

Factors Associated with Medication Adherence among Adult Heart Failure Patients at Selected Public Hospitals of Addis Ababa, Ethiopia. A Cross-Sectional Study

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Abstract

Background: Medication adherence is a very important issue in the management of drugs and prevents delaying disease progression, complications, and hospitalization of heart failure patients and very limited studies have been conducted on the impact of medication adherence in Ethiopia. Therefore, this study aimed to assess medication adherence and associated factors among adult heart failure patients at selected public hospitals in Addis Ababa, Ethiopia.

Methods: A health care institution-based cross-sectional study was conducted with a diagnosis of heart failure and prescribed one or more cardiovascular drugs among heart failure patients attending four public hospitals in Addis Ababa Ethiopia, from March to April 2021. The study participants were selected by using a systematic random sampling technique. Data were collected using semi-structured and pretested questionnaire and the collected data were entered and analyzed by using SPSS version 25. Variables with a p-value < 0.05 were considered statistically significant and the odds ratio was used to test the strength and association between the outcome and predictor of variables.

Results: A total of 385 heart failure patients were involved, from this 67.8% of the participants were females and the mean age was 46.27 ± 16 . and 48.6% of them adhered to medication. Respondents who received education about medication administration were two times more likely to adhere to medications when compared to those who have not received any education about medication (AOR = 2.127, 95% CI = 1.038 - 4.357, P = 0.039). and also, the study participants responded as sometimes patients may forget to take medications (AOR = 0.064, 95% CI = 0.034 - 0.121, P < 0.001) were 94% less likely to be adherent than those who did not forget to take prescribed medications.

Conclusion: The study indicates that poor medication adherence of heart failure patients is associated with education about medication, symptoms of heart failure, and the cost of medication. Therefore, all health professionals should focus on providing information about medication adherence to heart failure patients is mandatory.

Keywords: Heart Failure; Patients; Medication Adherence; Addis Ababa; Ethiopia

Background

Heart Failure (HF) is defined as “a progressive and complex clinical syndrome that can be occurred due to impairment of cardiac function that leads to inability of the heart to pump sufficient amount of blood” [1]. It is a rapidly growing cardiovascular disease worldwide [2]. However, the population burden and individual impact of chronic heart failure has been well described in the western world, but inadequately addressed in African continents [3].

According to the World Health Organization (2017) each year, 17.9 million people die from cardiovascular disease globally and > 75% of these deaths occur in low and middle-income countries [4,5]. Sub-Saharan African (SSA) regions, contributing 5.5% of the global CVD deaths [5]. Studies conducted in Ethiopia reveal that cardiac disorders including rheumatic heart disease, hypertensive heart disease and ischemic heart disease were increasing from time to time [6].

Medication adherence is “the extent to which the person’s behavior corresponds with agreed recommendations from a health care provider. It includes the initiation of the treatment, implementation of the prescribed regime, and discontinuation of the pharmacotherapy” [7]. These were considered as very crucial to delaying disease progression and preventing hospitalization in heart failure [8]. While medication non adherence is defined as taking less than prescribed doses or many doses which is associated with an increased risk of poor health of an individual’s [9]. However, medication non-adherence is a priority preventable health care problem [10]. Because it is a common problem among heart failure patients [11]. In western country, economic factors, health care related factors, therapy related factors and patient related factor were reported as key factors affecting medication adherence [12]. In this regard a few research studies conducted particularly medication adherence among adult with heart failure in Ethiopia is very limited.

Aim of the Study

The aim of this study was to assess medication adherence and associated factors among adult with heart failure visiting selected public hospitals in Addis Ababa, Ethiopia.

Materials and Methods

Study design, area, period and sample population

A health care facility based cross-sectional study was conducted at four randomly selected public hospitals who had cardiac clinic follow up in Addis Ababa, Ethiopia which includes: Tikur Anbessa Specialized Hospital, St. Paul’s Millennium medical college, Armed force public hospital and Yekatit 12 hospital from March-April 2021. Patients age 18 years old and above who had been diagnosed with heart failure, taking medications for six months and on active follow up were incorporated in the study. A total of 385 heart failure patients were included in this study. The sample was proportionally assigned to the study hospitals based on the number of patient flow. A systematic random sampling technique was applied to choose each study participants and single population proportion formula was applied to estimate sample size. The assumptions used in the sample size calculation were a proportion of 65% based on a study reported from western Ethiopia [1], a 5% significance level of 95% confidence interval, and 5% margin of error.

