

# **Self-care Behaviors among Sudanese Patients with Heart Failure: A cross-sectional Assessment**

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## **ABSTRACT**

**Background:**

Selfcare is a vital component of heart failure (HF) management that known to improve the outcomes. However, little is known about the status of self-care behaviors among patients with HF in Sudan.

**Objectives:**

This study aimed to assess the self-care behaviors among Sudanese patients with HF at a tertiary hospital in Sudan.

**Methods:**

A cross-sectional single-institutional study was conducted across three-month period in 2021. A total of 200 HF patients were enrolled, and collect data was collected by patients' interview. Descriptive and binary logistic regression analyses were processed to check the effect of different factors on the patients' adherence levels.

**Results:**

Out of 200 HF patients, 53.5% were females, and the mean age of patients was 60 ( $\pm$  13.7 SD) years. Among them, only 4.5 % of HF patients reported adequate adherence to their self-care recommendations and the mean total score was 42.6 ( $\pm$  SD15.5). Adherence to self-care recommendations wasn't significantly associated with age, gender, marital status, education level, and comorbidity.

**Conclusion:**

In this study, the overall adherence to self-care behavior was found to be extremely low among Sudanese HF patients, and selectively adherence to prescribing medications was good. These outcomes put light on a major opportunity for further prospective follow-up studies, which have an intervention approach for each self-care recommendation to improve the HF situation in Sudan.

*Keywords: Heart failure, self-care behaviors, adherence, assessment, Sudan*

## **1. INTRODUCTION**

Heart failure (HF) is a final clinical outcome of all cardiovascular diseases, caused by either structural or functional dysfunction of ventricular filling or ejection of blood [1]. Globally, HF is a rapidly emergent cardiovascular disorder that affects more than 37 million individuals [2]. In high-income countries (HICs) such as the USA, heart failure has affected over six million adult populations [1]. Similarly, in Sub-Saharan Africa, HF is highly prevalent and covers around 44% of newly diagnosed cardiovascular diseases [3]. Moreover, the younger population assess to be more affected by HF in Sub-Saharan Africa compared to the western countries [4]. The rate of heart failure-associated deaths is higher in middle and low-income countries (LMICs) than in HICs [5]. The main causes of heart failure include myocardial ischemia, hypertension, cardiomyopathies, valvular heart disease, pulmonary hypertension, and congenital heart disease [6].

HF treatment strategies commence with the determination of the cause of HF and diagnosing potentially reversible causes. HF therapy includes non-pharmacological strategies, pharmacological therapy, and device therapies [7]. In addition to optimizing medical therapy, improving HF patients' self-care is considered a strategy for reducing HF's economic burden by reducing overall hospital readmissions and HF-related readmissions [8].

Self-care is formed of the three key concepts of (i) self-care maintenance health, (ii) self-care monitoring, and (iii) self-care management [9]. The most common reliable and valid scales used to measure HF self-care behavior are European Heart Failure Self-care Behavior Scale version-9 (EHFScBS-9) [10] and the Heart Failure Index version 6.2 [11]. These instruments are available in many languages as well as used in research studies, and can be used in clinical practices to guide patients' education.

Previous studies in Africa stated that adherence to self-care recommendations ranged from 2.5 to 98%. Generally, HF patients had low adherence to high sodium diet restriction, regular exercise, weight monitoring, and fluid intake restriction [12]. With regard to Sudan, there was only one published study in which the authors used the HF Compliance Questionnaire to assess adherence self-care recommendations among 76 patients, it concluded that the total adherence was poor among Sudanese patients with HF, although adherence to some individual self-care items was high but it was still suboptimal [13]. To the best of the author's knowledge, there were no studies that assessed self-care in HF patients in Sudan by using EHFScBS-9. Therefore, the current study aimed to assess the self-care behaviors among Sudanese patients with HF in Medani Heart Center (MHC), Gezira state, Sudan.

## **2. METHODS**

### **2.1 Study Setting**

The study was conducted at MHC, which is a tertiary hospital located in Wad Medani, Gezira State, Sudan. The center was established in 2008 as one of the largest (115 beds) specialized cardiac hospitals outside Khartoum capital of Sudan. It provides free and ideal clinical services for patients from Gezira and other states [14].

