

Adherence to Self-Care Behaviours and Knowledge on Treatment among Heart Failure Patients in Ethiopia: The Case of a Tertiary Teaching Hospital

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Abstract

Aim: Non adherence to self-care behaviour is common in patients with heart failure leading to reduced quality of life, increased morbidity, mortality and health care costs. We assessed adherence to self-care behaviours and knowledge among adult patients with heart failure on active follow up.

Method and results: Hospital based cross-sectional study was employed and patient reported adherence to self-care behaviours and knowledge on heart failure was assessed among 328 adult heart failure patients. The mean (\pm standard deviation (SD)) age was 52 (\pm 17) years; 55.5% were men. Among 26 self-care behaviours studied, four of the top eight most frequently performed were related to taking prescribed medications, and the seven least frequently performed ones were concerned with symptom monitoring or management. Adherence to individual self-care behaviours 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. The mean (\pm SD) total knowledge score was 7.38 \pm 2.2 out of a maximum score of 14. Multivariate analysis showed that age, co-morbidity, NYHA functional class and heart failure knowledge score were independent predictors of poor adherence to self-care behaviours ($P < 0.01$).

Conclusion: Overall adherence to heart failure self-care behaviours is low and selective. Majority of patients had a severe knowledge deficit related to heart failure and self-care behaviours. Age, co-morbidity, NYHA class and heart failure knowledge score were independent predictors for poor over all adherences.

Keywords: Self-care behaviour; Adherence; Knowledge; Heart failure; Ethiopia

Introduction

Heart failure (HF) represents an emerging problem in low to middle income countries significantly undergoing epidemiological transition [1,2]. There is growing awareness that adherence to self-care behaviour remains a substantial problem among people with HF who must follow a multi component treatment regimen. Poor adherence to self-care behaviour 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 [3-7]. Lack of knowledge and adherence to self-care recommendations were also predictive risk factors of hospitalization and re-admission for patients with HF [6,8-15].

In an African context, there is insufficient amount of data about self-care behaviour adherence among patients with heart failure. However, some studies reported patient education about HF is not optimal and patient's knowledge on HF medication and management is also poor [16-22].

The status of HF patients' adherence to prescribed gold-standard, non-pharmacological & pharmacological treatments and self-management practice is not yet known in Ethiopia. Hence, the present study examines adherence to self-care behaviours and knowledge on heart failure among adult patients with chronic heart failure on active follow up at Jimma University Specialized Hospital. We focus on the level of adherence to overall and individual self-care behaviours, level of patients' knowledge on heart failure and independent predictors for

overall poor adherence.

Method

A hospital based cross-sectional study was employed to examine adherence to self-care behaviours and their understanding of prescribed treatment and the overall purpose of HF management among adult patients with chronic heart failure at adult cardiac clinic, Jimma University Specialized Hospital (JUSH), a tertiary teaching hospital found southwest Ethiopia. This study was conducted from February 30 to May 30, 2013.

In this study, all adult cardiac patients diagnosed with HF, who were on active follow up and receiving treatment as outpatients were included. Patients who were critically ill and unwilling to give informed consent were excluded in the study. Those patients who fulfilled the criteria were interviewed using structured questionnaires. To enhance the reliability of the tools used in this study, these questionnaires were originally prepared in English and translated to local language (Amharic

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Received October 21, 2015; **Accepted** November 06, 2015; **Published** November 13, 2015

Citation: Sewagegn N, Fekadu S, Chanie T (2015) Adherence to Self-Care Behaviours and Knowledge on Treatment among Heart Failure Patients in Ethiopia: The Case of a Tertiary Teaching Hospital. J Pharma Care Health Sys S4-001. doi:10.4172/2376-0419.S4-001

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and Afan Oromo) and re-translated back to English to check the consistency of the instrument. The internal consistency and reliability for the scale for each item was done using Cronbach's reliability test and was found to be 0.86. Moreover, the instruments to be used in the study were pre-tested on similar populations (5% of the actual sample size) which were not included in the study. The questionnaire was then utilized to interview the participants face to face on one to one basis for approximately 20 minutes duration. Patients' clinical profile and readmission rate was reviewed using patient chart besides subjects self-report. Data collection was conducted by adequately trained nurses and pharmacists.

Statistical Analyses

Data are presented as means \pm standard deviation (SD) for continuous variables, and as frequencies and percentages for categorical variables. All statistical analyses were carried out using SPSS version 19.0 software for Microsoft window.

