ABSTRACT

Background: Adherence to self-care behavior is important for patients with heart failure (HF). Adherence with multiple self-care instructions among HF patients is not well described in Ethiopia. This study assessed adherence to medication, self-care behaviors and knowledge among adult patients with chronic heart failure on follow-up at the cardiac follow-up clinic of Jimma University Specialized Hospital (JUSH).

Materials and Methods: Hospital based cross-sectional study was employed and patient-reported adherence to HF self-care behaviors and knowledge was assessed among 328 sampled adult patients attending the cardiac follow up clinic at JUSH from February 30 to May 30 in 2013. Patients were interviewed using systematic sampling technique. Data were collected using structured questionnaire. Data were analyzed using SPSS version 19.0 of the computer software. Bivariate and multivariable analyses were conducted to identify factors associated with poor adherence to self-care behaviors.

Results: Four of the top eight most frequently performed self-care behaviors were related to taking prescribed medications, and the seven least frequently performed self-care behaviors were concerned with symptom monitoring or management. There were significant relationships between the total self-care behavior score and age (p=0.02), marital status (p=0.09), readmission (p=0.003) and New York heart association functional class (p=0.023) and knowledge (p=0.000) in bivariate analysis. In addition, a number of significant relationships between patient factors and individual self-care behaviors were observed, (e.g. occupation was predictor of poor medication adherence in multivariable analysis (p<0.05)). Multivariable analysis showed that being old age (p<0.05), co-morbid, New York heart association functional class I and II and low HF knowledge were independent predictors of poor overall adherence to self-care behavior (P<0.01), while marital status were not associated significantly. There was a significant correlation between the mean total knowledge score and the total mean self-care score (r = 0.61, P =0.01).

Conclusion and recommendation: In this study, we found that patient-reported overall adherence with HF self-care behaviors is low and selective. Many patients in the study reported a knowledge deficit related to HF and the HF self-care behaviors, particularly salt restriction, and daily weighing. There is, therefore, a need to develop strategies aimed at improving adherence. Such strategies may include carrying out effectively self-care practices/measures directed toward prevention of exacerbations or complication of HF (early

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symptom recognition and contacting doctors, being aware of the effects and results of HF (noted hard activities, daily rest times), modifying the self-concept in accepting oneself as having HF, improved communication between patients and health care providers (physicians) and repetitive, objective evaluation of adherence. Providing comprehensive HF education and counseling that target   knowledge, skill and behavior ameliorates level of adherence.

Keywords: Medication adherence, Self-care behavior, Knowledge, Heart failure, Jimma.

ACKNOWLEDGMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVATIONS AND ACRONYMS

ACEIs	Angiotonsin Converting Enzyme Inhibitors
BCFs	Basic Conditioning Factors
CHF	Chronic Heart Failure
ECD	Early Clinical Deterioration
HBI	Home -Based Intervention
HF	Heart Failure
JUSH	Jimma University Specialized Hospital
LVEF	Left Ventricular Ejection Fraction
NYHA	New York Heart Association
SMHF	Self-Management of Heart Failure
HFKS	Heart Failure Knowledge Scale
HTN	Hypertension
DM	Diabetes Mellitus
KD	Kidney Disease
HCP	Health Care Providers

1. INTRODUCTION

1.1 Background

Heart failure is a syndrome in which the heart fails to pump adequately to meet the body's metabolic needs. At present, more than 23 million people suffer from HF in developed countries. The number of patients is gradually increasing as our lifestyle becomes more westernized; the associated medical expenses are rapidly growing (1). HF is a major cause of morbidity, reduced quality of life and increased health-care costs. The number of persons who suffer from HF is expected to increase as the population ages and more people survive cardiac disease. Today most countries face high and increasing rates of heart disease and it has become a leading cause of debilitation and death worldwide in men and women over age sixty-five and today in many countries heart disease is viewed as a "second epidemic," replacing infectious diseases as the leading cause of death(2).

The problem of HF disproportionately affects the older population. Approximately 80% of all cases of HF in the United States occur in persons aged 65 years and older. It is associated with very poor long-term survival, with a minority surviving 5 years after diagnosis. In the older population, HF accounts for more hospital admissions than any other single condition. Following hospitalization for HF, older persons are at high risk for re-hospitalization: nearly half are readmitted within 6 months. The economic impact of the condition is thus dramatic. Despite the importance of HF in the older population, there is a dearth of research specifically targeting this group(3).

Traditionally, heart disease was thought to be the problem of developed countries, but now it is becoming a headache for developing countries too and contributing to significant morbidity and premature mortality in vulnerable populations and it is especially devastating for the developing countries since they do not have adequate health care. Previously it was considered to be a man's problem, but now it is recognized as number one killer of women, just as it is of men (4-5). HF is an important cause of morbidity and mortality in Africa. While it is apparent that the causes of HF are largely non ischemic in Africans, the incidence, prevalence, treatment, and outcome are not defined. By comparing the percent of hospital admissions in Africa and the developed world, it is likely that HF has a significant effect on the health and health economics in Africa (6-7).

Therefore, one of the key issues that determine individual outcomes are patient knowledge and adherence to prescribed gold-standard, non-pharmacological and pharmacological

treatments. Self-care management is a part of successful HF treatment and can significantly impact on symptoms, functional capacity, wellbeing, morbidity, and prognosis. Good adherence has been shown to decrease morbidity and mortality and improve well-being. Similarly, enhancing self-care behaviors and providing comprehensive HF education and counseling associated with treatment out come in HF patients (8-11).

The literature suggests that only 20–60% of patients with HF adhere to their prescribed pharmacological and non-pharmacologic treatment. Data from western studies demonstrate that a large proportion of patients either misunderstood or had problems recalling that they had received recommendations regarding self-care management such as instructions on medications, diet and exercise(12). Overall, it has been estimated that between one-third and one-half of all patients with chronic heart conditions have difficulty adhering to their prescribed medication regimen in the western world, contributing to impaired quality of life, high healthcare costs linked to increasing rates of hospital re-admissions and out-patient hospital care, in addition to premature mortality(13). Importantly, increased CHF-related knowledge is associated with better treatment adherence(14). Levels of non-adherence to prescribed medication regimens in African patients with heart disease are very high and it is one of the main causes of poor treatment outcomes like re-admission. Factors such as cultural norms and knowledge about a disease modify beliefs and perceptions and can thereby influence behavior, for example, adherence to therapy (8, 15-18).

Good adherence was associated with lower resource utilization and better health status. Self-care can be defined as actions aimed at maintaining physical stability, avoidance of behavior that can worsen the condition, and detection of the early symptoms of deterioration. Self-care management is a part of successful CHF treatment and can significantly impact on symptoms, functional capacity, wellbeing, morbidity, and prognosis (10-11, 19-22).

1.2 Statement of the Problem

Approximately 23 million people worldwide are afflicted with HF and 2 million new cases of HF are diagnosed each year worldwide. In contrast to other cardiovascular disorders that have actually declined during the past few decades, the incidence of HF is on the rise. Cardiovascular disease made up of 16.7 million, or 29.2% of total global deaths according to world health report(1).

The cost of managing HF in the early 1990s was estimated to be 1–2% of total health care expenditure. Because hospital care consumes a significant proportion of this expenditure, and rates of HF related hospitalization (admission rates) have probably risen, this may be an underestimate of the current cost of HF. It is associated with an approximately 60% mortality rate within five years of diagnosis (1-3). HF appear to be steadily increasing in all industrialized countries, especially among older individuals(3)

The overall burden of cardiovascular disease is predicted to rise by approximately 150% in the developing world within the next 20 years. In Africa alone, it is predicted that it will affect 1.3 million people per annum during this period. Even in low to middle income countries such as South Africa it is already responsible for close to 10% of healthy life years lost; being second only to HIV/AIDS in this regard. (4-5).

Therefore; significantly CHF represents an emerging problem in low- to middle-income countries in sub-Saharan Africa undergoing epidemiological transition. For example, CHF is already an important cause of morbidity and mortality in black South Africans and it is conceivable that the incidence of CHF will increase over time (5-6).

Poor self-care behavior adherence remains a substantial problem among people with CHF who must follow a multi component treatment regimen that includes medications, dietary restrictions and exercise recommendations. It has been estimated that between one-third and one-half of all patients with chronic heart conditions have difficulty adhering to their prescribed medication regimen in the western world(12). Poor adherence to medical regimens among HF patient's results in increased morbidity and mortality rates, decreased quality of life, and increased health care costs associated with increased outpatient care and increased rates of hospital readmission. Additionally, between one third and two thirds of all medication-related hospital admissions are attributed to non-adherence (10, 13, 23-25). Approximately half of hospital re-admissions are preventable(26). Among the risk factors predictive of hospitalization and re-admission for CHF are the lack of knowledge of and

adherence to self-care recommendations for the disease such as dietary sodium intake restriction, daily weight monitoring, level of physical activities and medication dosage adherence (14, 24, 27-33). Non-adherence to recommended treatment is common in patients with CHF, leading to reduced quality of life, increased hospitalizations and increased morbidity(34).

Educating patients with HF is a process that is important, challenging, and complex. The symptoms of HF must be correctly interpreted and recognized by patients so that they can take appropriate action (e.g., increase a diuretic dose) and contact their physicians appropriately. This challenge is even more important for rural patients who live in geographic settings distant from medical services (18).

There is insufficient amount of data on treatment adherence in patients with heart disease in the African context, however CHF treatment is also a significant problem in Africa because education about CHF is not optimal and knowledge on CHF medication and management is poor (8, 15-18, 35-36). The status of CHF patients' adherence to prescribed gold-standard, non-pharmacological and pharmacological treatments and self-management practice is not yet been known in Ethiopia. In addition there is limited literature on the number of readmissions in chronic heart failure patients and health care costs

Published reports show that poor adherence to medical recommendations remains a substantial problem among people with CHF who must follow a multi-component treatment regimen that includes medications, dietary restrictions and exercise recommendations that are contributing to impaired quality of life, high healthcare costs linked to increasing rates of hospital re-admissions and out-patient hospital care, in addition to premature mortality (8, 10-11, 19-20, 23-25).

Therefore, the purpose of this study was to examine pattern of adherence to medication, self-care behaviors and knowledge to optimize CHF management and outcomes.

2. LITERATURE REVIEW

2.1 The Burden of Heart Failure

HF is now a major and escalating public health problem in industrialized countries with ageing populations. CHF may, therefore, become a more common manifestation of chronic heart disease and contribute to many more deaths (1-3).

Dilated cardiomyopathy is a major cause of heart failure in Africa. Similarly, peripartum cardiomyopathy is ubiquitous on the continent. By contrast, endomyocardial fibrosis is restricted to the tropical regions of East, Central, and West Africa. Reliable information about the incidence, prevalence, determinants, and outcome of cardiomyopathy in Africans is lacking. The epidemiological information is essential to the development of health policies for the diagnosis, treatment, prevention, and control of this condition, which is endemic on the continent (2, 4).

Heart disease represents an increasing problem in developing world populations in epidemiologic transition. The true extent of the problem is unknown given the inherent difficulty in tracking the emergence of new patterns of disease and related morbidity/mortality in countries where both health care resources and research capabilities are sub-optimal(1, 5).

HF is an important cause of morbidity and mortality in Africa. The causes of HF are largely non-ischemic in Africans, the incidence; prevalence, treatment, and outcome are not defined. By comparing the percent of hospital admissions in Africa and the developed world, it is likely that heart failure has a significant effect on the health and health economics in Africa. Efforts should be put forward to characterize this disease and ultimately improve its detection, treatment, and possibly prevention(6). Previously data were predominantly derived from western cohorts; but this study suggests that any extrapolation of current HF data to nonwestern populations should be interpreted with caution. Therefore the need for a series of studies in Africa that parallel the detailed documentation of the epidemic of HF in the western world, and also need to better understand the individual experiences of those affected by HF in our own communities(7).

2.2 Concept of Self-care

Self-care is an active, cognitive process in which persons engage for the purpose of maintaining their health or managing disease and illness. The process of self-care can be

divided into maintenance and management categories. Self-care maintenance involves compliance with positive health practices such as a proper diet, exercise, and taking medications as prescribed. "Compliance" is an important term in this definition because it refers to behavior occurring in response to a recommendation from an external source. Compliance with a specific treatment recommendation does not mean that someone is performing self-care fully. Compliance is generally used in reference to specific treatment behaviors while the broader sphere of self-care, which subsumes compliance (9-10, 14, 35).

The broader construct of self-care incorporates maintenance or compliance along with self-care management behaviors. Self-care management involves a thoughtful process of attending to subtle changes in health status and cognitively evaluating the importance of signs and symptoms, taking action to treat those changes, and monitoring the effectiveness of those actions. The management component of self-care is a complex process requiring a certain amount of astuteness and perception. Self-care management builds on the maintenance component; at least in the case of HF. Self-care management is important in patients with HF because their early symptoms are often subtle and difficult to identify as being related to HF. The ability to recognize the need for action and to act on that need is the responsibility of the person engaging in self-care management. The key issues that determine individual outcomes are patient knowledge and adherence to prescribed gold-standard, non-pharmacological and pharmacological treatments (8-10, 12, 37-38).

2.3 Treatment Knowledge and Self-care Behaviors Adherence of HF Patients

Patient teaching and counseling that addresses the specific concerns of older patients with advanced HF may provide them with the knowledge, support, and skills needed to comply with prescribed regimens. Likewise, effective treatment strategies that minimize the difficulties associated with each of the prescribed regimens may potentially improve long-term morbidity and mortality from HF among elderly patients(12).

Self-care strategies and self-management guidance to improve HF compliance is a major challenge for health care professionals. Knowledge deficit related to HF, particularly with diet, fluid restriction, and daily weighing is common among HF patients. Hence strategies to improve compliance should be directed at improving knowledge and at changing beliefs about HF regimes to improve benefit perceptions and reduce barriers. Extra attention should be directed towards patients with depressive symptoms because of lower compliance (13, 38).

Patient non adherence is a universal significant risk factor for cardiovascular disease, thereby requiring a comprehensive intervention approach. For many patient populations, dynamic communication between the healthcare team and the patient is a key factor in fostering adherence with long-term medication regimens. Educational programs that inform patients about their disease and the importance of adherence, interdisciplinary approaches to monitoring adherence, and utilization of home-based technologies can also aid in increasing adherence(14).

Adherence to self-care correlated significantly with knowledge scores ($r = .33$, $P = .001$). A poor adherence to self-care behavior score is associated with being unmarried, lower perceived self-efficacy, a lack of knowledge about self-care, and no prior hospitalization(15). Non- compliance is common in HF patients with in urban setting, as are shortcomings in patients' knowledge regarding prescribed medication despite efforts to adequately provide information(17).

CHF treatment is also a significant problem in South Africa because education about CHF is not optimal and knowledge on CHF medication and management is poor. The study confirms the need for comprehensive CHF programs in South Africa and other low-resource settings which should include easy access to medications and education for patients to optimize CHF management and outcomes(8).

