPTER FOUR

7.0. DISCUSSION

This study was done in a tertiary hospital on patients admitted with a clinical diagnosis of heart failure. Framingham criteria was used to make a diagnosis of CHF for the patients who were included in the study. A total of 150 candidates were enrolled in the study. Among the study patients seven (4.7%) died during the study period. Of these (71.4%) died within the first 24 hours of admission. Out of all the study participants 54.3% were males. This was similar to other studies where CHF is found to be more common in males[24,26,41]. Heart failure progresses with the advancing age. This study reveals greater prevalence of HF in older ages where a large number of patients (41.3%) were aged 60 years and above. This is similar to studies done elsewhere in Africa and Worldwide where the mean age for HF patients is around 50years[24,26,42]. HF treatment requires maximum adherence to key drugs used in its treatment inorder to reduce morbidity and mortality. Most of the patients admitted in HF were peasants suggesting affordability of CHF key drugs being an obstacle in achieving maximum adherence.

Most patients (78.0%) were admitted for the first time in HF whereas (22.0%) were re-admissions. Of the re-hospitalized patients with a previous diagnosis of CHF majority were re-admitted within 3 months after discharge. This could be explained by inadequate treatment, drug stock outs, infections, or poor adherence (speculative). A previous study done by Makule et al at MNH showed re-admission rate of 62.9% [25].However Kingue etal in the study of a new look at adult chronic heart failure in Africa in the age of the Doppler echocardiography showed a re-admission rate of 8.3% [42]. It was found that most patients in the study presented with severe form of HF in which 93.3% of the studied patients were in NYHA class III / IV. This result is similar to findings from other previous studies where most patients were in advanced heart failure [26, 41-43]. Echo was done in 71.3% of all the cases and of those approximately 72% were found to have HFrEF. This finding is similar to other studies done among HF patients where LVSD is the most consistent finding [26, 41-43].

The main etiologies of heart failure were DCM(48.7%) followed by HTN (27%) and RHD (15%), Table 2. This finding is generally similar to a number of studies done in other parts of Africa where DCM, RHD and HTN are seen to be the cause in more than 75% of patients with CHF [44,45]. PHTN was present in 4% of all the patients included in the study. This finding reflects the same magnitude to that seen in studies done elsewhere in Africa where PHTN was a cause of HF in 5.1% to 10.0% [46-48].

The significance of these etiological factors was seen only with age. In this case RHD was found to affect the younger population.

Other cause of HF made a total of 7% and includes thyroid diseases, pericardial disease, and CHD. Tuberculous Pericarditis was present in 6% of all patients included in the study. This finding is similar to other studies in Africa where Tuberculous Pericarditis remains an important cause of HF in this continent [47, 49-50].

Patients with HF frequently present with co morbid conditions which may exacerbate HF. In this study 36% of patients with HF had other co morbid conditions such as DM, CKD, Infections and others which can all exercerbate HF. The prevalence of AF in patients with HF at MNH was 9.3%.This is similar to other studies where prevalance of AF among patients with HF ranges from 7% to 13% [30].

Prescription pattern of HF drugs used at admission

In this study nine (9) different pharmacological classes and up to six drug combination therapy were prescribed to patients with HF**.** It is recommended in the NHFA to include ACE inhibitors/ARBs, beta blockers and MRAs to all heart failure patients wherever possible[1,43]. In addition to these medications which have been shown to have survival benefits; diuretics, Nitrates, and Digoxin can be used for symptomatic relief[1,43**].** In this study one drug (mostly a diuretic) was suprisingly found to be used to treat CHF in this population of patients with advanced CHF.

Individual HF drugs used at admission

A number of pharmacological classes were used at admission and the most commonly prescribed drugs from each class were: Diuretics: Frusemide (96.0%); ACE-I: Enalapril (48%); BB: Carvedilol (20%); Vasodilators: ISMN (63.3%). MRA: Aldactone (77.3%), Dioxin (20%) and Among ARB only Losartan (8.7%) was used.