Multivariable logistic regression analyses was used to identify independent predictors of overall poor adherence (<75%). We calculated the overall adherence using the composite score of each individual self-care behaviour items.

Overall mean score is calculated by adding each individual item means (means of 26 items) divided by 26. Mean score of individual self-care items is also calculated by taking the sum of each response (0+1+2+3+4+5) divided by total no. of 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.

In accordance with previous studies of this type [5,19], medication adherence is defined as \geq 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 was defined as when patient attend \geq 75% of the scheduled appointments consisting of monthly medication refills at the hospital pharmacy in the last three months.

In accordance with the European Society of Cardiology guideline, self-care behavioural adherence is defined as daily weight monitoring, daily intake of five servings of fruit and vegetables, drinking less than two litres of fluids per day, being physically active, with compensated HF 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) [23,24]. Patients were categorized as "adherent" if they had an overall score of 75% or greater. For individual health behaviours, patients were categorized as "adherent" if they had a score of 75% or greater, which correspond to being adherent "most of the time" or "all of the time" [4,5].

Patients were also categorized as having "high level of HF knowledge" if they had an overall score of 75% or greater Knowledge about HF and its treatment, i.e. being knowledgeable " \geq 10.5 out of maximum 14 scores" in heart failure knowledge scale.

Ethical clearance was obtained from the Institutional Review Board of Jimma University, College of Public Health and Medical Sciences. Further approval was obtained from the hospital management 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.

Results

Socio-demographic characteristics and clinical profiles of study subjects

There were 328 participants included in the study, 182 (55.5%) men, ranging in age from 18 to 90 years (Mean age 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).

The 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 only (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 were 0.95 (\pm 0.94) (ranging from 1 to 5).

Although 177 (54.0%) participants were free from any co-morbid diseases, the remaining participants were with chronic multi-morbidity with hypertension (81, 24.7%), diabetes mellitus (8, 2.4%), kidney disease (24, 7.3%), hypertension plus diabetes mellitus (2, 0.6%), hypertension plus kidney disease (30, 9.1%) and diabetes mellitus plus kidney disease (6, 1.8%). The overall clinical profile of study subjects is presented in Table 1.

Frequency of HF self-care behaviours adherence

Four of the top eight most frequently performed self-care behaviours were related to taking prescribed medications, 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 behaviours were concerned with symptom monitoring or symptom management. These infrequently performed behaviours included behaviours related to talking to physician when experiencing the following HF symptoms: shortness of breath, being tired all the time or more tiredness, swelling of ankles, legs or stomach, anxious about their worsening symptoms of heart failure and nausea. The other behaviours 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 behaviours were reported to be performed either "a good bit of the time" ("half- of the time") or "some of the time." Table 2 displays means for each HF self-care items in rank order from those performed "most of the time" to those performed "a little of the time."

Adherence level of HF patients

The adherence rate for overall HF self-care behaviours was low (Mean, 62.6%) (SD, 12.7%). Higher levels of adherence for individual self-care behaviours (>90%) were noted for follow-up appointments, taking prescribed medications, and smoking and alcohol cessation. Overall, 98.5% of all study participants kept \geq 75% of their follow up appointment schedule and were consequently designated as adherent. Similarly, 308 (93.9%) adhered to 100% of their follow-up appointment

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 labourer	32 (9.8)	5 (2.7)	27 (18.5)
Others	52 (15.9)	20 (11.0)	32 (21.9)
Clinical profiles			
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)

*Others: Retired, Driver (private), Unemployed; SD- Standard Deviation; HTN – Hypertension; DM- Diabetes Mellitus; KD- Kidney Disease

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

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 and 271 (82.6%) of the patients were non adherent. The adherence rate for each individual self-care behaviours: reported adherence with smoking was very high; 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 they limit 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%) 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%) took rest when they are short of breath, 268 (81.7%) reported following a low-sodium diet is important, 122(37.2%) reported to be adherent to 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. Figure 1 demonstrates adherence to different self-care behaviours.

Level of knowledge on HF

Study subjects knowledge on HF was found to be low in this study. The mean (± SD) total knowledge score was 7.38 ± 2.2, with a range of 12 out of a possible maximum score of 14 points.

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%) 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 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. The percentages of different knowledge categories are presented in Table 3.