Their findings suggest that many patients are confused about which changes reflect worsening HF. A significant minority do not appreciate the importance of monitoring fluid status by weighing themselves each day. Helping patients, particularly older men and patients with preserved systolic function, sort out the subtleties of their symptoms requires careful attention to what they say about their past experiences and the expectations they hold for the future. Assessing patients' knowledge about HF and self-care behaviors continues to be an important strategy to reduce re hospitalization and improve clinical outcomes (18, 38).

This study demonstrates the level of adherence to self-care behavior and associated factors in relation to the experience of previous HF hospitalizations in 116 outpatients with HF. Regardless of previous hospitalizations with HF; adherence to seeking help in case of worsening of HF was poor, although adherence to medication was high in this population. Moreover, they found that diabetes mellitus and employment were independent predictors of poorer adherence to self-care behavior, but the experience of previous HF hospitalizations was not a predictor. These findings emphasize the need to educate patients with HF to take

appropriate action if HF worsens. Furthermore, a self-care strategy for HF should target patients with diabetes mellitus and employed patients (19).

HF self-care encompasses a varied set of behaviors, each of which may be influenced by diverse factors. Their findings highlight the relationship between knowledge and self-care. Patients with HF must adjust to many life-altering behaviors, and are often readmitted to acute care due to lack of knowledge about self-care. Self-care patient education may decrease readmission rates and increase independence of individuals with HF(10).

Compliance with medication and appointment keeping are surprisingly high in an older HF population. However, compliance with diet, fluid restriction, and especially compliance with advice regarding activity and daily weighing is low. Although some aspects of compliance had an acceptable level, compliance with weighing and exercise were low. In order to improve compliance, an increase of knowledge and a change of patient's beliefs by education and counseling are recommended. Extra attention should paid to patients with depressive symptoms(20).

Adherence with self-care is alarmingly low among HF patients, and selective adherence to various recommendations is common. Better adherence is associated with improved health status and reduced resource utilization. These results highlight a major opportunity for further clinical and research effort in understanding and improving self-care adherence to optimize HF outcomes(11).

HF-action is the largest and most comprehensive study of exercise training in patients with NYHA class II to IV heart failure, to their knowledge. The results demonstrate that participation in an exercise training program provides a modest but statistically significant improvement in patient-reported health status compared with usual care. The clinical meaningfulness of the magnitude of average change requires further study. The improvement associated with exercise training occurred early during supervised training and persisted over time during home based training (22).

Non-compliance with medication and other lifestyle recommendations is a major problem in patients with HF. Evidence based interventions to improve compliance in patients with HF are scarce. Interventions that can increase compliance and prevent HF related readmissions in order to improve the quality of life of patients with HF need to be tested (24).

Patients with HF had poor compliance with dietary and exercise regimens. Since following a dietary and exercise regimen has been demonstrated to reduce morbidity in this population, strategies to increase compliance with diet and exercise recommendations should be rigorously pursued. Helping patients understand their treatment regimen may improve their compliance(25).

Poor self-care abilities and confidence levels to effectively treat symptoms are common among patients. A descriptive, cross sectional, comparative study indicated that both experienced and newly diagnosed HF patients had difficulty with symptom recognition. There was no significant difference in the Self-Management of Heart Failure (SMHF) importance scores between experienced and new HF patients. Experienced patients were more apt to practice certain specific self-care management behaviors; such as limiting sodium intake, increasing diuretics and sleeping in recliner. The highest subscale score was the ability to evaluate treatment effectiveness for both the experienced and new HF patient. Confidence in recognizing symptoms improved with experience. Self-care self-efficacy scores showed no differences among experienced and new HF diagnosis groups (27).

Early clinical deterioration (ECD) is a common phenomenon in older CHF patients discharged from acute hospital care and is associated with poorer health outcomes in the longer-term. They also show that home -based intervention (HBI) is an important means for identifying and addressing ECD. In the context of increasing re-admission rates, a parallel increase in related health care costs, in addition to contemporary mortality rates comparable to and even worse than, many forms of cancer, the individual and overall economic benefits of establishing a national heart failure service based on this type intervention are becoming increasingly apparent. Residual morbidity and mortality rates in patients exposed to HBI, however, remain unacceptably high. These data provide a sound basis for increasing the effectiveness of HBI by altering the strategy of visiting patients at 10–14 days post discharge and applying earlier home visits to selected 'high-risk' patients(30).

Understanding what influences a patient's ability to practice self-care is very important. A positive correlation between education and HF compliance behaviors was noted. Self-care may be practiced more by better educated persons. Co-morbidity could be either a predisposing or an enabling variable. Self-care scores associated with more severe symptom severity may implicate that self-care education could be more difficult to promote early in the disease process(37).

All self-care behaviors can be influenced by outside factors. Patients have low levels of knowledge about the specifics of HF self-care. Some knowledge is apparent which supports Orem's Theory proposal that knowledge enables self-care. This implies that nursing interventions should be aimed toward providing information to HF patients that leads to understanding the hindering and helping effects of basic conditioning factors on self-care behaviors(39).

Studies showed that significant increases in self-care behaviors among patients with HF when education and support are provided in the hospital setting and at home. HF symptoms and treatment can influence the lives of patients. Better self-care abilities and behaviors have been associated with improved feelings of well-being. The authors hypothesized that a supportive educational intervention would increase HF self-care abilities and behaviors thus improving quality of life   (10, 36, 40).

Knowledge gap existed which needed to be filled. Concerns about the undesirable effects of drug therapy needed to be addressed. A structured medicines information provision system is required at the public clinic studied, to ensure that patients receive all the pertinent information about their disease condition and the prescribed therapy (41).

2.4 Medication Adherence of HF patients

Non-adherence to recommended treatment is common in patients with CHF, leading to reduced quality of life, increased hospitalizations and increased morbidity. Perceived difficulty in overcoming a barrier to medication use was the main predictor of non-adherence in this cohort of CHF patients. Our results highlight the need for closer monitoring of pharmacotherapy in patients who are non-adherent to non pharmacological management. Simple measures such as self-reporting could be used for routine screening of adherence in CHF patients during clinic visits. Regimen complexity should not be considered in isolation when strategies for addressing adherence issues are designed. Medication regimens should be designed after accounting for existing routines to ensure that the new regimen has least disruption on the daily routines of patients and their families (34).

Home telemonitoring is an acceptable reliable intervention. Baseline rates for compliance with self-monitoring are set out in this study. Benefit in terms of compliance with medication and self-monitoring is still seen after 1 year (35).

Patients should be aware that the beneficial effects of therapy may be delayed and not have unrealistic expectations regarding the initial response to treatment. It must be explained that side effects are often transient, and it might take months to up titrate and assess the full effects of a drug. Interventions to improve adherence are recommended and should be targeted by the healthcare provider. Non-compliance is common in elderly HF patients, as are shortcomings in patients' knowledge regarding prescribed medication despite efforts to adequately provide information. Non-compliance with hypertension medication is a problem in Ghana. Unaffordable drug prices appear to be the major cause. Efforts should be made both locally and internationally to improve access to medications for chronic disease in developing countries. Doctors may wish to consider affordability as a clinical factor when prescribing (9, 15, 42).

Use of an angiotensin converting enzyme (ACE) inhibitor is defined as at least one claim for an ACE inhibitor over the period examined, and dosing is assessed by calculating the mean percentage of an adequate daily dose dispensed. Before hospitalization and after hospitalization use of ACE inhibitors a significant increase. ACE inhibitor use before hospitalization is a predictor of post discharge use. Younger patients are more likely to take ACE inhibitors after hospitalization than older ones, and men have better compliance after hospitalization than women. Dose increased from 72% to 85% of an adequate daily dose after hospitalization among patients who took ACE inhibitors during both prehospitalization and posthospitalization periods. However, almost one third of hospitalized patients stopped taking their ACE inhibitor within six months of hospital discharge. The study found few significant predictors of patient compliance after hospitalization. Dosing of ACE inhibitors before and after hospitalization needs to be improved(43). Non-adherence with ACE inhibitor treatment is found to be common in patients with CHF(44). A large proportion of patients who begin digoxin therapy end CHF therapy or consume substantially less medication than expected in the first year of therapy. Such high rates of cessation could represent an important impediment to effective CHF therapy(45).

2.5 Factors and Outcomes

Overall, it seems that in many cases the recurrence of chronic heart failure and the need for readmission to hospital are attributable to preventable factors and not to the underlying disease. Few studies have examined the impact of multidisciplinary programmes involving home care, patient education, and physician training. There is preliminary evidence that such programmes can improve both the quality of treatment and the quality of life and thereby

reduce the overall cost of health care in the growing number of elderly patients with congestive heart failure(26).

The fact that alcohol use is far higher among patients with multiple readmissions has important implications. Continued alcohol use after a HF diagnosis may be critical to the progression or exacerbation of the disease process. Previous research has indicated that alcohol interferes with a number of myocardial metabolic steps, but no single factor for the development of cardiac insufficiency related to alcohol has been identified, and there is evidence that abstention is effective only up to a certain stage of the disease. Therefore, it seems more likely that continued alcohol use may be a general marker for health care usage either because patients with HF experience more health problems and seek help or because they engage in other noncompliant behaviors. Other predictors of noncompliance: the clinical variables that predict multiple hospital readmissions in this study are HF of ischemic etiology and higher NYHA class. The significant difference found among patients with ischemic HF may be due to the compounded effects of HF and coronary disease (9, 28).

Social deprivation was associated with an increase in cardiac hospitalizations in CHF patients. This effect was independent of disease severity and of non-adherence with treatment. Understanding how social deprivation influences doctor and patient behavior in the important pre hospital phase is now crucial in order to reduce the amplifying effect that social deprivation has on cardiac hospitalizations (29).

Deterioration of clinical status is a common occurrence in patients with CHF. Such patients are clinically fragile, and a variety of preventable factors can lead to deterioration, such as excessive salt intake use of negative inotropic medications. Ensuring that all patients with CHF receive vaccination for influenza and pneumococcus might also reduce these causes of CHF worsening. Health care providers involved in the care of these patients should be aware of these factors and should take steps to incorporate this information in to the care and education of their patients (32).

Most people hope for a long and healthy life. What happens to them varies greatly by sex: males have shorter lives than females, and they are probably less healthy while living-from a medical viewpoint. But from a sociomedical viewpoint, females have less healthy lives. They simply do not feel well as often as males do(33).

The readmission rate for patients with HF remains high and the majority of variables measured in this study are not significant predictors of hospital readmissions. However, key

predictors that did predict readmission are the interaction of severity of patient cardiac illness and functional status, interaction of caregiver depression and stress, and caregiver informal social support. Poor compliance (21%) and infection (12%) are the most frequent precipitating factors, but a precipitating factor is not identified in 40% of the patients. Poor compliance is more common in women, but no other clinical characteristics emerged as being related with a specific precipitating factor. Fifty-seven percent of the patients with a short-term recurrence of worsening HF required hospital admission; infusion treatment with inotropes and/or vasodilators was necessary in 19% of them. Long-term therapy was changed in 48% of the patients. Thus, in ambulatory HF patients, short-term worsening HF can be predicted according to the clinical characteristics on an outpatient basis. Nearly 1/3 of precipitating factors can be prevented. Patient education and avoidance of inappropriate treatment may reduce the number of relapses (5, 24, 28, 30, 37).

HF is associated with a high rate of mortality, morbidity and hospital readmission. Preventative nursing interventions such as patient education programs can improve self-care behaviors thus improve HF quality of life and decrease health care costs. Studies showed that HF patients need instruction on medications, diet, activities and symptoms. Teaching self-care in the hospital increased patients' ability to take prescribed medications, follow proper dietary recommendations and identify HF symptoms. HF self-care can help to reduce hospitalizations and improve outcomes (40, 45).

Elderly patients with congestive heart failure have a high incidence of mortality, morbidity, and hospital readmission. Descriptive research of 41 patients with chronic CHF found that almost all patients cannot correctly define CHF, less than half can correctly identify their medications, and almost three fourths of patients do not weight themselves daily. The self-perceived reasons for hospitalizations included shortness of breath, swelling of limbs, exercise intolerance, and eight other symptoms. Some of these patients are able to follow self-care intervention during their hospital stay, which included daily weighing, taking medications at the bedside, ordering a low-salt diet, and identifying symptoms of CHF (46).

2.6 Conceptual Framework

Adherence to treatment is the key link between treatment and outcome in medical care. Adherence to self-care behaviors is affected by socio demographic and clinical characteristics as well as knowledge, is a determinant for better therapeutic outcomes. Providing information to HF patients that lead to understand the hindering and helping effects of these basic factors on self-care behaviors. Supportive educational intervention would increase HF self-care abilities and behaviors thus improving quality of life.
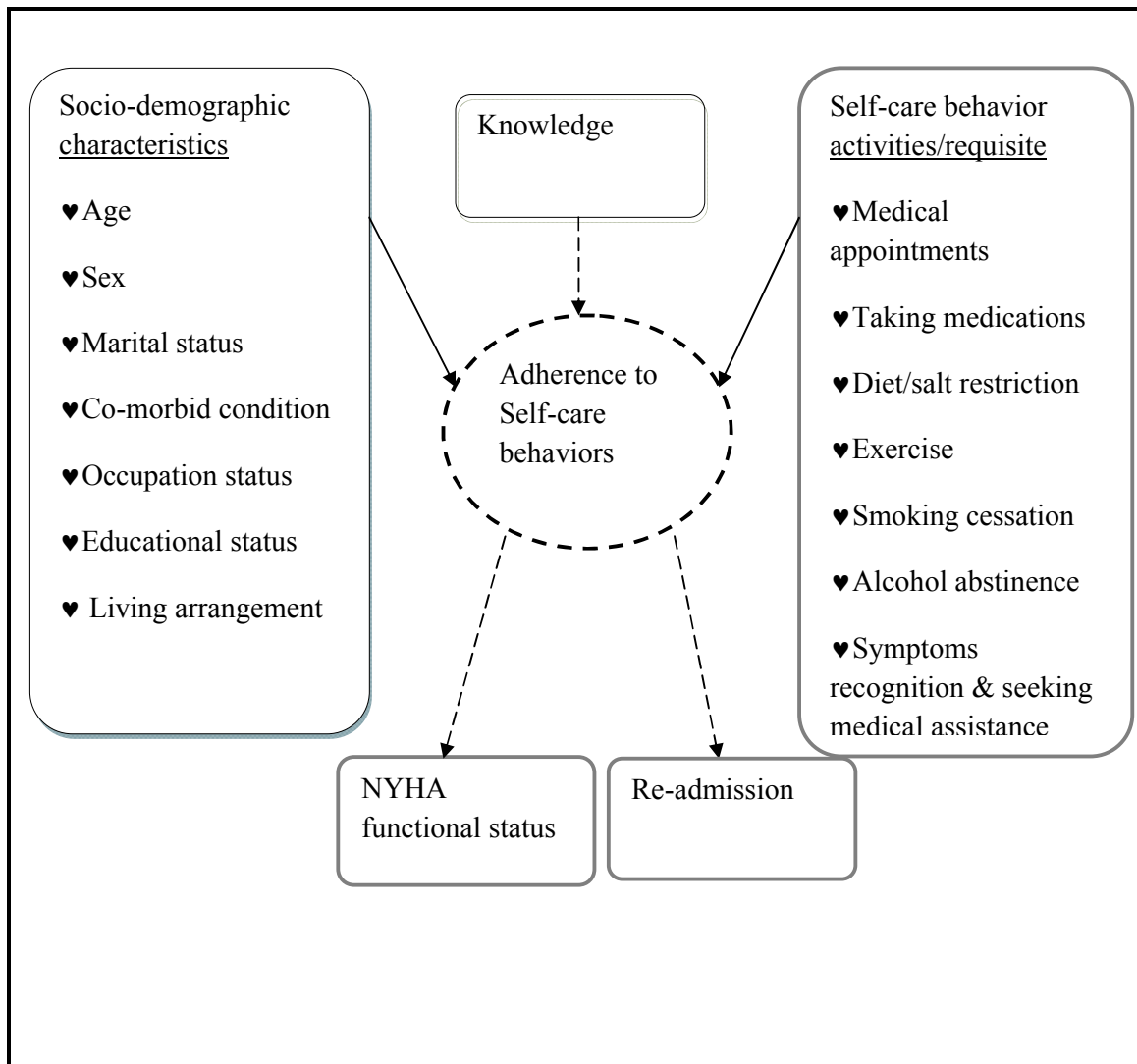
Figure:1 Conceptual framework of factors affecting adherence to self-care behavior and subsequent outcomes in patients with heart failure.