Data collection procedure and tools

Data was collected using a semi structured questionnaire after review and adapted different literature towards sociodemographic characteristics of the study population [1,7,13,14]. In accordance with the world Health Organization’s procedures for translation and adaptation of data collection instrument [15], first, two researchers were independently translated into Amharic language; and then,

two independent translators converted into English language (were translated the text back into English). The translated and original questionnaires were reviewed by a group of experts. According to their comments some amendments were made on translated questionnaires. Finally, questionnaire was used to assess the research objectives. To ensure accuracy of each subsection, the Amharic version was applied for pilot test with 30 adult cardiac patient selected randomly in the assigned for pilot study hospital.

Patients were approached at the appointment office right after they visited their physician and at the waiting area. First inclusion criteria were checked, oral and written consent was obtained. Information regarding patient demographic, clinical data, medication adherence, challenges of adherence and assessment of patient knowledge was collected by trained nurses through face-to-face patient interview.

Medication adherence data collection tool

Eight-Item Morisky Medication Adherence Scale (MMAS-8) was used to assess adherence. Based on the MAQ, Morisky, *et al.* developed this 8-item (MMAS-8) in 2008 [7]. Its Cronbach's alpha for internal consistency was 0.75. The tool consists of eight questions, and scoring was done according to an already developed method, in which the total score is eight. For questions one up to seven there was a score of zero for every "yes", response and one for every "no", responses except item number five in which the values are of "yes" and "No" were reversed while the last item is a five-point Likert response: "never/ rarely", "sometimes", "usually", and "always." a score of one was assigned to "never/rarely" response and zero for all other responses. The total MMAS-8 score was calculated by adding all of the eight individual question scores and patients with a score of eight classified as good adherence, 6 < 8 medium adherence and a score below 6 indicates low adherence [10,13].

The tool used to assess heart failure patient's knowledge

The tool used to assess heart failure patients' knowledge is the Dutch knowledge assessment scale. It is Cronbach's alpha for internal consistency was 0.79. Fifteen questions was used to assess patients HF knowledge with a choice of (yes, no, and I don't know). One point was given for each correct answer, no point assigned for incorrect and 'I don't know' responses. The overall level of knowledge was categorized as 'Good' for HF patients who correctly answered $\geq 75\%$ of knowledge questions and 'poor' for lower than 75% [2,14].

Data processing and analysis

All the collected data were checked for completeness and consistency of responses. After cleaning, data were coded and entered in to Epi Data version 4.4. Then it was exported and analyzed using SPSS version 25. Both descriptive and analytical statistical test were used. The general characteristics of the participants were described using descriptive statistics including frequency distribution, mean, standard deviation and range. A binary logistic regression model was used to check the effect of different factors on patient's medication adherence. Statistical significance was set at 5% and the associated 95% confidence interval (CI) was reported. Both continuous and categorical independent or predictor variables were entered in to the regression models.

Results

Socio-demographic characteristics of study participants

A total of 385 adult heart failure patients participated in the study with a response rate of 100%. The mean age of participant reveals 46.27 (± 16) years with range of 18 to 80 and 36.6% were 18 - 39 years. Out of 385 patients 261 (67.8%) were women, more than half 215 (55.8%) of the study participants were married. Of the respondents 115 (29.9%) were on primary education category. Regarding occupation 131 (34%) of patients were housewife and 67 (17.4%) of patients were government employed. Regarding to residency 344 (89.4%)

of respondents, living in urban area and 312 (81%) of participants, their level of knowledge was poor.

Clinical characteristics of study participants

Of 385 participants, 154 (40%) had chronic comorbidity, of these hypertension 125 (32.5%), diabetes 57 (14.8%), diabetes and hypertension 38 (9.9%), were the most common. Half of the patients 195 (50.6%) were on treatment for more than five years. More than half of the patient 225 (58.4%) had been hospitalized for their heart problems, 203 (52.7%) of patients paid for the drugs. Most of the patients 362 (94%), 365 (94.8%), 318 (82.5%) reported that their physician communicates about their illness, they didn't experience drug allergy and they have got education about medication respectively. As depicted in table 1 below, more than half of the participants reported drug availability problem 213 (55.3%). The use of Prescribed medication was 367 (95.3%), 375 (97.4%) were not discontinued the drug when symptoms of heart failure worsen and when the symptoms become free respectively.