There was also a knowledge deficit on the best measures to do in case of increased shortness of breath or swollen legs that indicate worsening of their HF; 124 (37.8%) patients knew that it is important to 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.

Relationship between HF knowledge and HF self-care behaviours

In our study, there was a significant relationship between the mean total knowledge score and the mean total self-care behaviour score (r=0.598, P=0.01) which is imperfect positive correlation (0<r<1) (Figure 2).

Univariate and multivariate association between factors and overall adherence

Overall, 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 behaviours. Analysis was conducted on 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

Rank order	Self-care behaviour	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

Table 2: Mean HF self-care behaviour item scores in rank order in patients with HF on follow up at JUSH, February 2013.

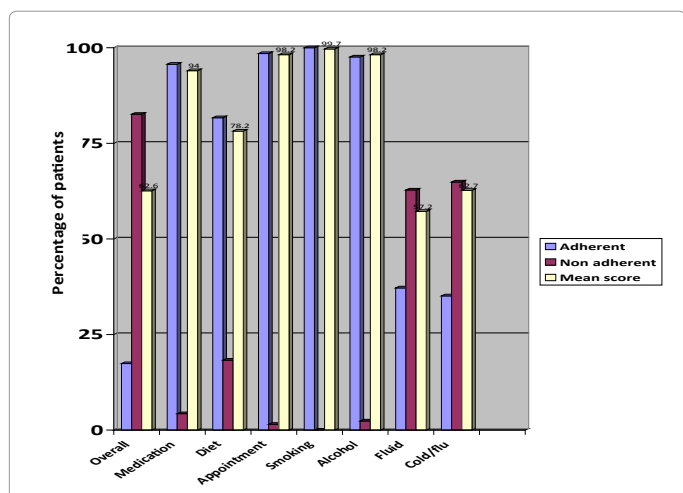


Figure 1: Percentage of patients with their respective adherence level to overall and selected self-care items in patients with HF on follow up at JUSH, February 2013.

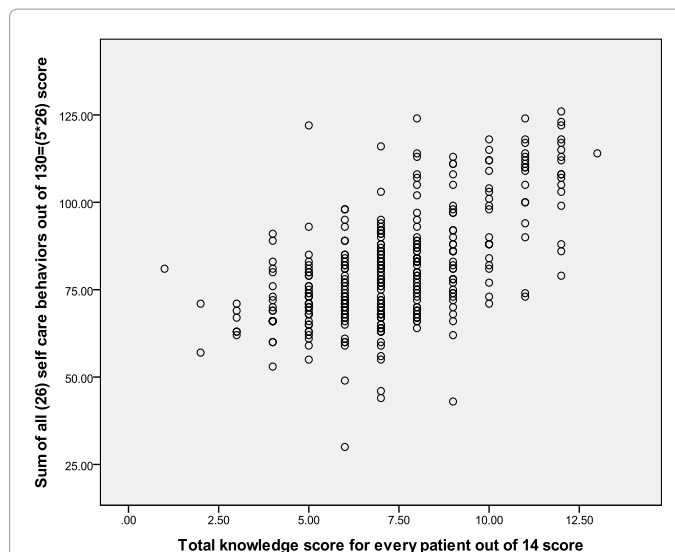


Figure 2: The correlation between mean score of self-care behaviours and mean knowledge score about HF and HF regimens in patients with HF on follow up at JUSH, February 2013.

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)

Table 3: Frequency of patients with HF identifying the correct answer on each item of the HF knowledge questionnaire (n = 328) on follow up at JUSH, February 2013.

Variable	Overall adherence		Odds Ratio [95% C.I.]	P- value	Adjusted Odds Ratio [95% C.I.]	P- value
	Adherent N=57(%)	Non adherent N=271(%)				
Age in years						
18-35	18 (26.5)	50 (73.5)	1	0.024 **	1	0.049**
36-90	39 (15)	221 (85)	2.040 [1.079- 3.858]		1.903 [0.948 - 3.82]	
Marital status						
Married	37(15.3)	205 (84.7)	1	0.096*	1	0.132
Single	20 (23.3)	66 (76.7)	0.596 [0.323-.1097]		0.613 [0.325- 1.15]	
Co-morbidity						
None	41 (23.2)	136 (76.8)	1	0.003†	1	0.006†
With co morbidity	16 (10.6)	135 (89.4)	2 [1.362 -4.75]		2.534 [1.310- 4.90]	
NYHA class						
Class III and IV	50 (20.2)	198 (79.8)	1	0.023 **	1	0.003†
Class I and II	7 (8.8)	73 (91.3)	2.633 [1.142 - 6.071]		3.791 [1.573- 9.13]	
HF Knowledge						
≥10.5 score	28 (80.0)	7 (20.0)	1	0.000 ††	1	0.000††
<10.5 score	29 (9.9)	264 (90.1)	36.414 [14.61- 0.707]		37.688 [13.432- 105.746]	