3. SIGNIFICANCE OF THE STUDY

Culturally sensitive and affordable CHF management programmes that can improve treatment adherence and optimize self-care behaviors and knowledge are needed in order to improve CHF-related health outcomes overall in low setting countries like Ethiopia.

The result of this study will provide information on adherence of medication, self-care behaviors and knowledge and understanding about HF management by patients in our set up, the health care providers will then target their educational efforts to address identified gaps in knowledge and to equip patients with the specific skills they may lack for implementing this knowledge on self-care practices. It also will provide information on factors that influence self-care behaviors and outcomes. So, the findings of the study will benefit policy makers, program planners and implementers to design and implement appropriate programs and strategies to improve patient adherence to medical recommendations and treatment outcomes among heart failure patients in our set up.

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4. OBJECTIVES

4.1 General Objective

To assess adherence to self-care behaviors and knowledge among adult patients with chronic heart failure on follow-up at the cardiac follow-up clinic of JUSH

4.2 Specific Objectives

- To determine the level of individual self care behaviors and adherence among patients with CHF at the cardiac follow-up clinic of JUSH
- To determine the level of overall self-care behavior adherence among patients with CHF at the cardiac follow-up clinic of JUSH
- To assess the level of knowledge about HF and HF recommendations among CHF patients at the cardiac follow-up clinic of JUSH
- To identify predictors of overall HF self-care behavior adherence among CHF patients at the cardiac follow-up clinic of JUSH
- To identify predictors of medication adherence among CHF patients at the cardiac follow-up clinic of JUSH

The following research questions will be addressed:

1) What self-care behaviors do patients with HF perform most frequently?
2) What self-care behaviors do patients with HF perform least frequently?
3) What relationships exist between age, sex, marital status, living arrangements, co-morbidities, occupation, education, and level of overall self-care behaviors and medication adherence?
4) What is the association between the level of HF knowledge and over all self care behaviors adherence?
5) What is the relationship between total self-care behaviors adherence (secondary) and HF related outcomes like NYHA functional status and re-admission (primary)?

5. MATERIALS AND METHODS

5.1 Study Area and Period

This study was conducted from February 30 to May 30, 2013 at adult cardiac clinic, Jimma University Specialized Hospital, which is located in Jimma town 350Km Southwest of Addis Ababa. It is a referral hospital serving a catchment population of over 15 million. JUSH gives both inpatient and outpatient services. As one of the outpatient services, the hospital has specialty clinics such as diabetic clinic, cardiac clinic where patients with specific chronic disease are referred for follow-up. These clinics are staffed with internists, internal medicine residents, medical interns and nurses.

5.2 Study Design

A hospital based cross-sectional study was employed to examine adherence to medication, self-care behaviors and their understanding of prescribed treatment and the overall purpose of CHF management among adult patients with chronic heart failure on follow-up at the cardiac follow-up clinic of Jimma University Specialized Hospital by interviewing and patient chart reviewing.

5.3 Population

5.3.1 Source Population

The source population for the study was all cardiac patients diagnosed with HF and registered at JUSH cardiac follow-up clinic.

5.3.2 Study Population

The study population was adult cardiac patients who were on active follow up.

5.3.3 Sampling Unit

Adult CHF patients who have regular scheduled appointments for refill and check-up at cardiac follow up clinic.

5.3.4 Eligibility Criteria

5.3.4.1 Inclusion Criteria

Adult cardiac patients whose age was 18years and above receiving treatment as outpatients presenting at cardiac follow-up clinic

5.3.4.2 Exclusion Criteria

Patients who were critically ill and unwillingness to give informed consent

5.4 Sample Size Determination and Sampling Procedure

5.4.1 Sample Size Determination

A single population proportion formula, $[n = (Z \ \alpha/2)^2 \ p \ (1-p)]$, was used to estimate the sample size. The following assumptions were made: since no previous data, proportion was taken as 50% (p = 0.5), 95% confidence level, margin of error 5% (d = 0.05). Computing with the above formula gives a total sample size of 384.

$$n = (Z \ \alpha/2)^2 \ x \ p \ (1-p)/d^2$$

$$n = (1.96)^2 x \ 0.5(1-0.5)/ \ (0.05)^2$$

$$n = 384$$

Source population <10,000 adjusting formula:

$$nf = n/[1+(n/N)]$$

$$nf = 384/[1+(384/1319)]$$

$$nf = 298 \ patients$$

Considering 10% non response rate the final sample size= 328.

5.4.2 Sampling Techniques

All outpatients with HF who were making scheduled visits to the cardiovascular outpatient clinic of the JUSH were included. The cardiac clinic schedule was once a week every Friday then patients who full fill the above criteria based on their medical chart number was interviewed using systematic sampling technique when they came for follow up at the chronic care clinic. The sampling interval was therefore 4. The number of the first patient to be included in the sample was chosen randomly, for example by blindly picking one out of 4 patient cards, numbered 1 to 4. If number 2 was picked, then every 4 patient was included in the sample, starting with patient card number 2, until 328 patients were selected: the numbers selected were 2, 6, 10, and 14.

5.5 Data Collection Tools
5.5.1 Questionnaires

Revised Heart Failure Self Care Behavior Scale and Dutch Heart Failure Knowledge Scale which were structured questionnaires were used, which addressed the following sections: socio-demographic and clinical data, medication adherence, self-care behavior (adherence to follow-up appointments, weighing behavior, dietary restriction, regular physical activity, smoking abstinence and alcohol intake), knowledge concerning CHF medication and overall CHF management. The Questionnaire was translated into local languages such as Amharic and Oromiffa and then was back translated into English language by the investigator and native speaker (10, 47). The internal consistency reliability for the scale for each item was done (i.e in this study, Cronbach's reliability of the test was 0.86). The questionnaire was then applied to the above study population on a one-to-one basis in an interview of approximately 20 minutes.

5.6 Variables

5.6.1 Study Variable

5.6.1.1 Independent Variables

Socio-demographic variables**:** Age, Sex, Marital status, Educational status, Occupation status, Living status, Co morbid condition and HF Knowledge

5.6.1.2 Outcome Variables

Primary Outcome**:** Self-care behaviors adherence

Secondary Outcomes**:** NYHA functional status and Re-admission rate

5.7 Data Collection Techniques

Data were collected using structured questionnaire filled by data collectors through face to face interview of patients and patient clinical profile and re-admission rate was reviewed by using patient chart besides patient report. Data collection was conducted by using trained nurses and pharmacists who were trained in interview skills, asking questions in a neutral manner without any expression of what responses were expected, and recording responses as they were provided without showing any agreement, disagreement, or surprise. A pre-test study was initiated to 20 patients with socio-demographic data, 'self-care behaviors and knowledge on HF.

5.8 Data Quality Management

The data quality control measures include: pre-testing of data collection tools, training of data collectors and supervisors and checking completeness and internal consistencies of data. To enhance the reliability of the tools to be used in this study, the instruments was prepared in English and translated from English to local language (Amharic and Afan Oromo) and re-translated back to English to check the consistency of the instrument. Moreover, the instruments to be used in the study were pre-tested on a similar population (5% of the actual sample size) which was not included in the study. Cronbach's-α reliability of the modified revised self-care behaviors scale in this sample was 0.86.

The data collectors and supervisors were trained, demonstrated, and practiced the data collection technique to be familiar with the tools to be used and the overall purpose of the research project. The data collectors were given data collecting instrument in the morning of each day. At the end of each day the supervisors was checked the completeness of the questionnaires. Continuous follow up of the completeness of questionnaires and over all process was carried out by the principal investigator.

5.9 Data Analysis

Descriptive statistics and measures of frequency were conducted to describe the study population and various adherences. Data were presented as means ±standard deviation or percentages. To compare groups x^2 –analyses was used for categorical variables and the Student's t-test for continuous variables. Multivariable logistic regression models were performed in SPSS version 19.0 software to determine variables predicting poor adherence. Multivariable logistic regression was used to identify independent predictors of medication and overall poor adherence (<75%). Determinants for medication and overall adherence was presented by odds ratio (OR) and 95% confidence intervals (CI), where an OR = 1 indicated no influence on adherence. Overall adherence is the composite score of each individual self-care behavior items.

5.10 Operational Definitions

In accordance with previous studies of this type (8, 10), medication adherence is defined as ≥75% of the prescribed number of pills (dose) taken each day and the timing of doses (taking pills within a prescribed period). Similarly, appointment adherence will be defined as being present at ≥75% of the assigned appointments consisting of monthly medication refills at the hospital pharmacy in the last three months.

In accordance with the European Society of Cardiology guidelines self-care behavioral adherence is defined as daily weight monitoring, daily intake of five servings of fruit and vegetables, drinking less than two liters of fluids per day, being physically active, with compensated CHF two to three times per week, refraining from smoking and keeping a moderate alcohol intake (one beer, one to two glasses of wine per day) (9, 38).

Patients will be categorized as "adherent" if they had an overall score of 75% or greater. For individual health behaviors, patients will be categorized as "adherent" if they had a score of 75% or greater, which corresponded to being adherent "most of the time" or "all of the time" (10, 23).

Patients will be categorized as "high levels of HF knowledge" if they had an overall score of 75% or greater Knowledge about HF and its treatment, which corresponded to being knowledgeable " ≥10.5 out of maximum 14 score" in heart failure knowledge scale.

5.11 Ethical Considerations

Ethical clearance was obtained from the Institutional Review Board of Jimma University, College of Public Health and Medical Sciences. Permission was obtained from the hospital officials before data collection. Each study participant was adequately informed about the purpose, method, anticipated benefit and risk of the study by the data collectors. A written consent was obtained from study participants and anonymity was maintained to ensure confidentiality.

5.12 Plan for Data Dissemination and Utilization of Findings

The findings will be presented to the Jimma University scientific community and will be submitted to the College of Public Health and Medical Sciences Department of Pharmacy. The findings will also be communicated to the local health planners and other relevant stakeholders at hospital and lower level in the area to enable them take recommendations in to consideration during their planning process. Presentation and publication to scientific forum and journals will be considered.

6. RESULTS

6.1. Socio-Demographic Characteristics

There were 328 participants included in the study, 182 (55.5%) men, ranging in age from 18 to 90 years (M 52.02, SD 16.54 years). Most participants (n =242, 73.8%) were married. Majority of participants (n=287, 87.5%) reported as living with a spouse, parent, child, friend, sibling, or other type of housemate. The education level of participants (n=185, 56.4%) were illiterate, and (n=42, 12.8%) were able to read and write only. Majority of participants (n= 207, 63.1%) were farmers (Table 1).

Table 1. Frequency distribution of HF patients on follows up by socio-demographic characteristics disaggregated by gender at JUSH, February 2013.

Variable	Total (%) n =328	Men (%) n=182	Women (%) n=146
Age(mean± SD)	52.02±16.54	56.63±15.42	46.28±16.15
Marital status			
Married	242 (73.8)	163 (89.6)	79 (54.1)
Single	22 (6.7)	11 (6.0)	11 (7.5)
Divorced	1 (0.3)	0 (0.0)	1 (0.7)
Widowed	63 (19.2)	8 (4.4)	55 (37.7)
Living status			
Live alone	41 (12.5)	21 (11.5)	20 (13.7)
Live with someone	287 (87.5)	161 (88.5)	126 (86.3)
Educational level			
Illiterate	185 (56.4)	90 (49.5)	95 (65.1)
Read and write only	42 (12.8)	31 (17.0)	11 (7.5)
Elementary	67 (20.4)	44 (24.2)	23 (15.8)
High school	27 (8.2)	13 (7.1)	14 (9.6)
Diploma and above	7 (2.1)	4 (2.2)	3 (2.1)
Occupation			
Government employee	17 (5.2)	11 (6.0)	6 (4.1)
Merchant	20 (6.1)	11 (6.0)	9 (6.2)
Farmer	207 (63.1)	135 (74.2)	72 (49.3)
Daily laborer	32 (9.8)	5 (2.7)	27 (18.5)
Others	52 (15.9)	20 (11.0)	32 (21.9)

*Others: Retire, Driver (private), Unemployed

6.2. Clinical profile

The overwhelming majority of the study participants (n=202, 61.6%) and (n=79, 24.1%) were in New York Heart Association (NYHA) class III and II respectively, and the remaining were (n=46, 14.0%) in NYHA class IV.

Of the 328 participants in the sample, (180, 54.9%) had single admissions (index admission only), (6, 1.8%) had greater than four times admission. The remaining 99 (30.2%) patients had no previous admissions. The mean (SD) readmission rate for the 229 patients with multiple hospital readmissions was 0.95($\pm$0.94) (range 1 to 5).

Although 177 (54.0%) participants were free from any co-morbid diseases, the remaining participants were with chronic multimorbidity with [hypertension (81, 24.7%), diabetes mellitus (8, 2.4%), kidney disease (24, 7.3%), hypertension+ diabetes mellitus (2, 0.6%), hypertension + kidney disease (30, 9.1%) and diabetes mellitus + kidney disease (6, 1.8%)]. The overall demographic profile of the study is presented in Table 2.

Table 2. Frequency distribution of HF patients on follows up by clinical profiles disaggregated by gender at JUSH, February 2013.