Dose and Frequency of HF drugs used at admission

Dose of Frusemide was 20-120mg, the most prescribed dose was 80mg twice a day, Aldactone ranged 25-100mg, the most prescribed dose was 25mg once a day, Carvedilol dose were 3.125-25mg, the most prescribed dose was 3.125mg twice a day, Enalapril dose ranged from 2.5-20mg , the most prescribed dose was 5mg once a day, ISMN dose ranged from 5-15mg, the most prescribed dose was 10mg thrice a day where as Digoxin dose ranged from 0.125-0.25mg, the most prescribed dose being 0.25 once a day. Frusemide was mostly (61.3%) given by I.V route. The range of doses and frequencies for different drugs lies within that recommended by standard HF guidelines such as NICE and AHA [50-52].

Class of HF drugs used at admission

Nine different drug classes were used as recommended by standard HF guidelines. As previously stated all HF patients should receive the three key HF drug classes (ACEI/ARB, BB and MRA) unless contraindicated. The classes used included BB, ACEI/ARB, MRA, Vasodilators, Diuretics, PDE5 inhibitors, Ionotropes and Digitalis. The prescription rates of each class were as follows; BB (22%), Diuretics (96%), ACEI/ARB (52.7%), Vasodilators (67.3%), Digoxin (20%), PDE5 inhibitors (1.3%), Ionotropes (4%) and Aldactone (77.3%). The prescription rates of both Diuretics (96.0%) and MRA (77.3%) were higher when compared to that seen in the NHFA where the rate of use of these classes was 86% and 36% for Diuretics and MRA respectively [1, 43]. This prescription rate of Diuretics and MRA was far higher when compared to prescription rates in a resource limited country like Nepal where the rates were 32.14% Diuretics (in which MRA was inclusive). The prescription rates of other class of HF drugs in this study was low when compared to that observed in the Nepal study

and also that reflected in the NHFA [1, 24, and 43]. Diuretics that were used in the treatment of HF included Frusemide and Metolazone but Metolazone was used in two patients only. About 93.3% of our study patients were in NYHA class III/IV, indicating severe symptoms of HF. These patients would have been eligible to use BB, but this study uncovers a low prescription rate of BB in the treatment of HF at admission. This suggests that our prescribers are reluctant to use BB in the acute settings as recommended by standard HF guidelines [50-52]. Among the BB recommended for treatments of HF Carvedilol and Metoprolol were used with Metoprolol used in only one patient. Atenolol though not recommended was also used in the treatment of HF in three candidates. Enalapril, Captopril, and Ramipril were the ACEIs used with Enalapril replacing Captopril as a conventional choice in the treatment of HF in our setting. Ramipril was only used in one patient. Of the Vasodilators ISMN and Hydrallazine were used both alone and in combination. PDE5 inhibitors have been proved to be useful in symptomatic relief for patients with PHTN [50-52]. In this study Sildenafil was added to all patients with PHTN. Only 4% of my study patients required use of Ionotropes at admission however most of these patients (67%) died within 24 hours after admission indicating that they were too ill to survive despite appropriate care.

Combination of HF drugs used at admission

Combination therapy was used in 96% of all Patients who were prescribed HF drugs at admission. A combination of up to six drugs was in practice in this study. Overall a 3-4 drug combination was prescribed at admission. This is similar to most of the other studies where >3 drug combination is prescribed for HF [24]. A combination of Diuretics, ALD and ISMN were used in most of the drug combinations.

The combinations containing DIR and MRA were more likely to be prescribed in my study where as lower rates of such combination was observed from other studies [24]. A combination of DIR and MRA was used in 74% of patients who received HF treatments. However use of BB/ACEI was significantly lower (12.5%) compared to the use of the same combination seen in other studies [43]. This suggests that clinicians in our setting are avoiding

early introduction of BB in the treatment of HF as recommended by standard guidelines. A combination containing BB/ACEI/ARB/MRA was only used in 12% of the studied clients at admission. A-HEFT study recommends use of a combination of ISDN and Hydrallazine to African American patients based on its efficacy and survival benefit in this population [13]. This study reveals a very low prescription rate (5%) of this beneficial combination suggesting that there is a need to increase its awareness to our clinicians.