C.I. – Confidence interval, * p<0.25, **p<0.05, †p<0.01, ††p<0.001

Table 4: Univariate and multivariate logistic regression analysis for factors associated with poor adherence to overall self-care behaviours in patients with HF on follow up at JUSH, February 2013.

bivariate analysis (Table 4). Gender [female vs. male, OR 1.03, CI 0.581-1.836, P=0.913], living arrangement [living alone vs. with someone, OR 0.849, CI 0.370-1.950, P-value=0.700], education level [illiterate vs. literate, OR 1.203, CI 0.678-2.133, p-value=0.528], occupation [farmer vs. others, OR 0.828, CI 0.453-1.514, p-value=0.541] and history of readmission [no admission vs. ≥ 1 admission, OR 1.131, CI 0.601-2.130, P-value=0.702] were not associated with adherence. There were no gender-related differences (82.9% women vs. 82.4% men; P-value=0.91).

The results of multivariate analysis are shown in Table 4. Only age, Co-morbidity, NYHA functional class and HF knowledge were independent predictors of poor overall adherence to self-care behaviour. However, marital status was not a statistically significant predictor (P=0.123) though it showed association with self-care behaviour in univariate analysis at a significance level of 0.25.

Discussion

We studied HF self-care behaviour adherence, individual as well as overall, by self-reported adherence to self-care behaviours, by defining good adherence as scoring ≥ 75% cumulative score. Our study, in contrary to some studies, addressed adherence in a comprehensive manner, highlighting the issue of individual (selective) adherence. Moreover, we also assessed HF outcomes in terms of NYHA functional class and re admission rate like most of other studies [5,19,25,26].

There is considerable variation among methods used to measure

adherence to self-care behaviours. Of these, self-report is the most widely used method, is specific, is easily employed and is associated with outcomes [8,27,28]. We therefore assessed patient-reported adherence, realizing the limitation with self-report which might overestimate the actual adherence.

In our study, only around one fifth of patients reported good adherence to total HF self-care behaviour items. Additionally, when assessed using ≥ 75% adherence to each individual 26 recommendations, ten items were selectively rated by patients. These data suggest relatively low adherence level to total self-care and a higher rate of adherence for some individual self-care behaviours. Previous studies have suggested that while most HF patients have less difficulty in adhering to medications, the majority have difficulty in adhering to exercise [20]. 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 important since exercise training is shown to be safe and associated with improved outcomes. 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 behaviour in order to select the appropriate individualized intervention to improve outcomes [29,30].

We found several associations between patient characteristics and overall self-care behaviour adherence. In multivariate analysis;

age, co morbidity, NYHA functional class, and HF knowledge level were independently associated with poor adherence. Conflicting data exist between age and adherence [31,32]. In our study, compared with young age participants, old age participants were more likely to be non-adherent. This finding seems in contrary to a literature that reports older patients were more likely to be adherent [26]. As the prevalence of HF increases with aging population, [33] the issue of HF self-care adherence among the elderly will become even more important. Other previous studies evaluating characteristics of adherent vs non adherent patients have also reported mixed results [34-36].

In our study gender, educational level, other demographic and social characteristics studied were not associated with poor self-care behaviour adherence. However, several other studies reported different findings [5,8,15,28,37]. Gehi showed that compared with adherent participants, non-adherent participants were more likely to be female [28]. Ni and colleagues reported that being unmarried was significantly associated with non-adherence to self-care recommendations [8]. Our finding also demonstrated that level of adherence to self-care behaviour was not associated with occupation and previous admission, however; the result reported by Kato et al. revealed that occupation was independent predictor of poorer adherence to self-care behaviour [37].

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 [38] and account for more than half of the \$39 billion annual cost of HF care [39].