Variable	Total (%) n =328	Men (%) n=182	Women (%) n=146
Clinical profile			
NYHA functional class			
I	1 (0.3)	1 (0.5)	0 (0.0)
II	79 (24.1)	40 (22.0)	39 (26.7)
III	202 (61.6)	120 (65.9)	82 (56.2)
IV	46 (14.0)	21 (11.5)	25 (17.1)
Co-morbid condition			
None	177 (54.0)	93 (51.1)	84 (57.5)
HTN	81 (24.7)	47 (25.8)	34 (23.3)
DM	8 (2.4)	7 (3.8)	1 (0.7)
KD	24 (7.3)	15 (8.2)	9 (6.2)
HTN+DM	2 (0.6)	0 (0.0)	2 (0.6)
HTN+KD	30 (9.1)	15 (8.2)	15 (10.3)
DM+KD	6 (1.8)	5 (2.7)	1 (0.7)
Admission rate			
none	99 (30.2)	43 (23.6)	56 (38.4)
one	180 (54.9)	109 (59.9)	71 (48.6)
two	33 (10.1)	21 (11.5)	12 (8.2)
three	6 (1.8)	5 (2.7)	1 (0.7)
four times	4 (1.2)	1 (0.5)	3 (2.1)
>four times	6 (1.8)	3 (1.6)	3 (2.1)

6.3. Frequency of HF self-care behaviors

Four of the top eight most frequently performed self-care behaviors were related to taking prescribed medications (Table 3). The other frequently performed self-care behaviors were being non smoker, limiting alcohol intake to one glass a day, keeping doctor appointments and taking rest when they are short of breath, after having HF.

The seven least frequently performed self-care behaviors were concerned with symptom monitoring or symptom management. These infrequently performed behaviors included behaviors related to making physician contact when experiencing the following HF symptoms: shortness of breath, tired all the time or more tiredness, swell of ankles, legs or stomach, anxious about their worsening symptoms of heart failure and nausea. The other behaviors infrequently performed included watching how much water they pass (urinate or pee) each day and putting their feet up when they sit in a chair. The remaining 11 HF self-care behaviors were reported to be performed either "a good bit of the time" (''half- of the time'') or "some of the time." Table 3 displays the means for the HF self-care items in rank order from those performed "most of the time" to those performed "a little of the time."

Table 3 Mean HF self-care behavior item scores in rank order in patients with HF on follow up at JUSH, February 2013.

Rank order Self-care behavior	Mean score
1. I am a non-smoker.	4.984
2. I limit my alcohol intake to one glass of beer or wine, or one shot a day.	4.917
3. I keep my appointments with my doctor.	4.908
4. I always refill prescriptions for my pills on time.	4.859
5. I take my pills every day.	4.832
6. I take my pills as the doctor Prescribed— I take all the doses of my pills.	4.823
7. I have a system to help tell me when to take my pills.	4.289
8. When I am short of breath, I rest.	4.054
9. I watch that I do not eat canned Soups or TV dinners.	3.911
10. When I am short of breath or tired, I ask for help with something I am unable to do	3.762
11. I believe that having heart failure is a condition that I can adjust to.	3.182
12. I stay away from people who have a cold or flu.	3.137

13. I talk to my doctor and family about my condition in order to make choices and plans for the future.	3.054
14. To help reduce my symptoms, like fatigue or shortness of breath, I limit the activities that are hard for me.	3.039
15. I think a person can live a happy and good life even after having heart failure.	2.914
16. I am careful not to drink "too many" fluids	2.859
17. I plan rest times during my day.	2.765
18. I am physically active (for example, walk) on 3 to 4 days per week.	2.448
19. I spread my activities out over the whole day so I do not get too tired.	2.024
20. I watch how much water I pass (urinate or pee) each day	1.804
21. I contact my doctor when I feel more short of breath.	1.771
22. I contact my doctor when I realize I am feeling tired all the time.	1.719
23. I contact my doctor when I see my feet, ankles, legs or stomach swell.	1.710
24. When I feel anxious about my worsening symptoms of heart failure I talk with my doctor about it.	1.624
25. I contact my doctor when I have nausea or do not feel like eating.	1.588
26. I put my feet up when I sit in a chair.	0.487

*__Mean score of individual self-care items__ = No. of patients [0+1+2+3+4+5]

Total no. patients (328)

Where**:** 0=none of the time, 1=a little of the time, 2=some of the time, 3=a good bit of the time, 4=most of the time and 5=all of the time

*__Overall mean score__ = the sum of each individual means (means of 26 items)

26

6.4. Adherence level of HF patient

The adherence rate for overall HF self care behaviors was low (M, 62.6%) (SD, 12.7%).Higher levels of adherence for individual self-care behaviors (>90%) were noted for follow-up appointments, taking prescribed medications, and smoking and alcohol cessation. Overall, 98.5% of all study participants kept ≥ 75% of their follow up appointment schedule and were consequently designated as adherent. Overall, 308 (93.9%) adhered to 100% of their follow-up appointment schedule. Poor adherence (<75%) on the scale was observed with fluid and exercise recommendations.

According to the criteria we used for 'overall adherence' only a total of 57(17.4%) of the patients were adherent and271 (82.6%) of the patients were non adherent. The adherence rate for the individual self-care behaviors: reported adherence with smoking was very high in this population; 328 (100%) of the patients reported that they always or most of the time do not smoke tobacco or cigarette.

Most patients 320 (97.6%) indicated that limiting alcohol intake to one glass a day, 323 (98.5%) keeping doctor appointments, 314 (95.7%) taking prescribed medications(overall 4 items), 314 (95.7%) reported that they most of the time or all of the time take their pills every day, 312 (95.1%) reported that they always take their pills as the doctor prescribed— they take all the doses of their pills, 318(97.0%) they always refill prescriptions for their pills on time, 303(92.4%) reported that they have a system to help tell them when to take their pills. Two hundred sixty six (81.1%) taking rest when they are short of breath, 268 (81.7%) following a low-sodium diet is important, 122(37.2%) reported to be adherent their recommended fluid restriction, 55(16.8%) patients stated that it is important to engage in some exercise doing so. Reported adherence with learning to live with the effects of HF and the effects of HF treatments was very low in this population; 17(5.2%) of the patients reported that they put their feet up when they sit in a chair either ''most of the time'' or ''all of the time.'' In addition, 115(35.1%) of patients reported that they stay away from people who have a cold or flu. Table 4 demonstrates adherence to different self-care behaviors.

Table 4. Scores for self-care behavior variables in percentage in patients with HF (N = 328) on follow up at JUSH, February 2013.

Variable	Minimum	Maximum	Mean	SD
Overall Adherence	23	97	62.6	12.7
Medication	0	100	94	11.8
Follow-up appointments	0	100	98.2	9
Diet/Salt restriction	0	100	78.2	23.2
Smoking cessation	80	100	99.7	2.4
Alcohol cessation	40	100	98.2	7.4
Exercise	0	100	47	27
Fluid restriction	0	100	57.2	26.8
Cold/flu prevention	0	100	62.7	20.5
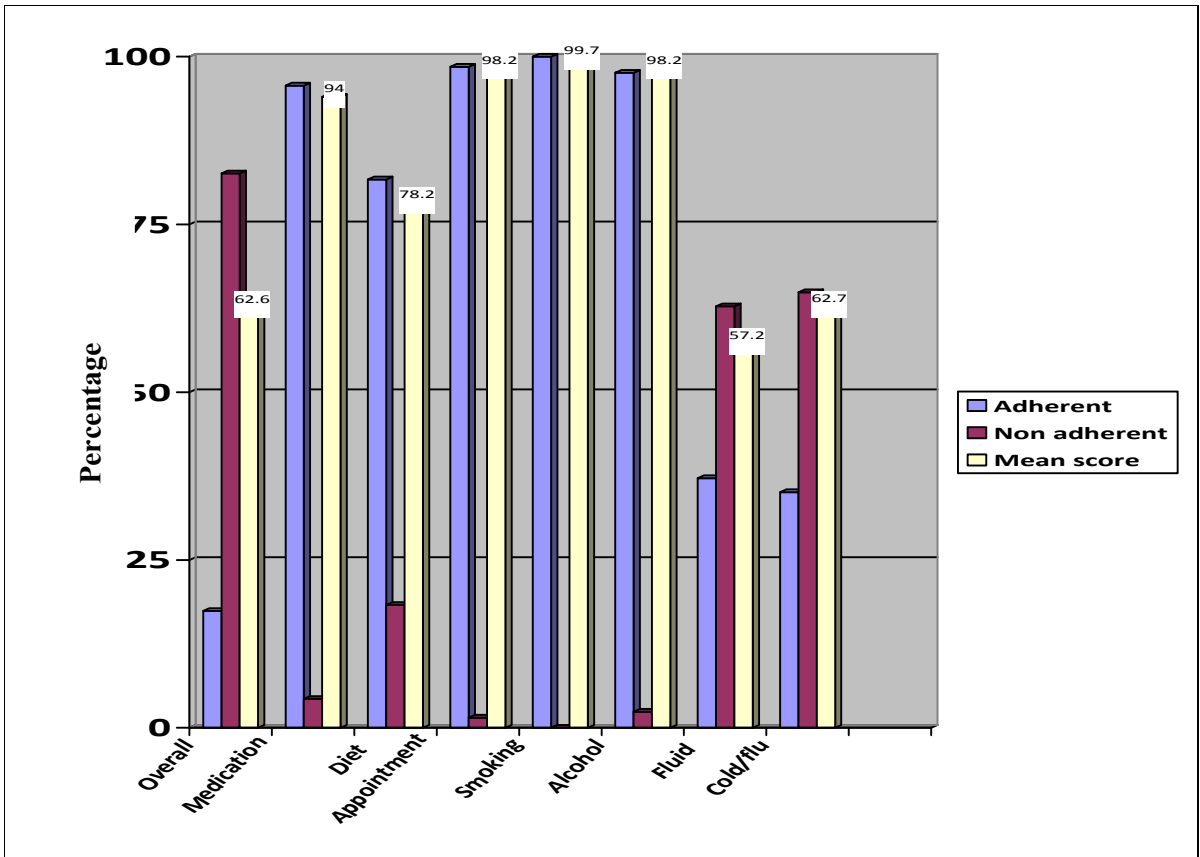
Figure 2 Percentage of mean adherence level for selected self-care items and percentage of patients with their respective adherence level in patients with HF on follow up at JUSH, February 2013.

6.5. Level of knowledge on HF

The total score on the Dutch HF Knowledge Scale theoretically ranges from 0 to 15 points. Self-care knowledge scores were low in this study. The mean ± (SD) total knowledge score was 7.4 ± 2.2, with a range of 12 out of a possible maximum score of 14 points.

Percentages of the different knowledge categories are presented in Table 5. Patients scored particularly low on the question of why those with HF should follow a low salt diet; only 106 (32.3%) knew that salt promotes fluid retention and out of 222 (67.7%) of the patients 84 (25.6%) patients thought that salt causes constriction of the blood vessels and 138 (42.1%) patients thought that salt increases the heart rate. Similarly patients scored low on the question of how often those with severe HF should weigh themselves; 126 (38.4%) knew that it is important to weigh daily and 13 (4%) of the patients thought they should weigh every now and then and 189 (57.6%) weigh every week.

There was also a knowledge deficit on the best measures to do in case of increased shortness of breath or swollen legs that indicates worsening of their HF; 124 (37.8%) of the patients knew that it is important to call (see) the doctor or the nurse. Around sixty percent 199 (60.7%) of the patients answered they should wait until the next check-up and 5 (1.5%) preferred taking less medication.

Table 5 Frequency of patients with HF identifying the correct answer on each item of the HF knowledge questionnaire (n = 328)   on follow up at JUSH, February2013.

Items	Correct Answer Identified n (%)
1. Which of these statements is true? x It is important that I take my heart failure medication regularly	279(85.1)
2. What is the function of the heart? x to pump blood around the body	264(80.5)
3. What are the main causes of heart failure? x a myocardial infarction and high blood pressure	206(62.8)
4. How much fluid are you allowed to take at home each day? x 1.5 to 2.5 litres at the most	194(59.1)
5. Which statement about exercise for people with heart failure is true? x it is important to exercise at home and to rest regularly in between	193(58.8)
6. Why can the legs swell up when you have heart failure? x because of accumulation of fluid in the legs	177(54.0)
7. Which statement about weight increase and heart failure is true? x in case of an increase of over 2 kilograms in 2 or 3 days, you should contact your doctor or nurse	174(53.0)
8. Why are water pills prescribed to someone with heart failure? x to prevent fluid retention in the body	168(51.2)
9. What can cause a rapid worsening of heart failure symptoms? x a cold or the flu	158(48.2)
10. What does heart failure mean? x that the heart is unable to pump enough blood around the body	143(43.6)
11. How often should patients with severe heart failure weigh themselves? X Every day	126(38.4)
12. What is the best thing to do in case of increased shortness of breath or swollen legs? x call the doctor or the nurse	124(37.8)
13. Why is it important that patients with heart failure should weigh themselves regularly? x To check whether the body is retaining fluid	109(33.2)
14. Why should someone with heart failure follow a low salt diet? x salt promotes fluid retention	106(32.3)

6.6. Relationship between HF knowledge and HF self-care behaviors

Self-care knowledge scores were low in these study subjects. The mean total knowledge score was 7.38, with a range of 1 to 13, out of a possible maximum score of 14. There was a significant relationship between the mean total knowledge score and the mean total self-care behavior score (r = 0.598, P =0.01) which is imperfect positive correlation (0< r <1).
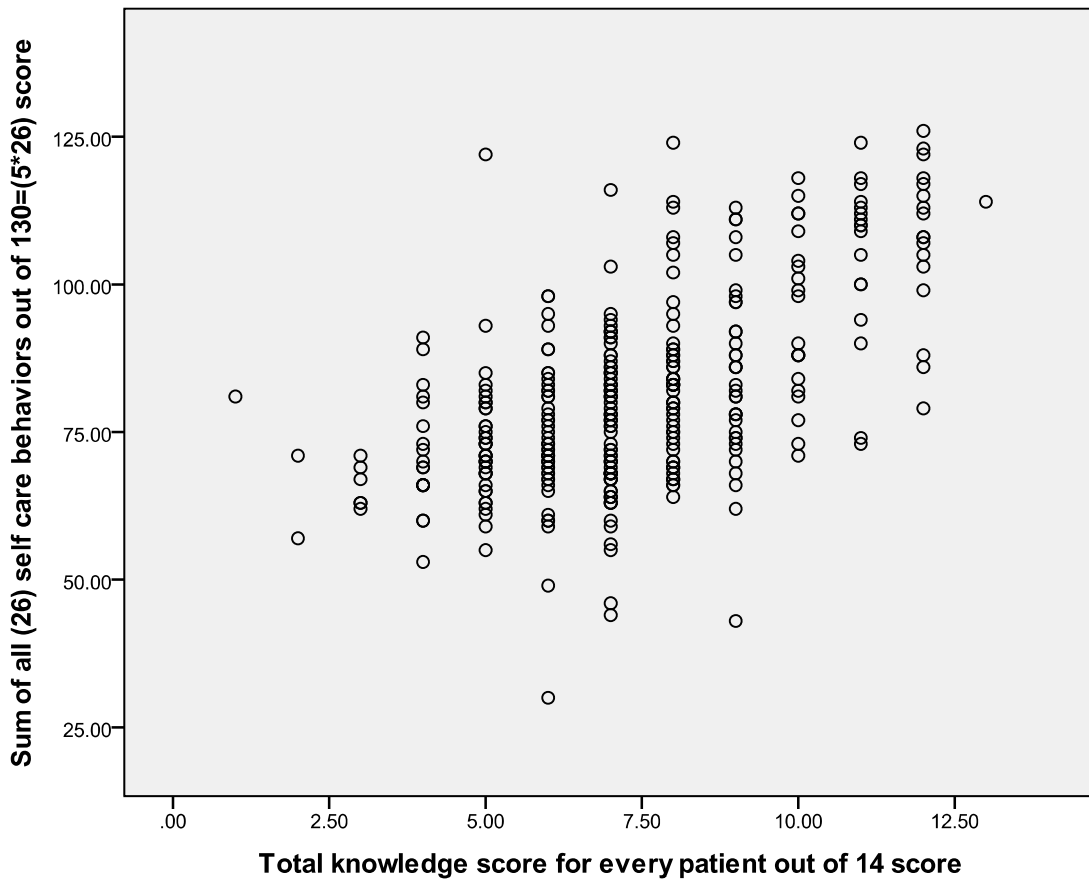
Figure 3 The correlation between mean score of self-care behaviors and mean knowledge score about HF and HF regimens in Patients with HF on follow up at JUSH, February 2013.