### **2.2 Study Design and Patient Selection**

An observational cross-sectional single-institutional study was conducted by patients interview from March to May 2021. All HF patients who attended MHC outpatients' clinics for follow-up during the study period, were included in the study.

Patients 18 years and older who attended MHC with a diagnosis of all subtypes of HF during the study period were included. Patients were excluded if they had decompensated HF, cognitive or psychological diseases, or refused to participate.

### **2.3 Sample and sampling technique**

A total of 200 eligible HF patients who attended MHC during the study period were selected conveniently.

### **2.4 Data collection**

Data was collected using interview-guided questionnaire. This questionnaire included patients' age, gender, marital status, educational level, occupation, comorbidity, NYHA functional class, hospitalization history, and medications.

Self-care behaviors had been evaluated by using EHFScBS-9. The permission to use the EHFScBS-9 was obtained from the scale founder [10]. After that, translation and back-translation for the full questionnaire were performed by one consultant cardiologist, a clinical pharmacy specialist, and two experts in English and Arabic. No discrepancy between the basic and the translated tool was found. The nine items can be grouped into two domains: consulting behaviors and adherence to the regimen. The consulting behaviors domain examines how often people with HF call their physician/nurse in case of dyspnea, lower limb edema, weight gain, and fatigue, whereas the adherence with the regimen domain questions are assess how often patients weigh themselves, try to drink less water, follow a low sodium diet, regularly take their medications, and exercise. Furthermore, the item consists of 9 items scored on 5 points Likert scale from 1 (completely disagree) to 5 (completely disagree). The possible score is 9–45 with a higher score indicating better self-care. For better interpretation, we implement a standardized score from 0–100 for the EHFScBS-9. The score was also reversed such that a lower score means better self-care [15]. Also, a cutoff point of more than 70 was represented adequate adherence [16].

### **2.5 Data analysis**

All analyses were performed using the Statistical Package for Social Sciences (SPSS) version 26 (SPSS Inc., Chicago, IL). Descriptive statistics were made; categorical variables were expressed in percentages and/or frequencies, while continuous variables were summarized as median and means. Association

between variables was carried out using binary logistic regression. *P value* of less than 0.05 was considered statistically significant in all analyses.

### 3. RESULTS

A total of 200 HF patients participated in the study, the mean age of participants was 60 ( $\pm$  13.7 SD) years with the range of (19 to 91 years), there were 107 females (53.5%) and 93 males (46.5%), the majority 161 (80.5%) were married. Moreover, 142 (71%) of the participants were received primary education. The detailed sociodemographic characteristics of patients are shown in Table 1.

**Table 1. Socio-demographic and clinical characteristics of heart failure patients in Medani Heart center (n=200).**

Variable	Frequency	Percentage (%)
<b>Age</b>		
19 -25	3	1.5
26 -40	14	7.0
41 – 55	49	24.5
56 -70	88	44.0
Above 70	46	23.0
<b>Sex</b>		
Male	93	46.5
Female	107	53.5
<b>Marital status</b>		
Married	161	80.5
Single	13	6.5
Divorced	6	3.0
Widowed	20	10
<b>Educational level</b>		
Primary	142	71
Secondary	43	21.5
University	12	6
Post graduate	3	1.5
<b>Occupation</b>		
Government employee	8	4
Farmer	13	6.5
Worker	28	14
Housewife	107	53.2
Retired	44	21.8
<b>Chronic co morbidity</b>		
HTN	52	26
DM	29	14.5
Hyperthyroidisms	3	1.5
HTN+DM	35	17.5
HTN+CKD	6	3
Other	22	11
<b>NYHA functional class</b>		
Class I	42	21
Class II	103	51.5
Class III	55	27.5
<b>Hospitalization history</b>		
Yes	150	75
No	50	25

HTN: Hypertension; DM: Diabetes; CKD: Chronic Kidney Disease; NYHA:New York Heart Association; SD=standard deviation

On analysis of clinical characteristics among the study's participants, as demonstrated in Table 2, more than two thirds 147 (73.5%) of patients had chronic comorbidity such as hypertension in 52 (26%) patients, diabetes mellitus in 29 (14.5%) of the study cohort. Regarding functional classification of HF, more than half of patients were recently classified as NYHA class II 103 (51.5%) followed by class III 55 (27.5%) HF, then NYHA class I 42 (21%), and the majority 150 (75%) of patients had a hospitalization history (Table 1).

