



Self-care Behaviors among Sudanese Patients with Heart Failure: A Cross-sectional Assessment

Kannan O. Ahmed ^{a*}, Hager Ahmed Abdelmaged ^a,
Khadiga Mohamed Ibrahim ^a,
Nayla Mohammed Abdalgader ^a,
Nusiba Mohammed Ahmed Babekir ^a,
Nosiba Salah Mohammed Ali ^a,
Sabah Badereldean Eltyeb ^a, Tasneem Mahdi Osman ^a,
Bashir A. Yousef ^b and Hiba F. Muddather ^a

^a Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, University of Gezira, Wad Medani, Sudan.

^b Department of Pharmacology, Faculty of Pharmacy, University of Khartoum, Khartoum, Sudan.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2022/v34i54B7243

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/93090>

Original Research Article

Received: 17/08/2022

Accepted: 19/10/2022

Published: 05/12/2022

ABSTRACT

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

*Corresponding author: E-mail: omerkannan@gmail.com;

Objectives: This study aimed to assess the self-care behaviors among Sudanese patients with heart failure 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 heart failure patients were enrolled, and data was collected through 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 heart failure patients, 53.5% were females, and the mean age of patients was 60 (\pm 13.7 SD) years. Among them, only 4.5% of heart failure 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 heart failure patients, and selectively adherence to prescribed 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 heart failure situation in Sudan.

Keywords: Heart failure; self-care behaviors; 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, HF in Sub-Saharan Africa affected younger population which was differ from that occurred in the western countries in which HF is the disease of elderly [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 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 to 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), 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 an 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 scale consists of 9 items scored on 5 points Likert scale from 1 (completely agree) to 5 (completely disagree). The possible score is 9–45 with a higher score indicating better self-care. For better interpretation, we implemented 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 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 or 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 had 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 (%)
Age		
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

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

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

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

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

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

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).

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

Items	Mean± 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 EHFSBS-9 sum,	29.7 (5.6)					
Total “Standardized” score EHFSBS-9	42.6(15.5)					
Inadequate level of Self-care %	95.5					
Adequate level of Self-care %	4.5					

SOB: Shortness of Breath; EHFSBS-9: European Heart Failure Selfcare and Behavior scale version 9

Table 4. Binary logistic regression analysis of factors associated with adequate self-care (EHFSBS-9 ≥ 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

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.

Higher proportion (95.5%) of Sudanese HF patients had inadequate self-care behavior, while only 4.5% had adequate levels. The mean total score of EHFSBS-9 was 42.6 (± 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).

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.

4. DISCUSSION

We address the first use of EHFSBS-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, and 55.5% on ARBs or ACEIs this is lower than what had been reported [19], this might be due to the source of information in this study primarily depending 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 a 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 prescribed 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 other levels of education, and 4) as EHFScBS-9 self-report scale is always subjective and vulnerable to recall bias which would not 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 prescribed 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.