6.7. Association between factors and overall adherence in bivariate analysis

Overall a majority of patients (82.6%) were non adherent to their self-care medical recommendations. Logistic regression analysis was employed to predict the probability that a patient would be non-adherent to overall self-care behaviors. Among baseline patient characteristics, the following were assessed for their potential impact on total self-care behavior score: age, co morbidity, education, gender, marital status, living arrangement, occupation, NYHA functional class, and re admission. Analysis was conducted on the 328 patients with complete data on the variables of interest (there were no missing values. Poor adherence was associated with age, marital status, NYHA functional class, co morbidity and HF knowledge in bivariate analysis (Table 6). Gender, living arrangement, education level, occupation and history of readmission were not associated with adherence. There were no sex-related differences (82.9% women vs 82.4% men; $P=0.91$).

Table 6 The results of bivariate logistic regression analysis for factors associated with poor adherence to self-care behaviors in patients with HF on follow up at JUSH, February 2013.

Variable	Overall adherence		Odds Ratio (OR)	95%C.I.for OR		P-Value
	Adherent n=57(%)	Nonadherent n=271(%)		Lower	Upper	
Age in years						
18-35	18(26.5)	50(73.5)	1			
36-90	39(15)	221(85)	2.040	1.079	3.858	0.024**
Gender						
Male	32(17.6)	150(82.4)	1			
Female	25(17.1)	121(82.9)	1.033	0.581	1.836	0.913
Marital status						
Married	37(15.3)	205(84.7)	1			
Single	20(23.3)	66(76.7)	0.596	0.323	1.097	0.096*
Living status						
Live with someone	49(17.1)	238(82.9)	1			
Live alone	8(19.5)	33(80.5)	0.849	0.370	1.950	0.700
Education						
Literate	27(18.9)	116(81.1)	1			
Illiterate	30(16.2)	155(83.8)	1.203	0.678	2.133	0.528
Occupation						
Others	19(15.7)	102(84.3)	1			
Farmer	38(18.4)	169(81.6)	0.828	0.453	1.514	0.541
Co-morbidity						
None	41(23.2)	136(76.8)	1			
With co morbidity	16(10.6)	135(89.4)	2.544	1.362	4.75	0.003†
NYHA class						
Class III and IV	50(20.2)	198(79.8)	1			
Class I and II	7(8.8)	73(91.3)	2.633	1.142	6.071	0.023**
Readmission						
≥ 1 admission	41(17.9)	188(82.1)	1			
No admission	16(16.2)	83(83.8)	1.131	0.601	2.130	0.702
Knowledge on HF						
≥10.5 score	28(80.0)	7(20.0)	1			
<10.5 score	29(9.9)	264(90.1)	36.414	14.61	90.707	0.000††

C.I- confidence interval, *P<0.25, **P<0.05, †P<0.01, ††P<0.001

6.8 Association between factors and overall adherence in multivariable analysis

The results of multivariate analysis are shown in Table 7. The predictor variables were participant's age, marital status, Co-morbidity, NYHA functional class) and HF knowledge. Only age, Co-morbidity, and NYHA functional class and HF knowledge were independent predictors of poor adherence to self-care behavior. However, marital status was not a statistically significant predictor (P= 0.123).

Table 7 The results of multivariable logistic regression analysis for factors associated with poor adherence to over all self-care behaviors in patients with HF on follow up at JUSH, February 2013.

| Variable | Overall adherence | | Adjusted Odds Ratio | 95%C.I.for OR | | P-Value |
	Adherent n=57(%)	Nonadherent n=271(%)		Lower	Upper	
Age in years						
18-35	18(26.5)	50(73.5)	1	0.948	3.82	0.049**
36-90	39(15)	221(85)	1.903			
Marital status						
Married	37(15.3)	205(84.7)	1	0.325	1.15	0.132
Single	20(23.3)	66(76.7)	0.613			
Co-morbidity						
None	41(23.2)	136(76.8)	1	1.310	4.90	0.006†
With co morbidity	16(10.6)	135(89.4)	2.534			
NYHA class						
Class III and IV	50(20.2)	198(79.8)	1	1.573	9.13	0.003†
Class I and II	7(8.8)	73(91.3)	3.791			
HF Knowledge						
≥10.5 score	28(80.0)	7(20.0)	1	13.432	105.746	0.000††
<10.5 score	29(9.9)	264(90.1)	37.688			

C.I. -Confidence Interval, **P<0.05, †P<0.01, ††P<0.001

6.10 Association between factors and medication adherence in bivariate analysis

Overall a minority of patients (4.3%) were non adherent to their HF medications. Poor adherence was associated with occupation, NYHA functional class, and re admission in bivariate analysis (Table 8). The remaining variables were not associated with poor overall

medication adherence in the bivariate analysis. There were slight sex-related differences (4.8% women vs 3.8% men; P=0.68).

Table 8 The results of bivariate logistic regression analysis for factors associated with poor medication adherence in patients with HF on follow up at JUSH, February 2013.

Variable	Overall adherence			95%C.I.for OR		
	Adherent n=314(%)	Nonadherent n=14(%)	Odds Ratio	Lower	upper	P-Value
Age in years (old)						
18-35	66(97.1)	2(2.9)	1			
36-90	248(95.4)	12(4.6)	1.597	0.349	7.311	0.547
Gender (Female)						
Male	175(96.2)	7(3.8)	1			
Female	139(95.2)	7(4.8)	1.259	0.431	3.674	0.676
Marital status(Single)						
Married	233(96.3)	9(3.7)	1			
Single	81(94.2)	5(5.8)	1.598	0.520	4.908	0.413
Living status (alone)						
Live with someone	276(96.2)	11(3.8)	1			
Live alone	38(92.7)	3(7.3)	1.981	0.529	7.422	0.310
Education(Illiterate)						
Literate	138(96.5)	5(3.5)	1			
Illiterate	176(95.1)	9(4.9)	1.411	0.462	4.307	0.545
Occupation(Farmer)						
Others	112(92.6)	9(7.4)	1			
Farmer	202(97.6)	5(2.4)	0.308	0.101	0.942	0.039**
Co-morbidity						
None	171(96.6)	6(3.4)	1			
With co morbidity	143(94.7)	8(5.3)	1.594	0.541	4.70	0.398
NYHA class (I&II)						
Class III and IV	240(96.8)	8(3.2)	1			
Class I and II	74(92.5)	6(7.5)	2.432	0.818	7.236	0.110*
Readmission(None)						
≥ 1 admission	217(94.8)	12(5.2)	1			
No admission	97(98.0)	2(2.0)	0.373	0.082	1.698	0.202*
HF Knowledge						
≥10.5 score	34(97.1)	1(2.9)	1			
<10.5 score	280(95.6)	13(4.4)	1.579	0.200	12.446	0.665

6.11 Association between factors and medication adherence in multivariable analysis

The results of multivariable analysis are shown in Table 9. The predictor variable was participant's occupation (p<0.05). However, NYHA functional class and re admission were not a statistically significant predictors.

Table 9 The results of multivariable logistic regression analysis for factors associated with poor medication adherence in patients with HF on follow up at JUSH, February 2013.

| Variable | Overall adherence | | Adjusted Odds Ratio | 95%C.I.for OR | | P-Value |
	Adherent n=314(%)	Nonadherent n=14(%)		Lower	Upper	
NYHA class (I&II)						
Class III and IV	240(96.8)	8(3.2)	1	0.749	6.903	0.147
Class I and II	74(92.5)	6(7.5)	2.273			
Readmission(None)						
≥ 1 admission	217(94.8)	12(5.2)	1	0.070	1.507	0.151
No admission	97(98.0)	2(2.0)	0.326			
Occupation(Farmer)						
Others	112(92.6)	9(7.4)	1	0.101	0.967	0.044**
Farmer	202(97.6)	5(2.4)	0.312			

7. DISCUSSION

Sub optimal adherence to individual and overall HF self care recommendation has been described previously (8, 10-11, 48). This study resumes the research related to HF self-care by assessing patient-reported adherence to self-care behaviors, as assessing individual behaviors and overall adherence, by defining good adherence as individual and overall a ≥75% cumulative score. Adherence to individual behaviors ranged from (9.7%) to 99.7%) however, cumulative good adherence was low at 62.7%, and only 17.4% of patients reported good adherence with all 26 self-care recommendations, indicating high rates of selective adherence. Older, co morbid, NYHA functional class I and II and low HF knowledge scored patients were more likely to be non adherent, whereas single (unmarried) and other factors were less likely. Poor adherence was strongly associated with co morbidity, knowledge and NYHA functional class (health status). Considering the high rate and cost of HF hospitalizations, these results are important. By studying adherence in a comprehensive manner, we highlight the issue of individual (selective) adherence. Moreover, like previous literature that tended to focus on particular outcomes, we assessed some of HF outcomes, including NYHA functional class and re admission.

There is considerable variation among methods used to measure adherence to self-care. Medication adherence has been studied extensively with direct measurements, example, observing intake or measuring drug levels (49). These methods are costly and impractical for routine practice and, importantly, cannot be used for all self care activities. Other methods include questionnaires and self-report, electronic medication monitors, and pharmacy refill data. Of these, self-report is the most widely used method, is specific, is easily employed and is associated with outcomes (14, 50-51). We therefore assessed patient-reported adherence, realizing that the actual adherence may be less than self-report.

Characterization of adherence has been largely arbitrary, with most studies using a ≥75% cut-off point to define medication adherence, as this threshold has been shown to have acceptable sensitivity and specificity (8, 10). By approaching adherence in a comprehensive manner, by defining good adherence as overall ≥75% adherence, we also accounted for selective (individual) adherence, which is common in HF patients. In our study, only around one fifth of patients reported good adherence with total HF self-care behavior score. Additionally, when assessed in requiring ≥75% adherence to each individual recommendation, ten items were selectively rated by patients. These data suggest relatively low adherence with total self-care and a high rate of individual adherence. These results may

explain why HF self-management trials have largely failed to demonstrate significant impact on outcomes (21). Previous studies have suggested that while most HF patients have less difficulty in adhering to medications, the majority have difficulty in adhering to exercise. (35) Likewise, in our study, the highest adherence was reported with smoking and alcohol cessation, followed by medications and the lowest with symptom monitoring and exercise. Although not possible to ascertain whether this is related to debilitating symptoms or lack of effort, these results are nevertheless concerning since exercise training is shown to be safe and associated with improved outcomes (22).

These results provide insight into the complex and personal nature of selective adherence and suggest the need for a deeper understanding of individuals' motivations and adherence behavior in order to inform the appropriate individualized intervention to improve outcomes (52-53). It is unlikely that health care quality improvement efforts will realize their full potential without complete engagement by patients.

We found several associations between patient characteristics and overall self-care behavior adherence; however, only age, co morbidity, NYHA functional class, and HF knowledge level were independently associated with poor adherence. Conflicting data exist between age and adherence (37, 54).

Compared with young age participants, old age participants were more likely to be non adherent. This finding seems contrary to the literature, which reports older patients were more likely to be adherent (11). As the prevalence of HF increases with the aging population, (2) the issue of HF self-care adherence among the elderly will become even more important. Other previous studies evaluating characteristics of the adherent vs non adherent patient have reported mixed results (34, 55-56). While it is possible that adherence may vary by sex, and educational level, other demographic and social characteristics were not associated with poor self-care in our study. We, however, highlight that older, co-morbid, NYHA functional class I and II patients and patients with low HF knowledge score represent a particularly vulnerable population that may benefit from targeted interventions. Because adherence was related to hospitalizations, these associations are especially important because HF hospitalizations have reached an all-time high (57) and account for more than half of the $39 billion annual cost of HF care(58).

Although sex, living arrangement, educational level, and occupation were not related to the total self-care behavior score, several factors influenced individual self-care behaviors.

Previous studies found that, women did not contact the doctor any more often than did men for HF-related symptoms, (10), contrary to Verbrugge's (33) hypothesis that women might be more attentive to bodily symptoms than men because of childhood socialization experiences about health. In addition, Gehi (51) noted that compared with adherent participants, non adherent participants were more likely to be female. However our findings indicated that gender was not associated with individual and total self-care behavior score.

Marital status did not have a large influence on HF self-care behaviors, contrary to the findings of Ni and colleagues, (14) who reported that being unmarried was significantly associated with non adherence to self-care recommendations. However; it was related to many individual self-care behaviors. Example, in this study, single individuals were more likely to rest during SOB and to plan rest times during their day ($p<0.01$). These findings may reflect that unmarried individuals may not be bound to household eating or activity patterns as much as married individuals are, which may give them greater opportunity to control their activities.

Although living arrangements were not related to the total self-care behavior score, it had a larger impact on individual self-care behaviors than did marital status. Patients with HF who lived alone were less likely to ask for help during SOB, perhaps because there was no one to ask. They also were less likely to contact the doctor when they noticed symptoms, possibly because they did not have the support or encouragement from anyone to do so. Individuals living alone were more likely to use pre packed foods ('Mitmita', 'Shiro' etc), perhaps because they find cooking for 1 person unenjoyable. Individuals living alone were more inclined to report being physically active than were individuals living with someone, maybe because living alone often prevents delegating obligatory activities, such as household tedious tasks or grocery shopping. Both unmarried participants and those living alone more often believed that they could lead a happy life, even with HF, perhaps because their condition was not interfering with the needs or schedules of an intimate partner or other household members.

Although education level was not associated with adherence in multivariable analysis in our study, other studies have correlated higher education levels with improved adherence (37, 59) as well as fewer emergency department visits, (60) and low health literacy was associated with poor self-care and outcomes (61).

Our finding demonstrates that the level of adherence to self-care behavior was not associated with occupation and previous admission, however; the result reported by Kato et al., 2009 revealed that occupation was independent predictor of poorer adherence to self-care behavior (19). Although occupation was not related to the total self-care behavior score, it had a larger impact on individual self-care behaviors than did education level. Patients with HF who are farmers were less likely to ask for help during SOB, perhaps because there was no access to ask around the farm area. They also were less likely to contact the doctor when they noticed symptoms, possibly because they did not have access of health facility nearby the resident or they live far distance from the hospital. They also noted that they could not get medical services unless otherwise keeping the appointment day.