Regarding HF medications, 154 (77%) of patients were on diuretics and Beta-blockers, 59 (29.5%) on ARBs, and 52 (26%) were using ACE Inhibitors. While

only 9 (4.5%) of patients were on Digoxin as illustrated in Table 2.

**Table 2. The common treatment patterns of Heart failure patients at MHC.**

Medication	Frequency	Percentage (%) ARBs
Diuretic	154	77
Beta Blockers	154	77
ARBs	59	29.5
ACEIs	52	26
Digoxin	9	4.5

ARB: Angiotensin receptor blocker; ACE-I: Angiotensin converting enzyme inhibitor

The present study indicated that a higher proportion (95.5%) of Sudanese HF patients had inadequate self-care behavior, while only 4.5% had adequate levels. According to the findings of this study, the mean total score of EHFS<sub>c</sub>BS-9 was 42.6 ( $\pm$  SD15.5). Among the 200 patients, for individual self-care recommendation, higher levels of good adherence were noted for taking prescribed medications as directed 170 (85%), adherence to exercise 104 (52%), salt restriction 73 (36.5%), adherence to body weight monitoring 4 (2%), fluid restriction 19 (9.5%), consultation of doctor or nurse in case of shortness of breath 68 (34%), feet and leg swelling 60 (30%), if gain weight more than 2 kg in 7 days 16 (8%), and fatigue 60 (30%) (Table 3).

**Table 3. Adherence status of heart failure patients to self-care recommendations at Medani Heart center (n= 200)**

Items	Mean $\pm$ SD	Percentages of responses per each Likert point				
		1	2	3	4	5
1 I weight myself every day	4.5 (0.9)	2	2.5	7.5	16.5	71.5
2 If my SOB increase, I contact my doctor or nurse	3.2 (1.8)	34	6.5	6	12	41.5
3 If my feet /legs become swollen, I contact my doctor or nurse	3.5 (1.8)	30	5	4	12	49
4 If I gain weight more than 2Kg in 7 days, I contact my doctor or nurse.	4.5 (1.8)	8	1.5	3.5	1.5	85.5
5 I limit the amount of fluids.	4.3 (1.3)	9.5	3	8.5	6	73
6 If I experience fatigue, I contact my doctor or nurse.	3.4 (1.7)	30	5	7.5	14	43.5
7 I eat a low –salt diet.	2.7(1.6)	36	12	20	10	22
8 I take my medication as prescribed.	1.3 (0.9)	85	6.5	3	2.5	3
9 I exercise regularly	2.3 (1.6)	52	11.5	12	6	18.5
Total “Classic” score EHFS <sub>c</sub> BS-9 sum,	29.7 (5.6)					
Total “Standardized” score EHFS <sub>c</sub> BS-9	42.6(15.5)					
Inadequate level of Self-care %	95.5					
Adequate level of Self-care %	4.5					

SOB: Shortness of Breath; EHFS<sub>c</sub>BS-9: European Heart Failure Selfcare and Behavior scale version 9

A binary logistic regression analysis specified that gender, marital status, educational level, and comorbidity weren't significantly associated with adherence to self-care recommendations as shown in Table 4.