Prescription pattern of HF drugs used at discharge

In general it appears that prescription patterns of the HF drugs at discharge were better when standard guidelines are considered. More key HF drugs were given at recommended dosages at discharge. This is partly explained by the influence of the Cardiologists and specialists who usually reviews patients at a later stage after admission.

Individual HF drugs used at discharge

A total of 8 different pharmacological classes for treatment of HF were used at discharge and within each class of drugs used, the most commonly prescribed drugs were: Diuretics: Frusemide (96.%); ACE-I: Enalapril (60%); B-blocker: Carvedilol (45.3%); Vasodilators: ISMN (74%). MRA: Aldactone (88.7%), Digoxin (20%) and Among ARB only Losartan (12.0%) was used.

Dose and frequency of HF drugs used at discharge

Dose of Frusemide was 40-80mg, the prescribed dose was 40mg once a day, Aldactone ranged 25-100mg, the most prescribed dose was 25mg once a day, Carvedilol dose ranged 3.125-25mg, the most prescribed dose was 3.125mg twice a day, Enalapril dose ranged 2.5-10mg, the most prescribed dose was 5mg once a day, ISMN dose ranged from 5-10mg, the most prescribed dose was 10mg thrice a day while Digoxin dose ranged from 0.125-0.25mg and the most prescribed dose was 0.25mg once a day. The dose range observed in my study lies within ranges that are recommended by various HF guidelines such as NICE and AHA. [50-52]

Class of HF drugs used at discharge

Different drug classes were used as recommended by standard HF guidelines. Compared to admission at discharge only 8 classes of HF drugs were used. The key classes used include BB, ACEI/ARB, MRA, Vasodilators, Diuretics, PDE5 inhibitors and Digitalis. The prescription rates of each class were as follows; BB (48%), Diuretics (96%), ACEI/ARB (73.3%), Vasodilators (78.6%), Digoxin (20%) and Aldactone (88.7%). Diuretics that were used in the treatment of HF included Frusemide and Metolazone but Metolazone was used in 5 patients only.

Among the BB recommended for treatment of HF Carvedilol and Metoprolol were used with Metoprolol used in only 3 patients. Atenolol though not recommended was also used in the treatment of HF in 5 candidates. Enalapril, Captopril, and Ramipril were the ACEIs used with Enalapril replacing Captopril as a conventional choice in the treatment of HF. Ramipril was again used in one patient. Of the Vasodilators ISMN and Hydrallazine were used both alone and in combination. Prescription rate of BB was significantly increased at discharge compared to that at admission suggesting adherence among the prescribers to standard guidelines which instructs delay of use of BB in the acute settings. [49, 50]. The prescription rates of BB and ACEI/ARB is low when compared to that observed in other studies. In the NHFA 2013 BB was prescribed in 78% of patients included in the audit where as ACEI/ARB was 84% [43]. However the prescription rates of DIR and MRA was relatively higher in this study compared to that observed in NHFA where DIR and MRA were prescribed in 89%and 45% respectively.

Combination of HF drugs used at discharge

Combination therapy was used in 98.6% of all Patients who were prescribed HF drugs at discharge. Up to six combinations therapy was used with overall a 4-5 drug combination being more prescribed. This is similar to most of the other studies where >3 drug combination is prescribed [24, 43]. Combinations containing Diuretics, ACEI, BB and ISMN were used to treat most of the patients with HF. The choice of classes observed in this study was similar to that seen in other studies [24].

In this study DIR and MRA were more likely to be prescribed to HF patients [Table 6].