Multimorbidity and NHYA functional class was strongly associated with total self care behavior score. Compared with non co-morbid participants, co-morbid participants were more likely to be non adherent, perhaps because patients with multiple chronic illnesses face additional physical, cognitive and functional challenges to effective self care. These patients are more likely to have multiple clinicians and receive confusing or conflicting recommendations. Compared with class III and IV participants, class I and II participants were more likely to be non adherent, maybe patients with NYHA functional class I and II more often believed that they currently might not have HF symptoms and realized that it could be true in the future time. This thought precludes adhering to self care behavior recommendations. Like our findings, Kato et al., found that co morbidity (diabetes mellitus) was independent predictor of poorer adherence to self-care behavior (19).

Both our findings and that of Kato et al., showed that the experience of previous HF hospitalizations was not a predictor for poorer adherence. It seems contrary to our finding (75.2%), that regardless of previous hospitalizations with HF; adherence to seeking help in case of worsening of HF was poor (19). Previous studies evaluating associations between self-care and HF outcomes have shown varied results (62-63). Although previous admission rate was not associated with adherence in multivariate analysis in our study, more than half of all HF hospitalizations have been linked to some form of non adherence with self-care. (26, 64) Some trials have demonstrated improved self-care through interventions, (31) with promising associations with outcomes. However, most studies have concentrated on only specific aspects of self-care, typically medication or dietary (32, 60). Our results highlight the importance of comprehensively addressing adherence in order to discourage selective focus on particular self-care measure at the expense of others.

Self-care behaviors related to taking medications were among those reported as performed "most of the time. This finding consistent with findings reported by Artinian (10, 19) and Verbrugge (33) three of the top five most frequently performed self care behaviors were related to taking prescribed medications and seems contrary to the literature, which reports high rates of medication noncompliance. For example, a study by Monane and colleagues (44) showed that only 10% of 7247 outpatients filled enough prescriptions to have their daily HF medication available for 1 year of follow-up (45).

Our findings on medication adherence are generally higher than reports produced from high-income countries (8). However a study conducted in Zimbabwe and South Africa attained results were similar findings that: Bhagat and Mazayi-Mupanemunda and Ruf et al. found that 73% of the 22 and 71% of the 58 investigated heart failure patients were considered compliant with their prescribed medication (8, 16). Although adherence rates from several studies in the western world vary from 71 to 99%, over half of the listed studies had an adherence rate above 80% (23, 36), that support our finding. With regard to adherence to appointment schedules, patients in this study were similar to most other reports (i.e. > 90% appointment adherence) (8, 12, 23).

In respect of fluid management, (37.2%) of our study patients reported adhering to the recommended fluid intake of less than two litres per day. In comparison, Artinian et al. (23%) (10) and Jaarsma et al. (37%) (39) reported lower, while Ruf et al. (56%) (8) and van der Wal (73%) (35) reported higher adherence rates to fluid restriction. With 16.8% of participating patients performing some form of regular exercise (especially walking 20 to 30 min per day), our results were lower than results from Ruf et al. (38%)(8) And other studies (equivalent range 39 to 67%) (12, 20, 23, 39).

Concerning smoking abstinence, unfortunately, our participating patients were abstinent in smoking tobacco. However, Ruf et al. found 16% of their participating patients persisted in smoking tobacco(8) In comparison Evangelista et al. and Carlson et al. found less than l0% of their study patients to be non-compliant in this regard (12, 20, 23).Whereas higher smoking rates have been reported by Artinian et al. (46%) and also by Evangelista et al. (55%) in a study on veterans with CHF (10, 27).

Overall, 97.6% of all study participants were adherent with regard to reduced alcohol intake. This result is higher than in studies led by Evangelista et al. where adherence to alcohol

limitation varied between 64 and 94% (12, 23, 27) compared to 56% in a cohort studied by Artinian et al(10), our results were lower than results from Ruf et al. 98%(8).

In a study lead by Ni et al., and Ruf et al., the percentage of patients choosing the correct answer on eight questions concerning CHF management varied between 43 to 90% and 29 to 89% respectively versus a range of 23.3 to 85.1% in our study (8, 14). By self-report, only 43.6% of our patients said they knew a little about CHF. Whereas Ni et al.,1999 and Ruf et al.,2010, found that only 38% and 68% of their study participants reported that they knew only a little about CHF respectively (8, 14).

It is now largely accepted that greater CHF-related knowledge has a positive impact on adherence behaviors (14, 20). Studies from South Africa were found that patient education at the cardiology out-patient department is suboptimal in respect of a number of key educational areas (8, 17). Our findings that patients demonstrated poor knowledge of the nature and the causes of HF are similar to those of a study conducted few years ago, (8, 10, 18). In our study knowledge was strongly associated with overall self care behavior adherence. Comparing participants with high score HF knowledge scale, participants with low level HF knowledge score were more likely to be non adherent, because, it is clear that increasing patients' level of knowledge as a precursor to improving self-care behavior and avoiding rehospitalizations (18). Our findings showed that more than half (57.6%) of the patients thought that weighing themselves once a week was sufficient to assess fluid status. Whereas Dracup et al.(18), found that one-third of the patients thought that weighing themselves once a week was sufficient to assess fluid status.

There were some encouraging results with regard to the provision of CHF information, but this rnay be due to the fact that study participants had to decide only whether a statement on CHF management was correct or incorrect(8). Areas of patient education that may require special emphasis to increase patient knowledge about how best to avoid HF rehospitalizations are the symptoms of worsening HF and the self-care behaviors related to monitoring fluid status (18). It is clear from this and other studies from the western world that poor adherence to treatment and CHF-related self-care behavior exposes the patient to an increased risk of clinical instability and increased symptoms (30, 47). This can result in higher than-expected hospital admission rates, which place a substantial (2, 47) (cost) burden on the healthcare system. In order to prevent the deterioration of the patient's condition, adherence to medication and other self-care behavior needs to be enhanced.

Our finding is higher than with findings reported by Ni and Artinian colleagues (10, 14), that 74% of their sample reported taking medications exactly as their physicians prescribed. It is important to note that our study and that of Artinian and Ni and their colleagues, measured medication adherence through subjective rather than objective means. In addition, patients may perceive missing 1 to 3 doses of medication a week as not meaningful and therefore report that they take all their medication. A follow-up study in which actual medication adherence rates are compared with self-reports about medication self-care would be helpful.

Occupation was predictor of poor overall medication adherence in multivariable analysis. Compared with others participants, farmer participants were 69% less likely to be non adherent. It is not clear why farmer participants reported taking their HF medications more frequently.

In other studies age as an influential factor relative to medication-taking, Artinian (10) reported age positively influenced medication-taking, perhaps as a result of the experience with taking medications over time is consistent with the findings of Morrell and colleagues, (65) who reported the young-old were more likely to adhere to their medication regimens than were other age groups. However; in our study age was not related to medication adherence.

8. LIMITATION

Several study limitations must be acknowledged. First, the cross-sectional nature of the design did not allow us to explore causal relationships. For example, it is not clear why patients with NYHA functional class (I and II) vs (III and IV) would have significantly different levels of adherence.

Second, our findings can be applied only to similar populations, because our population was predominately farmer and illiterate, and it is not clear whether the findings would have been different in a more educationally diverse population.

As self-reporting is always subjective, vulnerable to recall and biased adherence rates to self-care behavior and the measured knowledge on CHF and its management may have been affected. It is likely true that the actual adherence to self-care is lower than self-report. We also defined behavioral adherence in accordance with the European Society of Cardiology guidelines and one study from South Africa, even though they might not be applicable to our study population, considering the different disease profiles (multimorbidity), cultural and socio-demographic profiles.

Despite these limitations, our study is the first study of this dimension on medication, self-care behavior adherence and HF knowledge in Ethiopia. These data indicate the need for interventions that have already been established in the western world to improve health outcomes.

These data therefore support the need for culturally sensitive and affordable CHF management programmes that can improve treatment adherence and optimize self-care behaviors and knowledge, in order to improve CHF-related health outcomes overall in Ethiopia.

9. CONCULISION

Overall adherence with self-care behavior is low among HF patients, and selective adherence to various individual self-care behaviors is common and widely ranged mean score. Many patients in the study reported a knowledge deficit related to HF and the HF self-care behaviors, particularly salt restriction, and daily weighing. Poor overall adherence is associated with old age, multi morbidity, NYHA functional class (I & II) and low level HF knowledge. Occupation is independent predictor for poor medication adherence. Moreover, there is strong positive correlation between HF knowledge and adherence.

In this study, most participants are unable to contact doctors, do not recognize symptoms of worsening heart failure, do not watch daily urine output, do not watch the amount of sodium in pre packed foods (such as 'mitin shiro' or 'berberie', iodized salt), do not stay away from people who have a cold/flu, are unable to walk 3 to 4 days per week, do not know how much sodium and fluid they should be taking daily, and have a variety of misconceptions about heart failure etiology, prognosis and management.

Future health professional's interventions should be directed to these vulnerable populations in order to improve their clinical outcomes. These results highlight a major opportunity for further clinical and research effort in understanding and improving self-care adherence to optimize HF outcomes.

10. RECOMMENDATION

In this study the most contributors for poor cumulative adherence are self-care behaviors related to symptom recognition and management and seeking appropriate medical assistance for their HF. Therefore, we recommend that (HCP) health care providers provide comprehensive HF education and counseling that is not only focused on knowledge, but also on skills and behavior.

To improve overall self-care behavior adherence the following strategies can be used:

- HCP to screen routinely for barriers to self-care behaviors (e.g. inability to contact doctors during worsening of their HF symptoms) so that solutions can be developed before poor self-care behavior adherence is evident.

- HCP need to encourage patients seeking appropriate medical assistance for their HF. (e.g. should contact their doctor: when they feel more short of breath, when they see their feet, ankles, legs or stomach swell, when they have nausea or do not feel like eating, when realize they are feeling tired all the time; in between without keeping medical appointments by providing structured and individually reinforced education, tailored at previous knowledge, literacy level, and cultural background.

- If possible, subsidizing and providing weight scale enables patients to weigh themselves every day at home, because almost all our study participants have follow up visit every three month, this precludes them from recognizing weight gain changes, so that they may consider flexible diuretic regimen/dose.

- Physicians need to adapt communication to patient's history, view of HF and treatment and expectations of the patient related to the treatment. (e.g. modifying the self-concept in accepting oneself as having HF, so they believe that having heart failure is a condition that they can adjust to, and they think a person can live a happy and good life even after having heart failure).

- Include family, friends, and other care-givers in education and counseling activities and provide educational materials (such as brochures, verbal education, or/and video-based education) and methods (such as support groups) to address different learning styles and needs and create a non-threatening climate and an inspiring learning atmosphere. Ask each patient what they would like to know more about. So that they may learn how to live with the effects of HF and the effects of HF treatments, (e.g.

patients should talk to doctor and family about condition in order to   make choices and plans for the future and when they feel anxious about worsening symptoms of HF. Learning to put feet up when they sit in a chair as well.)

- The hospital should set mutually agreed goals for learning, viewed as an on-going process of continuous learning by the patient and the health-care provider (e.g. we hope that nurses at cardiac follow up clinic can play an important role in this regard by providing information).

- Future research in the area of self-care should be focused at identifying and targeting risk groups for poor self-care behaviors. Prospective studies evaluating the short- and long-term outcomes of tailored programmes targeted to improve self-care are needed. This includes the evaluation of specific educational strategies and the effectiveness of innovative methods of communication. The economic and social consequences of chronic HF should also receive due attention in future research, as it involves lifelong medical care and social support with significant socioeconomic burden to the individual and the society at large.

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APPENDICES

QUESTIONNAIRE

SECTION 1: Socio-Demographic Characteristics of Study Participants

I am going to ask you questions about yourself. Please feel free and answer to the best of your ability.

1. Age? ☐

2. Gender?   Male ☐   Female ☐

3. Marital status?   Married ☐   Single ☐   Divorced ☐   Widowed ☐

4. Who are you living with?   Live alone ☐   Live with someone ☐

5. Educational level?

   Illiterate ☐   Elementary ☐   High School ☐

Read and write only ☐   Diploma and above ☐

6. Occupation?   Government employee ☐   Merchant ☐   Others ☐

                 Daily laborer ☐   Farmer ☐

SECTION2: Clinical Profile of Study Participants

7. Co-morbid Conditions_____

8. NYHA Functional Classes (I,   II,   III,   IV   )

9. How many times have you been admitted into hospital for heart failure in the past?

      (0   1   2   3   4   >4   )

SECTION 3: REVISED HEART FAILURE SELF- CARE BEHAVIOR SCALE

Directions: Listed below are behaviors that people with heart failure commonly use to take care of themselves. We are interested in how often you use these behaviors. Circle their response for each behavior listed.

Self Care Behavior	None of the Time	A Little of the Time	Some of the Time	Half of the Time	Most of the Time	All of the Time
1. When I am short of breath, I rest.	0	1	2	3	4	5
2. When I am short of breath or tired, I ask for help with something I am unable to do.	0	1	2	3	4	5
3. I contact my doctor when I feel more short of breath.	0	1	2	3	4	5
4. I contact my doctor when I see my feet, ankles, legs or stomach swell.	0	1	2	3	4	5
5. I watch how much water I pass (urinate or pee) each day.	0	1	2	3	4	5
6. I am careful not to drink "too many" fluids	0	1	2	3	4	5
7. When I feel anxious about my worsening symptoms of heart failure I talk with my doctor about it.	0	1	2	3	4	5
8. I contact my doctor when I have nausea or do not feel like eating.	0	1	2	3	4	5
9. To help reduce my symptoms, like fatigue or shortness of breath, I limit the activities that are hard for me.	0	1	2	3	4	5
I0. I believe that having heart failure is a condition that I can adjust to.	0	1	2	3	4	5
11. I spread my activities out over the whole day so I do not get too tired.	0	1	2	3	4	5
12. I plan rest times during my day.	0	1	2	3	4	5
13. I contact my doctor when I realize I am feeling tired all the time.	0	1	2	3	4	5
14. I watch that I do not eat canned Soups or TV dinners/'mitin shiro.'	0	1	2	3	4	5
15. I take my pills every day.	0	1	2	3	4	5
16. I take my pills as the doctor Prescribed— I take all the doses of my pills.	0	1	2	3	4	5
17. I always refill prescriptions for my pills on time.	0	1	2	3	4	5
18. I have a system to help tell me when to take my pills.	0	1	2	3	4	5

19. I stay away from people who have a cold or flu.	0	1	2	3	4	5
20. I am physically active (for example, walk) on 3 to 4 days per week.	0	1	2	3	4	5
21. I limit my alcohol intake to one glass of beer or wine, or one shot a day.	0	1	2	3	4	5
22. I am a non-smoker.	0	1	2	3	4	5
23. I keep my appointments with my doctor.	0	1	2	3	4	5
24. I put my feet up when I sit in a chair.	0	1	2	3	4	5
25. I talk to my doctor and family about my condition in order to make choices and plans for the future.	0	1	2	3	4	5
26. I think a person can live a happy and good life even after having heart failure.	0	1	2	3	4	5

SECTION 4: DUTCH HEART FAILURE KNOWLEDGE SCALE

This list contains a number of questions and statements about heart failure. You may or may not be familiar with the items below; but Please tick off what you think is the right answer (only tick 1 box per question). **All answers will be kept private.**

1. How often should patients with severe heart failure weigh themselves?

 ☐ Every week   ☐ Now and then   ☐ Every day

2. Why is it important that patients with heart failure should weigh themselves regularly?

 ☐ Because many patients with heart failure have a poor appetite

 ☐ To check whether the body is retaining fluid

 ☐ To assess the right dose of medicines

3. How much fluid are you allowed to take at home each day?

 ☐ 1.5 to 2.5 litres at the most   ☐ As little fluid as possible ☐ As much fluid as possible

4. Which of these statements is true?

 ☐ When I cough a lot, it is better not to take my heart failure medication

 ☐ When I am feeling better, I can stop taking my medication for heart failure.