**Table 4. Binary logistic regression analysis of factors associated with adequate self-care (EHFS<sub>c</sub>BS-9  $\geq$  70) among HF patients (n = 200)**

Variable	OR	95% C.I.	P
Gender	0.327	0.045-2.36	0.268
Age	0.335	0.11-1.021	0.054
Marital status	1.593	0.527-4.817	0.409

Educational level	0.936	0.264- 3.315	0.919
Chronic comorbidity	1.119	0.845- 1.481	0.433

#### 4. DISCUSSION

We address the first use of EHFScBS-9 to assess the adherence of HF patients to self-care behavior in Sudan in which resources are limited, healthcare systems are fragile, patients are poor, and HF affects them at younger age [4]. All these reasons and others necessitate healthcare providers to make use of a cost-effective strategy besides optimization of medical therapy which is also faced by the unavailability and high cost. Self-care behavior with medical therapy will enhance the patient's functional capacity, improve quality of life, prevent hospitalization, and reduce mortality and morbidity [12].

Our study shared similarities with previous Sudanese studies with regard to the mean age of HF patients, and that diabetes and hypertension were the main comorbid disease in HF [17, 18]. On the other hands, 77% of patients were on Beta blockers, 55.5% on ARBs or ACEIs this is lower than what had been reported [19], this might due to source of information in this study was primarily depends on patients.

The present study indicated that a higher proportion (95.5%) of Sudanese HF patients had inadequate self-care behavior, while only 4.5% had adequate levels. According to the findings of this study, the mean total score of EHFScBS-9 was 42.6 ( $\pm$  SD15.5) which also indicates inadequate self-care behavior of all patients with less pre-setted cutoff point of less than 70, this was extremely lower than previous studies in both developed or developing countries using similar or different tools to assess adherence for example, in Italy was 58.3 {EHFScBS-9} [15], in the Netherland (48%) {Revised Heart Failure Compliance Questionnaire} [20], Ethiopia (51.2 %) {EHFScBS} [12], in Sudan 28% {Revised Heart Failure Compliance Questionnaire} of the study participants had good overall to self-care recommendations [13].

On detailed analysis of self-care compared to the previous report we found there was poor adherence to body weighting only (2%) compared to the previous studies {2.5%–83%}, contact of doctor or nurse if gain more than 2 kg in 7 days (8%), and limitation of the amount of fluid (9.5%) {12%-90%}, contact of doctor or nurse if feet or legs swelling 30% and if experience fatigue, and developing dyspnea, eating low salt diet was and 36.5% {28%–88%}. On the other hand, the study shows good adherence to prescribing medications (85%) {75%–98.6%} and relatively to physical exercise (52%) {21%–60%}, although it was very difficult to make similarity comparison with previous study hence significant discrepancies were found because of the different study population, design, setting, and tools used to assess the self-care. But generally, our findings are consistent with other reports that showed the adherence to monitoring body weight was poor, while adherence to prescribed medications was good in the majority of them [12, 13]. Furthermore, binary logistic regression analysis indicated that gender, marital status, educational level, and comorbidity weren't significantly associated with adherence to self-care recommendations this was contrary to the study conducted in HF Slovenian patients [21].

Our study has several limitations to be addressed. 1) as the cross-sectional design we are unable to explore the direction of relations among study cohort, 2) because the study was carried out single center, it may face generalizability problems to other centers, 3) our findings can be useful only to similar populations because our cohort was predominately received secondary education which wasn't grantee to obtain similar results in those receiving higher education, and 4) as EHFScBS-9 self-report scale is always subjective and vulnerable to recall bias which cannot reflect the actual status of the self-care behavior. Despite these limitations, our study is the first study using EHFScBS-9 to highlight adherence to self-care recommendations in Sudan. It is the first step for further interventional work in this regard to improve the overall status of Sudanese HF patients in a culturally sensitive and affordable mechanism.

## **5. CONCLUSION**

In this study, the overall adherence to self-care behavior was found to be extremely low among Sudanese HF patients, and selectively adherence to prescribing medications was good. These outcomes put light on a major opportunity for further prospective follow-up studies, which have an intervention approach for each self-care recommendation to improve the HF situation in Sudan.

UNDER PEER REVIEW

## CONSENT

A written consent was obtained from each patient before the commencement of the interview.

## ETHICAL APPROVAL

Ethical approval (HS-ERC-14-21) was obtained from the Health-Sector Ethical Review Committee, University of Gezira, and performed in accordance with the Declaration of Helsinki. Furthermore

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