A combination of DIR and MRA was used in 74% of patients who received HF treatments. However use of BB/ACEI was significantly lower (30.4%) compared to that seen in other studies [43]. A combination containing ACEI/ARB, BB and MRA was used only in 34% of all patients with HF.

Use of DIR and MRA remained high at discharge in our setting as compared to other studies [24, 43] but use of key drugs BB/ACEI/ARB/MRA was significantly lower compared to other studies [43].

Prescription pattern of HF drugs as used By different Prescribers

Prescription rates for ACE inhibitors/ARBs, beta blockers and MRAs are all higher amongst patients who were reviewed by cardiologist and specialists. Figure. 2& 3.This suggests similar knowledge on the application of international HF treatment guidelines in these clinicians. This finding is similar to observations else where in which cardiologists and specialist staffs seems more likely to prescribe recommended drugs to HF patients[43]. In the NHFA it appeared that treatment rates for ACE inhibitors/ARBs and beta blockers were significantly better when patients are admitted to cardiology rather than general medical wards [1].

Prescription rates of key HF drugs by the different prescribers was low in this study however it based on standard guidelines (mostly European). Such low prescription rates of HF drugs from our prescribers could be influenced by the cost of the drugs, availability of such drugs and socioeconomic status of patients attending public health institutions such as MNH.

Prescription Pattern of HF drugs in Patients with HFpEF

Of the 28 Patients who had HFpEF there were little differences on the drugs which were prescribed when compared to those who had HFrEF. This finding is similar to studies done elsewhere [51-53]. The rates of drugs prescribed were FRU (92%), MRA (89.3%), while BB was given to 39.3% of the Patients with HFpEF [50-52]. A prescription rate of ACEI/ARBs was 67.9% and SIL was only given to 10.7% of all patients with HFpEF.

CHAPTER FIVE

5.0. CONCLUSIONS

1. Majority of patients are admitted with severe CHF(NYHA III/IV)
2. Readmission rate is relatively low
3. Three to five drug therapy is mostly used by clinicians
4. Prescriptions containing key CHF drugs(ACEI/ARB,BB and MRA) is low
5. ISDN-HYD is rarely prescibed despite its survival benefit among africans

5.1. RECOMMENDATIONS

1. Establishment of a hospital based CHF treatment guideline
2. It is hightime to establish a CHF treatment auditing system at MNH
3. There is a need for senior physicians to review prescriptions at discharge so as to avoid single drug use in severely ill patients

5.2. STUDY LIMITATION

This was a Hospital based study at a tertiary hospital with highly selected patients so the results may not be generalized to the community; however they can potentially be generalized for secondary and tertiary level hospitals.

Incomplete documentation of important information such as who exactly prescribed the drug in patient files both at admission/Discharge could have resulted into biased conclusion of the study findings.

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APPENDIXES

Appendix I: Questionnaire (English Version)

1. Questionnaire No. : ……..
2. Date of admission: ……..

Socio-Demographic Information

3. Name of patient: …….
4. Age: …… (Years)
5. Sex (Circle)

A. Male

B. Female

6. Occupation: …….

7. Labeled cause of CHF (Circle)

DCM

RHD

HTN

Others

8. Other medical problems (Circle)

IHD

Thyroid disease

Others: ……, ……, ……..…, ……..

9. Was the patient previously admitted with similar condition? (Circle)

Yes

No(if No go Qn10)

If yes; when was last admission?

Within last 1 month

1 to 6 months

Greater than 6 months

10. NYHA classification on admission (Circle)

I

II

III

IV

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

Cough

DIB on exertion

Paroxysmal Nocturnal Dyspnea

LL swelling

SOB

Easy fatigue

Tender Hepatomegaly

Basal crepitations

Bilateral ankle edema

Raised JVP

Gallop Rhythm

Other: …….

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

Frusemide

Aldactone

Captopril

Carvedilol

Enalapril

ISMN

Digoxin

Others: ……., ……., …….