 ☐ It is important that I take my heart failure medication regularly

5. What is the best thing to do in case of increased shortness of breath or swollen legs?

 ☐ Call the doctor or the nurse   ☐ Wait until the next check-up ☐ Take less medication

6. What can cause a rapid worsening of heart failure symptoms?

☐ A high-fat diet   ☐ A cold or the flu   ☐ Lack of exercise

7. What does heart failure mean?

☐ That the heart is unable to pump enough blood around the body

☐ That someone is not getting enough exercise and is in poor condition

☐ That there is a blood clot in the blood vessels of the heart

8. Why can the legs swell up when you have heart failure?

☐ Because the valves in the blood vessels in the legs do not function properly

☐ Because the muscles in the legs are not getting enough oxygen

☐ Because of accumulation of fluid in the legs

9. What is the function of the heart?

☐ To absorb nutrients from the blood   ☐ To pump blood around the body

☐ To provide the blood with oxygen

10. Why should someone with heart failure follow a low salt diet?

☐ Salt promotes fluid retention   ☐ Salt causes constriction of the blood vessels

☐ Salt increases the heart rate

11. What are the main causes of heart failure?

☐ A myocardial infarction and high blood pressure   ☐ Lung problems and allergy

☐ Obesity and diabetes

12. Which statement about exercise for people with heart failure is true?

☐ It is important to exercise as little as possible at home in order to relieve the heart

☐ It is important to exercise at home and to rest regularly in between

☐ It is important to exercise as much as possible at home

13. Why are water pills prescribed to someone with heart failure?

☐ To lower the blood pressure   ☐ To prevent fluid retention in the body

☐ Because then they can drink more

14. Which statement about weight increase and heart failure is true?

☐ An increase of over 2 kilograms in 2 or 3 days should be reported to the doctor at the next check-up

☐ In case of an increase of over 2 kilograms in 2 or 3 days, you should contact your doctor or nurse

☐ In case of an increase of over 2 kilograms in 2 or 3 days, you should eat less

AMHARIC VERSION/†MYƒ Ĺ ° ¨¡ /

1. እድሜ ☐   *ያታ* ሴት ☐ ወንድ ☐

2. የጋብቻ ሁኔታ ያገባ(ች) ☐ ያለገባ(ች) ☐

      የፈታ(ች) ☐ አግብቶ የፈታ(ች) ☐

3. ቤት ውስጥ አብሮህ የሚኖር/የሚያግዝህ/ ሰው አለ?

 ብቻዬን ነው የምኖረው ☐ አብሮኝ የሚኖር ሰው አለ ☐

4. የትምህርት ደረጃ ማንበብና መጻፍ የማይችል ☐

       ማንበብና መጻፍ ብቻ የሚችል ☐

 አንደኛ ደረጃ ☐ መለስተኛ ሁለተኛ ደረጃ ☐

 ከፍተኛ ሁለተኛ ደረጃ ☐ ዲፕሎማና ከዚያ በላይ ☐

5. የስራ ሁኔታ የመንግስት ሰራተኛ ☐

 የቀን ሰራተኛ ☐ ነጋዴ ☐ ገበሬ/አርሶአደር/ ☐

ክፍል 2፡ የህክምና ዝርዝርና ደረጃ ወይም ሁኔታ

6. ከልብ ድካም ተጨማሪ በሽታዎች (ሌሎች በሽታዎች ካሉ)-------------------------------

7. ኒውርክ የልብ ድካም ማህበር የአንቅስቃሴ /የህመም ደረጃዎች)

 (1 2 3 4)

8. በልብ ድካም ምክንያት ምን ያህል ጊዜ ሆስፒታል ገብተሃል (ተኝተሃል)

 (0 1 2 3 4 >4)

	መግለጫ ባህርያት	ምንም ጊዜ	በጣም ጥቂት ጊዜ	አንዳንድ ጊዜ	በከፊል	አብዛኛውን ጊዜ	ሁል ጊዜ
1	ትንፋሽ /አስትፋስ/ ሲያጥረኝ እረፍት አደርጋለሁ።	0	1	2	3	4	5
2	እስትፋስ ሲያጥረኝ ወይም ሲደክመኝ ምንም ማድረግ ስለማልችል የሌላ ሰው እርዳታ /እገዛ እፈልገለሁ።	0	1	2	3	4	5
3	በጣም እስትፋስ ሲያጠውረኝ ሐኪሜን አማክራለሁ።	0	1	2	3	4	5
4	እግሬ፣ ጭማዬ፣ ቁርጭምጭሚቴ ወይም ሆዬ አካባቢ ሲያብጥ ሐኪሜን አማክራለሁ።	0	1	2	3	4	5
5	የሸንት መጠኔን በየቀኑ እመለከታለሁ።	0	1	2	3	4	5
6	ብዙ ውሃ እንዳልጠጣ ጥንቃቄ አደርጋለሁ።	0	1	2	3	4	5
7	የልብ ድካም ምልቶች ሲባስብኝ ለሀኪሜን አማክራለሁ።	0	1	2	3	4	5
8	የምግብ ፍላጎቴ ሲቀንስ ሀኪሜን አማክራለሁ።	0	1	2	3	4	5
9	የልብ ድካም ምልክቶች ለመቀነስ ከባድ እንቅስቃሴ አላደርግም።	0	1	2	3	4	5
10	የልብ ድካም ህመም መስተካከል የሚችል መሆኑአስምናለው ሀኪም ያዘዘን ካደረግን።	0	1	2	3	4	5
11	ሙሉ ቀን እንቅስቃሴ ሳደርግ (ስራ ስስራ) ነው የምውለው እናም ምንም አይነት የድካም ስሜት አይሰማኝም።	0	1	2	3	4	5
12	በቀን ውስጥ የማርፍባቸውን ጊዜያቶች አቅዳለሁ።	0	1	2	3	4	5
13	ሙሉ ቀን ድካም ሲሰማኝ ሀኪም አማክራለሁ።	0	1	2	3	4	5
14	የታሸጉ ምግቦችን አይቤ ነው ምመገበው።/ስ/ሮ፣ዘ/ት ወዘተ	0	1	2	3	4	5
15	ክኒኔን(መድሀኒቴን)በየቀኑ እወስዳለሁ።	0	1	2	3	4	5
16	ሀኪም ያዘዘልኝን ክኒን መጠን ሁሉንም እወስዳለሁ።	0	1	2	3	4	5
17	መድሃኒቴን(ክኒኔን) በቀጠሮዬ መጥቶ እወስዳለሁ።	0	1	2	3	4	5
18	መድሀኒቴን የምወስድበትን ሰአት እንዳልረሳ የማስታወሻ ዘዬ እጠቀማለሁ።	0	1	2	3	4	5
19	ጉንፋን ኪያዛቸው ሰዎች እርቃለሁ።	0	1	2	3	4	5
20	አካላዊ እንቅስቃሴ ለምሳሌ የእግር ጉዞ በሳምንት 3 እና4 ቀናት አደርጋለሁ።	0	1	2	3	4	5
21	የአልኮል መጠጥ ፍጆታዬን ከአንድ ጠርሙስ ቢራ /አንድ ብርጭቆ ጠላ፣ ጠጅ/አንድ መለኪያ አረቄ አላሰበልጥም።	0	1	2	3	4	5
22	ሲጋራ አላጨስም።	0	1	2	3	4	5

23	የህክምና ቀጠሮዬን እጠብቃለሁ።	0	1	2	3	4	5
24	ወምበር ላይ ስቀመጥ እግሬን ወደላይ/ከፍ/አደርጋለሁ።	0	1	2	3	4	5
25	ስለወደፊት የህመም ሁኔታ አማራጭችና እቅዶች ከሀኪሜ ጋር አወራለሁ/እማከራለሁ።	0	1	2	3	4	5
26	ልብ ድካም ያለበት ሰው ደስተኛና ጥሩ ህይወት መኖር ይችላል ብዬ አስባለሁ።	0	1	2	3	4	5

የተሻሻለው ልብ ድካም እውቀት መለኪያ /ደች ኸርት ፌለር ኖሌጅ ሼኬል/

1. ከፍተኛ የልብ ድካም ያለባቸው ሰዎች ለምን ያህል ጊዜ ክብደታቸውን ይለካሉ?

   ☐ በየሳምንቱ

   ☐ አሁንም አሁንም

   ☐ በየቀኑ

2. የልብ ድካም ያለባቸው በሽተኞች በመደበኛ ጊዜ ክብደታቸው መለካታቸው ምን ጥቅም አለው?

   ☐ ምክንያቱም ብዙ የልብ ድካም በሽተኞች ዝቅተኛ የምግብ ፍላጎት አላቸው።

   ☐ ሰውነታቸው ፈሳሽ መያዙን ለማረጋገጥ

   ☐ ትክክለኛ የመድኃኒቶች መጠን ለማሳስ

3. በቤት ውስጥ በእያንዳንዱ ቀን ምን ያህል ፈሳሽ ለመውሰድ ትፈቅዳለህ?

   ☐ 1.5 እስከ 2.5 ሊትር በበዛ

   ☐ በተቻለ መጠን ጥቂትና ጥቂት ፈሳሽ

   ☐ በተቻለ መጠነው ብዙና ብዙ ፈሳሽ

4. ከሚከተሉት ዓረፍተ ነገሮች የትኛው ትክክል ነው?

   ☐ በጣም በሚያስብልኝ ጊዜ የልብ ድካም መድኃቴን አለመውሰድ ይሻላል።

   ☐ በሚሻለኝ ጊዜ የልብ ድካም መድኃኒቴን ማቁረጥ እችላለሁ።

   ☐ የልብ ድካም መድኃኒቴን በመደበኛ ሰአት መውሰድ በጣም ጠቃሚ ነው።

5. የእስትንፋስ ማጠር ወይም የእግሮች ማበጥ ሲጨምር ምን ማድረግ ትመርጣለህ?

   ☐ ሐኪም ወይም ነርስ እጠራለሁ/እታያለሁ

   ☐ እስከሚቀጥለው ቀጠሮ እጠብቃለሁ

   ☐ ዝቅተኛ/ያነሰ የመድኃኒት መጠን እወስዳለሁ።

6. የልብ ድካ ምልክቶች በፍጥነት መባባስ ምክንያቱም ምን ሊሆን ይችላል?

   ☐ ከፍተኛ ጨማ ምግብ

   ☐ ጉንፋን ወይም የመተንፈሻ ቧንቧ እንፌክሽን በሽታ

   ☐ እንቅስቃሴ አለማድረግ

7. ልብ ድካም ምን ማት ነው?

   ☐ ልብ ደም ወደተለያ የሰውነት ክፍሎች ለመርጨት አለመቻል ነው።

   ☐ አንድ ሰው በቂ የአካል እንቅስቃሴ ባለ ማድረግና የመነሳቆል ሁኔታ ነው።

   ☐ በልብ የደም ቧንቧ የደም መረጋት መኖር ነው።

60

8. የልብ ድካም በሚኖርሁ ጊዜ ለምንድን ነው እግሮቻን ማበጥ የሚችሉት?

☐ ምክንያቱም እግሮቻን ደም ቢነቢች ውስጥ የሚገኙ ቀለበት መሰል ክፍሎች በትክክል አለመስራታቸውን ነው

☐ ምክንያቱም የእግሮቻን ጡንቻቸው በቂ አየር ባለማግኘታቸው ነው።

☐ ምክንያቱም የእግሮቻን ውስጥ የፈሳሽ መጠራቀም ነው።

9. የልብ ስራ ምንድነው?

☐ ከደም ንጥረ ነገሮች ለመምጠጥ

☐ ለሰውነታችን ክፍሎች ደም ለመርጨት

☐ ደምን ከአየር ጋር ለማቅረብ

10. ለምንድነው ነው አንድ የልብ ድካም ያለበት ሰው ዝቅተኛ ጨው ያለው መከተል ያለበት?

☐ ጨው በሰውነታችን ውስጥ ፈሳሽ እንዲጠራቀም ስለሚያደርግ

☐ ጨው ለደም ቢንቢዎች መጥበብ ምክንያት ስለሆነ

☐ ጨው የልብ ምትን ስለሚጨምር

11. የትኞቹ ናቸው ዋና የልብ ድካም ምክንያቶች?

☐ የልብ ጡንቻ ደም ባለማግኘት ምክንያት መሞት እና ክፍተኛ የደም ግፊት

☐ የሳምባ ችግሮች እና የሰውነት መቆጣት

☐ ከልክ በላይ ውፍረትና የስኳር በሽታ

12. የልብ ድከም ለባቻው ሰዎች የአካል እንቅስቃሴን በተመለከተ ከሚከተሉት ዓረፍተ ነገሮች የትኛው ትክክል ነው?

☐ በቤት ውስጥ በተቻለ መጠን ጥቂት ና ጥቂት የአካል እንቅስቃሴ ማድረግ የልብ ህመምን ስቃይን ለማስታገስ ጠቃሚ ነው።

☐ በቤት ውስጥ የአካል እንቅስቃሴ ማድረግ መደበኛ እረፍት በመካከል ጠቃሚ ነው

☐ በቤት ውስጥ በተቻለ አቅም ብዙና ብዙ የአካል እንቅስቃሴ ማድረግ ጠቃሚ ነው

13. ለምንድን ነው የልብ ድካም ላለበት ሰው የውሃክኒኖች /የሚያሸና ክኒኖች/ የሚታዘዙለት

☐ የደም ግፊትን ለመቀነስ

☐ በሰውነት ውስጥ ፈሳሽ እንዲጠራቀም ለመከልከል

☐ ምክንያቱም ከዚያ በኂላ ብዙ ፈሳሽ መጠጣት የችላሉ

14. የክብደት መጨመርን እና ልብ ድካምን በተመለከተ የትኞቹ ዓረፍት ነገሮች ትክክል ናቸው

☐ ከ 2 ኪሎ ግራም በላይ በ1ቢ ወይም በ 3 ቀናት ውስጥ ከጨመረ በሚቀጥለው ቀጠሮ ለሐኪም መናገር አለብህ

☐ ከ2 ኪሉግራም በላይ በ2 ወይም በ3 ቀናት ውስጥ ከጨመረ ወዲያውኑ ሐኪም ወይም ነርስ ማነገር አለብህ?