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.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE, Drazner MH, et al. ACCF/AHA guideline for the management of heart failure: A report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. *Circulation*. 2013;62(16):e147-239. Available:10.1016/j.jacc.2013.05.019
2. Ziaeian B, Fonarow GC. Epidemiology and aetiology of heart failure. *Nat Rev Cardiol*. 2016;13(6):368–78. Available:10.1038/nrcardio.2016.25
3. Sliwa K, Wilkinson D, Hansen C, Ntyintyane L, Tibazarwa K, Becker A, et al. Spectrum of heart disease and risk factors in a black urban population in South Africa (the Heart of Soweto Study): A cohort study. *Lancet*. 2008;371(9616):915–22. Available:10.1016/S0140-6736(08)60417-1
4. Damasceno A, Mayosi BM, Sani M, Ogah OS, Mondo C, Ojji D, et al. The causes, treatment, and outcome of acute heart failure in 1006 Africans from 9 countries: Results of the sub-Saharan Africa survey of heart failure. *Arch Intern Med*. 2012;172(18):1386–94. Available:10.1001/archinternmed.2012.3310
5. Yusuf S, Rangarajan S, Teo K, Islam S, Li W, Liu L, et al. Cardiovascular risk and events in 17 low-, middle-, and high-income countries. *N Engl J Med*. 2014;371(9):818–27. Available:10.1056/NEJMoa1311890
6. Pazos-López P, Peteiro-Vázquez J, García-Campos A, García-Bueno L, de Torres JPA, Castro-Beiras A. The causes, consequences, and treatment of left or right heart failure. *Vasc Health Risk Manag*. 2011;7:237–54. Available:10.2147/VHRM.S10669
7. Janaswamy P, Walters TE, Nazer B, Lee RJ. Current treatment strategies for heart failure: role of device therapy and LV reconstruction. *Curr Treat Options Cardiovasc Med*. 2016;18(9):57. Available:10.1007/s11936-016-0479-1
8. Jovicic A, Holroyd-LEDUC JM, Straus SE. Effects of self-management intervention on health outcomes of patients with heart failure: A systematic review of randomized controlled trials. *BMC Cardiovasc Disord*. 2006, 6:43. Available:10.1186/1471-2261-6-43
9. Jaarsma T, Hill L, Bayes-genis A, Rocca HB La, Castiello T, Celutkien J, et al. Self-care of heart failure patients: practical management recommendations from the Heart Failure Association of the European Society of Cardiology *Eur J Heart Fail*. 2021;23(1):157-174. Available:10.1002/ejhf.2008
10. Ma J, Dracup K, Stro A. The European Heart Failure Self-care Behaviour scale revised into a nine-item scale (EHFScB-9): A reliable and valid international instrument. *Eur J Heart Fail*. 2009, 11(1):99-105. Available:10.1093/eurjhf/hfn007
11. Vellone E, Riegel AB, Cocchieri AA, Barbaranelli C, Agostino FD, Antonetti G, et al. Psychometric testing of the self-care of heart failure index version 6. 2. *Res Nurs Health*. 2013;36(5):500-11. Available:10.1002/nur.21554
12. Seid MA, Abdela OA, Zeleke EG. Adherence to self-care recommendations and associated factors among adult heart failure patients. From the patients' point of view. *PLoS One*. 2019;14(2):e0211768. Available:10.1371/journal.pone.0211768
13. AL-khadher MAA, Fadl-Elmula I, Ahmed WAM. Compliance to treatment and quality of life of Sudanese patients with heart failure. *International Journal of Preventive Medicine Research*. 2015;1(2):40-4
14. Ahmed KO, Ahmed AM, Wali MB, Ali AH, Azhari MM, Babiker A, et al. Optimal medical therapy for secondary prevention of acute coronary syndrome: A retrospective study from a Tertiary Hospital in Sudan. *Ther Clin Risk Manag*. 2022, 18:391-398. Available:10.2147/TCRM.S361129
15. Vellone E, Jaarsma T, Strömberg A, Fida R, Årestedt K, Rocco G, et al. The European heart failure self-care behaviour scale: new insights into factorial structure, reliability, precision and scoring procedure. *Patient Educ Couns*. 2014;94(1):97-102. Available:10.1016/j.pec.2013.09.014
16. Wagenaar KP, Broekhuizen BD, Rutten FH, Strömberg A, van Stel HF, Hoes AW, et al. Interpretability of the European heart failure self-care behaviour scale. *Patient Educ Couns*. 2014;94(1):97-102. Available:10.1016/j.pec.2013.09.014 Available:https://doi.org/10.2147/PPA.S144915

17. Omer A, Mohamed E, Abdulrahman A. Studying of heart disease prevalence, distribution and co-factors in Sudanese population. *International Journal of Research in Medical Sciences*. 2016; 4(1):206.
Available:10.18203/2320-6012
18. Ahmed KO, Eldin IT, Yousif M, Albarraq AA, Yousef BA, Ahmed N, et al. Clinical pharmacist led-educational intervention to promote medications' adherence for Sudanese patients with heart failure: A prospective study. *Advances in Pharmacology and Pharmacy*. 2022;10(4). 227-233.
Available:10.13189/app.2022.100401
19. Ahmed KO, Eldin IT, Yousif M, Albarraq AA, Yousef BA, Ahmed N, et al. Clinical pharmacist's intervention to improve medication titration for heart failure: First experience from Sudan. *Integr Pharm Res Pract*. 2021;10: 135-143.
Available:10.2147/IPRP.S341621
20. van der Wal MH, van Veldhuisen DJ, Veeger NJ, Rutten FH, Jaarsma T. Compliance with non-pharmacological recommendations and outcome in heart failure patients. *Eur Heart J*. 2010; 31(12):1486-93.
Available:10.1093/eurheartj/ehq091
21. Sedlar N, Lainscak M, Farkas J. Self-care perception and behavior in patients with heart failure: A qualitative and quantitative study. *ESC Heart Fail*. 2021;8(3):2079-2088.
Available:10.1002/ehf2.13287

© 2022 Ahmed et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/93090>