13. Who Prescribed/Instructed the drugs at admission?

Intern

Registrar

Resident

Specialist

Cardiologist

14. Number of drugs prescribed at admission: ……..

15. NYHA classification at discharge (Circle)

I

II

III

IV

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

Cough

DIB on exertion

Paroxysmal Nocturnal Dyspnea

LL swelling

SOB

Easy fatigue

Tender Hepatomegaly

Basal crepitations

Bilateral ankle edema

Raised JVP

Gallop Rhythm

Other: …….

17. Drug and dosage at discharge (from prescription)

Frusemide ……

Aldactone ……...

Carvedilol……...

Captopril…….

Enalapril…….

ISMN……..

Digoxin……

Others: ……., ……., …….

18. Who prescribed/instructed the drugs given at discharge?

Intern

Registrar

Resident

Specialist

Cardiologist

19. Number of drugs prescribed at discharge: …….

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

21. How many drug(s) is the patient taking? (Circle)

    None

    1 – 2

    3 – 4

    4 -5

    >5

22. ECHO findings

23. Discharge main diagnosis: ……..

24. Other diagnosis: ……, ……, ……

Appendix II: Questionnaire (Swahili Version)

1. Namba ya dodoso: ……..

2. Tarehe ya kulazwa wodini: ……..

3. Jina la mgonjwa: ……

4. Umri: …… (Miaka)

5. Jinsia

a. Mwanaume

b. Mwanamke

6. Kazi ya mgonjwa: …….

7. Sababu ya ugonjwa wa moyo

DCM

RHD

HTN

Mengineyo

8. Matatizo mengine ya afya

IHD

Goita

Mengineyo: ……, ……, ……..…

9. Je, Mgonjwa aliwahi kulazwa kwa tatizo hili?

Ndio

Hapana

Kama ndio, ilikuwa lini;

Katika mwezi mmoja

Miezi 1 hadi 6

Kabla miezi 6

Kama hapana nenda swali la 10

10. NYHA siku ya kulazwa

    I

    II

    III

    IV

11. Dalili ya tatizo la moyo siku ya kulazwa

    Kikohozi

    Kuhema

    Kuhema kwa shida usiku

    Ini kuvimba

    Miguu kuvimba

    Kujaa mishipa ya shingo

    Moyo kudunda

    Other: …….

12. Dawa ulizotumia siku ya kulazwa na kiasi

    Furosemide

    Aldactone

    Captopril

    ISMN

    Digoxin

    Nyinginezo: ……., ……., …….

13. Nani alitoa maelekezo ya dawa?

    Intern

    Resident/Registrar

    Specialist

    Cardiologist

14. Idadi ya dawa siku ya kulazwa: ……..

15. NYHA siku ya ruhusa

I

II

III

IV

16. Dalili ya tatizo la moyo siku ya ruhusa

Kikohozi.....

Kuhema.....

Kuhema kwa shida usiku.....

Ini kuvimba.....

Miguu kuvimba.....

Kujaa mishipa ya shingo.....

Moyo Kudunda.....

Mengineyo:.....

17. Dawa na kiasi siku ya ruhusa (kutoka karatasi ya dawa)

Furosemide ……

Aldactone …….

captopril…….

ISMN……

Digoxin……..

Mengineyo: ……., ……., …….

18. Nani alitoa maelekezo ya dawa?

Intern

Resident/Registrar

Specialist

19. Idadi ya dawa siku ya ruhusa: ……. (tarakimu)

20. Idadi ya siku ulizokaa wodini:.....(siku)

21. Idadi ya dawa unazotumia?

    0

    1 – 2

    3 – 4

    >4

22. ECHO

23. Ugonjwa wa moyo siku ya ruhusa: …….

24. Mtatatizo mengineyo: .....

Appendix III: Consent Form (English Version)

CONSENT FORM FOR STUDY PARTICIPANTS

TITLE: DRUG PRESCRIPTION PATTERNS IN THE TREATMENT OF HEART FAILURE AT MUHIMBILI NATIONAL HOSPITAL

Following greetings, introducing, as I am Dr Mwinchete, Saleh ,Hamisi, 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 medications.