☐ ከ2 ኪሉግራም በላይ በ2 ወይም በ3 ቀናት ውስጥ ከጨመረ ጥቂት   መብላት አለበት

GAAFFIILEE

KUTAA 1: Daataa dimoografikii haawaasaa

Waa'ee keessan isin gaafachuun barbaada. Sodaa tokko malee gaaffiiwwan dhiyaataniif deebii sirrii kan tau deebisaa.

1. Umurii ☐

2. Saala   Dhiira ☐   Dhalaa ☐

3. Haala fuudhaa fi heerumaa   Kan fuudhaan/heerymte ☐   kophaa ☐ kan walhiikan ☐

   Du'aan kan gar gar ba'an ☐

4. Eegnuu wajjin jirattu?   Kophaan jiradha ☐   Nama biraa wajjinin jiradha ☐

5. Sadarkaa barumsaa?

   dubbissu fi barreessuu kan hidandeegn ☐ Sadarkaa 1^{ffaa} ☐ Barumsa qopha'inaa ☐

   dubbisuu fi barreessuu kan danda'an ☐ Sadarkaa 2^{ffaa} ☐ Diiploomaa fi isaa ol ☐

6. Haala hojii?   Hojjataa mootummaa ☐   Daldalaa ☐

                 Hojjataa humnaa ☐   Qotee bulaa ☐

KUTAA 2: Piroofaayilii kiliinikaalaa hirmaattota qo'anna

7. Dhukkubowwan kan biroo_____

8. Sadarkaa Gamtaa Onnee Nuyoorkii (I, II, III,   IV)

9. Kanaan dura dhukkuba dadhabbii onneettiin al meeqa hoospitaala ciftaniittu?

        (1   2   3   4   >4   )

KUTAA 3: AMALA OFI EEGANNOO

Ajaja: kan arman gaditti tarreessaman amala of eegannoo namootni dhukkuba dadhabbii onnee qaban hordofanii dha. Qo'annoo kanaaf yeroohamammi amala of eegannoo kana akka jarri fudhatanu ilaalu barbaadna . Deebiiwwan keennaman keessaa isaa tokkotti marsaa.

Amala ofi eegannoo	Yeroo kam iyyuu	Baay'ee yeroo murasa	Darbee darbee	Al tokko tokko	Yeroo baay'ee	Yeroo hundumaa
1. Yeroo afuurri na citu nan boqodha	0	1	2	3	4	5
2. Yeroo afuurri na citu yookiin yeroon dadhabu,qarqrsa nama kan bira ni gaafadha	0	1	2	3	4	5
3. Yoo affuurri na cituu natti haamate gara mana yaala deemeen haakiimin illalama	0	1	2	3	4	5
4. Yeroo miilli,koronyoo, garaan na ita'u haakimattin agarsiifadha	0	1	2	3	4	5
5. Guyyatti hammami akkan finca'u nan madaala	0	1	2	3	4	5
6. Dhangala'oo baayyinan akka hinfudhane ofin eggadha	0	1	2	3	4	5
7. Mallattoon dhukkuba dadhabbii onnee oggaa na yaadessu haakimattiin himadha	0	1	2	3	4	5
8. Yeroo ol na jedhuu fi nyaachuu na jibisiisu haakimaan ni maryadha	0	1	2	3	4	5
9. Mallattoon akka dadhabbii, afuura na kutuu na qunnamu, gochawwan natti ulfatani irraa ofin qusadha	0	1	2	3	4	5
10. Dhukkuba dadhabbii onnee wajjin wal simee jiracuu akkan danda'n nan amana	0	1	2	3	4	5
11. Hojii guyyaa keessatii hojjechuu qabu, sa'atii ramadeef waanin hojjadhuuf hin dadhabu	0	1	2	3	4	5
12. Guyyaa keessatti yeroo itti boqadhu nan karoorfadha	0	1	2	3	4	5
13. Dadhabbin yeroo baay'ee oggaa natty dhaga'amu haakimattin himadha	0	1	2	3	4	5
14. Nyaata saamsame nyachhuu akka hnidandeenye hubadheera	0	1	2	3	4	5
15. Qoricha na hajajame guyyaa guyyaatti nan fudha	0	1	2	3	4	5
16. Qoricha hamma haakimani na hajaje ni fudha.	0	1	2	3	4	5
17. Guyyaa beellamaa dhiyadhee qorichaa koo nan fudha	0	1	2	3	4	5
18. Yeroo qoricha itti fudhu akka hindaganneef waan ittin yaadachuu	0	1	2	3	4	5

danda'u nan fayyadama						
19. Namoota utalloo qabanu irraa ofin Eega	0	1	2	3	4	5
20. Jabina qamaa qaba, kanaafu torbee keessaa guyyaa sadii addemsa miilla nan godha	0	1	2	3	4	5
21. Guyyaatti biiraa burcuqqoo tokkoo ol, araqee malakkee tokkoo ol hin dhugu	0	1	2	3	4	5
22. Tamboo hinxuxu	0	1	2	3	4	5
23. Beellama mana yaala sirriitti nan Hordofa	0	1	2	3	4	5
24. Oggaan kurssi irra ta'u miila koo ol kaaseen ta'a.	0	1	2	3	4	5
25. Gara fuulduratti haala filannoo yaalama fayyaa i haakima fi maatii koo wajjin nan maryadha	0	1	2	3	4	5
26. Namni dhukkubbii dadhabina onnee qabu jireenya gammachiisaa fi gaarii jirachuu ni danda'a jedheen amana.	0	1	2	3	4	5

SAFARTU BEEKUMSA DHIBEE ONNE HAAROMFAME

1. Namni dhibee onnee cimaa ta'e qabu yeroo hagamitti ulfatina isaa madalamu qaba?

☐ Torbeetti al tokko   ☐Yeroma yeroon   ☐ guyyaa guyyaan

2. Namni dhibee onnee qabu yeroo murta'etti ulfatina isaa madalamuun faaydaa maali qaba?

☐ Sababa fedhin nyaata hir'atuuf   ☐ hanga qoricha isaaf barbaachisuu beekuf
☐ qamni isaa dhangala'oo kuufachuu isa mirkaneeffachuf

3. Mana keetitti guyyati dhangala'oo hangami fudhatta?

☐ yeroo heddu litira 1.5 hanga 2.5   ☐ hanga danda'etti baay'ee xinnoo

☐ hanga danda'etti baay'ee danuu

4. Hima kamtu sirrii dha?

☐ Yeroo baay'isee yoo na qufasise,qoricha dhibee onnee fudhachuun hin barbachisu

☐ Yeroo natti fooyya'e qoricha dhibee onnee fudhachuu dhiisuun ni danda'ama

☐ qoricha dhibee onnee yeroo isaa eganii fudhachuun barbachisaa dha

5. Tarkaanfiin baay'ee gaariin yeroo hafuura si kutee yookiin miilli si dhiita'u fudhattu maali dhaa?

☐ doktoa yookin narsitti bilbiluu   ☐ hanga qoricha fudhatanii hi'isuu

☐ hanga guyyaan beellama yaala ga'utti eeguu

6. Maaltu dhibee onne akka itti cimuu taasisa?

☐ Nyaata cooma baay'ee qabu   ☐ qufaa   ☐ sochii qaamaa hojjachu dhabuu

7. Dhibee onnee jechuun maali?

☐ onneen dhiiga qaamaf raabsu dadhabuu

☐ namni tokko sochii qaamaa ga'aa hojjachu dhabuu yookin haala dadhabaa ta'een jiraachu

☐ dhiigni hidda dhiiga onnee keessati itituu

8. Namni tokko yoo dhibee onnee qabaate miilli isaa maaliif dhiita'a?

☐ Sababa valvoonni hidda dhiigaa miila keessa jiran seeran hin hojjanneef

☐ Sababa maashaan miila keessa jiran oksijiini ga'aa ta'ee hin arganneef

☐ sababa dhangala'oon miila keessatti kuufamuuf

9. Hojiin onnee maali?
☐ Nyaata dhiiga keessa xuuxuf   ☐ dhiigaa qaama raabsuuf   ☐ dhiigaa oksijiinitti fiduuf

10. Maaliif namni dhibee onne qabu tokko nyaata soogiddi itti xiqqatee nyaachu qabaa?
☐ soogiddi dhangala'oo waan kuusuf   ☐ soogiddi waan hidhaa dhiiga suntursuuf
☐ soogiddi waan rukuttaa onnee dabaluuf

11. Sababiin dhibee onnee maalii dhaa?
☐ manca'insa onnee fi hiddaa dhiiga   ☐ rakkoo sombaa fi alarjii

☐ haala malee furdachuu qaama fi dhibee sukkaraa

12. Sochii qaama nama dhibee onnee qabuu ilaachise kamtu sirri dha?

☐ Hanga xiqqo manatti sosochi hojaachun dhibee onnee irraa fooyya'uf ni gargaara

☐ yeroo murta'etti yeroo boqonnaa sosochi hojaachun ni barbaachisa

☐ Hanga danda'ameen manatti sosochi hojaachun ni barbaachisa

13. Maaliif qorichi fincoofsisu nama dhibee onnee qabuuf ajajama?
☐ Dhiibbaa dhiiga xiqqeessuf   ☐ sababa sana booda baay'ee dhuganiif
☐ kuufana dhangala'oo hir'isuuf

14. Hima armaan gadii keessa isa kamtu waa'ee ulfatina fi dhibee onnee ilaalchisee sirrii dha?

☐ Guyyaa 2 ykn 3 keessatti dabaliinsi kiloograma 2 olii yoo mul'ate doktoratti guyya yaalaf dhufaan himuun barbaachisa

☐ yoo guyyaa 2 ykn 3 keessatti ulfaatinni kiloograma 2 oliin dabale yeroma san doktora ykn narsii haasofsiisuun barbaachisa

☐ yoo guyyaa 2 ykn 3 keessatti ulfaatinni kiloograma 2 oliin dabale hanga nyaata sooratanii xiqqeessuu barbaachisa

Informed Consent

Name of principal investigator: Negese Sewagegn (Jimma University)

Research title: Adherence to medication, self-care behavior and knowledge among heart failure patients on follow up at cardiac clinic, jimma university specialized hospital, south west Ethiopia.

Card number_____

Code number_____

1. I confirm that I understand the information sheet for the above study and have had the opportunity to ask questions.
2. I understand that my participation is completely voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.
3. I understand that my medical notes will be looked at by data collectors of this study and necessary information will be extracted. I give permission for these individuals to have access to my records.
4. I agree to take part in the above study. I would like to confirm my agreement by signing.

Participant's   name   _____ Signature_____

date_____

Name of the data collector: _____ Signature: _____

date_____

Name of the principal investigator: _____ Signature: _____

date_____

Thank you for your participation and cooperation!

Consent Form

A. <u>English version</u>

This informed consent form is for invited potential participants of the research study entitled as adherence to medication, self-care behavior and knowledge among heart failure patients on follow up at cardiac clinic, jimma university specialized hospital, south west Ethiopia.

Principal investigator: Negese Sewagegn

Name of Organization: Jimma University, College of Public Health and Medical Sciences, Department of Internal Medicine, Division of cardiology

Name of Sponsors: Jimma University (JU)

Project Title: Adherence to medication, self-care behavior and knowledge among heart failure patients on follow up at cardiac clinic, jimma university specialized hospital, south west Ethiopia.

This informed consent has two parts: Participant information and certificate of consent

Part I: Participant information

My name is_____   _____ I work for Jimma University. We are conducting a study on cardiac disease, called heart failure. This is the commonest disease of cardiac clinic visit at Jimma University Hospital; adherence to medical recommendations is problem among people with chronic heart failure (CHF) who most follows a multi-component treatment regimen which includes medications, dietary restrictions and exercise recommendations and Knowledge on CHF medication and management is crucial for patients to optimize CHF management and outcomes. The main purpose of this study is to determine the pattern of treatment adherence, self-care behavior and treatment knowledge in patients attending a hospital.

I am pleased to inform you that you are invited to take part in this study. However before you decide your participation, I would like to give you more information about this study and its procedures. In case there are words not clear, please stop me so that I will take time to elaborate

Purpose of the study: To determine adherence to medication, self-care behavior and treatment knowledge in patients attending at JUSH.

Study procedures:

I: Interview: We will briefly ask you some information in the language you best understand. This will take maximum of 20 minutes.

Study risks and discomforts: This study does not pose any significant risk.

Potential benefits: The information that will be obtained from this study can help you know your adherence status. If you have rheumatic heart disease we are looking for you be arranged for follow up and medication that stop the progression of the disease to severe form. If not we will give you information how to prevent the disease. In general this study will indicate how common is poor adherence and lack of knowledge in our setting which helps for the planning in care, and prevention of the disease exacerbation.

 Confidentiality: The information collected will be kept to the strictest confidence and will only be used for the purpose of this study.

Right to refuse or withdraw: Your participation is all in all voluntary; if you do not wish to participate there will be no implication at all. We are grateful for to let us know your decision

Incentives: We will not pay you for taking part in this study. But, we will thank you for your participation

Whom to contact: If you have any questions you can contact the principal investigator, Negese Sewagegn (0918714691)

Part B: Certificate of consent

I have been requested to take part in the research and read the foregoing information, or it has been read to me. I have had the opportunity to ask any questions about it and any questions I asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study. I have understood the right I have to withdraw from the study at any time without precondition. Print name of subject date and signature or thumb impression of subject

_____ _____/___/___ (dd/mm/yy)

If illiterate:

Print Name of Independent Literate Witness Date and Signature of Witness

(If possible, this person should be selected by the participant and should have no connection to the research team)

_____   _____/____/___/___
(dd/mm/yy) Print Name of data collector, Date and Signature of data collector

_____   _____/___/___/___
(dd/mm/yy)

CERTIFICATE

This is to certify that the thesis entitled **"Adherence to medication, self-care behavior and knowledge among heart failure patients on follow up at cardiac clinic, jimma university specialized hospital, south west Ethiopia"** was carried out by **Negese Sewagegn** under direct supervision the advisor(s) listed below. Further, the advisor(s) certify that this work has not been submitted in part or full in any University or Institution for any Degree or Diploma.

1. Name: _____ Signature: _____ Date: _____

2. Name: _____ Signature: _____ Date: _____

DECLARATION

I hereby declare that the work embodied in this thesis was carried out by me under direct supervision of **Mr.Tesfahun Chanie and Dr. Sintayehu Fekadu**, Department of Pharmacy, College of Public Health and Medical Sciences, Jimma University. This work has not been submitted in part or full in any University or Institution for any Degree or Diploma. I further endorse that this work is the property of Jimma University and all rights in this regard are reserved with Jimma University.

Name: _____ Signature: _____Date_____