Co-morbidity and NHYA functional class were strongly associated with total self-care behaviour score. Compared with non-co-morbid participants, co-morbid participants were more likely to be non-adherent, possibly because patients with multiple chronic illnesses face additional physical, cognitive and functional challenges to effect multicomponent self-care recommendations. These patients are more likely to have multiple clinicians and might receive confusing or conflicting recommendations that may affect their adherence level. 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 believe that their HF symptoms might have gone totally and it could also be true in the future time. This belief may preclude adhering to self-care behaviour recommendations. Like our findings, Kato et al., found that co morbidity (diabetes mellitus) was an independent predictor of poor adherence to self-care behaviours [37].

Self-care behaviours related to taking medications were among those reported as performed "most of the time. This finding is consistent with findings reported by Artinian [5,37] and Verbrugge [15] three of the top five most frequently performed self-care behaviours were related to taking prescribed medications and seems a contrary to the literature, which reports high rates of medication noncompliance. Our finding on medication adherence was generally higher than reports from high-income countries [19]. However Zimbabwe and South African studies reported results were similar: Bhagat and Mazayi-Mupanemunda and Ruf et al. found that 73% and 71% studied heart failure patients were considered compliant to their prescribed medications [17,19]. Although adherence rates from several studies in the western world vary from 71 to 99%, over half of the listed studies had adherence rate above 80%, [4,21] that support our finding. With regard to adherence to appointment schedules, patients in this study were similar to most of

other reports (i.e. >90% appointment adherence) [4,19,40].

Another interesting result in our study is concerning smoking abstinence; our participants reported that they were abstinent in smoking tobacco. However, Ruf et al. found 16% of patients persisted in smoking tobacco, [19] in comparison Evangelista et al. and Carlson et al. found less than 10% of study patients to be non-compliant. [40-42] Whereas, higher smoking rates have been reported by Artinian et al. (46%) and Evangelista et al. (55%) in a study on veterans with HF [5,9].

Regarding study participants knowledge on HF, the percentage of patients choosing the correct answer on eight questions concerning HF management ranged from 23.3 to 85.1% whereas in a study done by Ni et al., and Ruf et al., it ranged between 43 to 90% and 29 to 89% respectively. Almost half of study patients reported that they knew little about HF whereas Ni et al. and Ruf et al. found that only 38% and 68% of their study participants reported that they knew only a little about HF respectively [8,19]. It is now largely accepted that greater HF-related knowledge has a positive impact on adherence to self-care behaviours [8,42]. Our finding about patients' poor knowledge of the nature and causes of HF is consistent to other studies conducted few years ago [5,19,22].

In our study, knowledge on heart failure was strongly associated with overall self-care behaviour adherence. When compared, participants with low level HF knowledge score were 37.7 times more likely to be non-adherent than participants with high HF knowledge score. It is clear that increasing patients' level of knowledge about the disease is a prerequisite to improve self-care behaviour and avoiding rehospitalisation [22]. Our findings also showed that more than half of the participants thought that weighing themselves once a week was sufficient to assess fluid status in contrary to one-third of patients in Dracup et al. study [22].

Limitations of the Study

Several study limitations must be acknowledged. First, the cross-sectional nature of the design did not allow us to explore causal relationships. 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. Third, as self-report is always subjective and vulnerable to recall bias, adherence rates to self-care behaviour and the knowledge score on HF and its management may have been overestimated. It is likely true that the actual adherence to self-care is lower than the one self-reported. Despite these limitations, our study is the primer study of this dimension on self-care behaviour adherence and HF knowledge in Ethiopia.

Therefore, this study out surfaced the need for urgent interventions that are culturally sensitive and affordable HF management programmes that will bring improved adherence to self-care behaviours and enhance heart failure patients knowledge about the disease and management in order to improve overall HF-related health outcomes in Ethiopia.

Conclusion

In this study setting, overall adherence with self-care behaviour was found to be low among HF patients and selective adherence to various individual self-care behaviours is also common. Most participants were 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, do not stay away from people who have a cold/flu, were 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 aetiology, prognosis and management. Majority of patients reported a knowledge deficit related to HF and self-care behaviours. Age, multi morbidity, NYHA functional class (I & II) and low level HF knowledge were independent predictors for poor overall self-care adherence. Future interventions should be directed to these vulnerable populations in order to improve their clinical outcomes.

Funding

This research work was part of partial fulfilment for Master of Science in Clinical Pharmacy and was funded by Jimma University through postgraduate students' research fund.

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