This study aims to describe Drug Prescription patterns in the treatment of CHF for patients admitted with clinical diagnosis of heart failure at Muhimbili National Hospital and this will help to offer appropriate drugs for patients

Patient's files will be used to obtain information needed and patients will also be interviewed using a questionnaire that will include their social demographic characteristics, occupation, clinical presentations and the drugs prescribed at admission and discharge/death

There are no risks associated. If an inappropriate prescription will be found it will be reported to the Head of unit for correction. Patient's informations 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 Mwinchete, Saleh, Hamisi 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_____ 59

Appendix IV: Consent Form (Swahili Version)

KARATASI YA IDHINI YA USHIRIKI KATIKA UTAFITI

AINA YA UTAFITI: DAWA ZINAZOTUMIKA KWA MATIBABU YA WAGONJWA WALIOLAZWA KWA TATIZO LA MOYO HOSPITALI YA TAIFA MUHIMBILI

Salaamu; Mimi naitwa Dr Mwinchete, Saleh ,Hamisi, 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 dawa zinazotumika kwenye matibabu ya wagonjwa waliolazwa na tatizo la moyo. Hii itasaidia kuhakikisha wagonjwa wanapata matibabu bora zaidi.

Taarifa zitachukuliwa kutoka kwenye faili za matibabu na mahojiano mafupi na Wagonjwa ambao wanafikia vigezo vya ushiriki katika utafiti huu yatafanywa kwa maswali yanayohusisha mambo ya kijamii, namna mgonjwa anavyojisikia na dawa alizoandikiwa wakati alipolazwa na wakati ameruhusiwa.

Hakuna madhara yoyote wakati wa ushiriki kwenye utafiti huu.

Taarifa za mgonjwa 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 Mwinchete, Saleh. Hamisi, 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_____

Appendix V: Introduction Letter

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

Directorate of Postgraduate Studies

P.O. BOX 65001
DAR ES SALAAM
TANZANIA.

Website: http://www.muhas.ac.tz

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Tel (Direct): +255-(0)22-2151378
Telefax:255-(0)22-2150465
E-mail: *dpgs@muhas.ac.tz*

Ref. No. HD/MUH/T. 08/2011

24th May, 2013

Executive Director,
Muhimbili National Hospital
P.O. Box 65000
DAR ES SALAAM.

Re: INTRODUCTION LETTER

The bearer of this letter Dr. Salehe H. Mwinchete is a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing MMed Internal Medicine.

As part of his studies he intends to do a study titled: ***"Drug prescription patterns in teh treatment of Heart failure at MNH Dar es Salaam- Tanzania".***

The research has been approved by the Chairman of University Senate.

Kindly provide him the necessary assistance to facilitate the conduct of his research.

We thank you for your cooperation.

A. Ndyeikiza
For: DIRECTOR, POSTGRADUATE STUDIES

cc: Dr. Salehe H. Mwinchete
cc: Dean, School of Medicine

Appendix VI: Approval of Ethical Clearence

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

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Ref. No. MU/PGS/SAEC/Vol. VI/

22nd May, 2013

Dr. Saleh Mwinchete
MMed. Internal Medicine,
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED "DRUG PRESCRIPTION PATTERNS IN THE TREATMENT OF HEART FAILURE AT MNH DAR ES SALAAM - TANZANIA"

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has on behalf of the Senate approved ethical clearance for the above-mentioned study.

Thus ethical clearance is granted and you may proceed with the planned study.

Please liaise with bursar's office to get your research fund.

Prof. O. Ngassapa
DIRECTOR, POSTGRADUATE STUDIES

/emm

cc Vice Chancellor, MUHAS
cc Deputy Vice Chancellor – ARC, MUHAS
cc Dean, School of Medicine, MUHAS