Variable	Category	Frequency	Percentage
Source of medication	Paid	203	52.7
	Free	182	47.3
History of hospitalization	Never	160	41.6
	One or more time	225	58.4
Duration of medication use	Up to one year	45	11.7
	1 - 5 years	145	37.7
	> 5 years	195	50.6
Comorbidities	None	231	60.0
	Diabetes	57	14.8
	Hypertension	125	32.5
	Diabetes and hypertension	38	9.9
	Dyslipidemia	34	8.8
	Others	14	3.6
No of medication prescribed	1 up to 5	269	69.9
	5 and above	116	30.1
Frequency of follow up	< 3 months	334	86.8
	> 4 months	51	13.2
Education about medication	Yes	318	82.6
	No	67	17.4
Known drug allergy	Yes	20	5.2
	No	365	94.8
Medication availability problem	Yes	213	55.3
	No	172	44.7
Symptom severity	Yes	18	4.7
	No	367	95.3
Fewer symptom	Yes	10	2.6
	No	375	97.4

Table 1: Clinical, medication and health care related characteristics associated with ambulatory heart failure patients in Addis Ababa Public Hospitals (n = 385).

Social and behavioral factors

The result of this study indicates that 341 (88.6%) of the respondents were living with their family, followed by 39 (10.1%) living alone and most of the participants do not practice any of the social drugs.362 (94%) do have the practice of communication with their physician about their illness.

Adherence status

This study indicates that 187 (48.6%) were good adherence to the prescribed medications. Overall, medication adherence was measured by using MMAS-8 scale. Whereas about 198 (51.4%) were poor adherence to the prescribed medications as shown in figure 1 below and 47.3% of them were unable to cover the required drug cost.

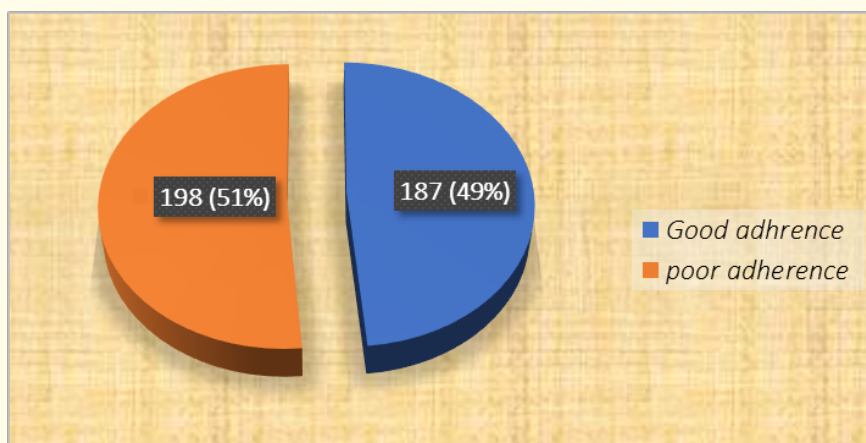


Figure 1: Medication adherence based on eight item Morisky scale of adult clients with chronic heart failure patients attending public teaching hospitals of Addis Ababa, Ethiopia (n = 385).

Level of heart failure knowledge

The study participants knowledge of their own condition assessed with Dutch heart failure knowledge scale in which 'Good' for HF patients who correctly answered $\geq 75\%$ of knowledge questions and 'poor' for lower than 75%. Of the respondents 73 (19%) and 312 (81%) were correctly and incorrectly answered knowledge questions respectively.

Factors associated with medication adherence

Binary logistic regression was computed to see the existence of an association between Medication adherence among heart failure patients and each independent variable separately. Nine variables had a significance level of less than 0.25 with medication adherence. The variables were educational status, education about medication, fewer HF symptom, Patient forgetfulness, cost of drugs, cigarette smoking, drug unavailability, symptom severity and regimen complexity. All nine variables were entered in to multivariate logistic regression analysis to see the effect of confounding and identifying significant variables, of which five variables educational status, education about medication, fewer HF symptom, Patient forgetfulness, cost of drugs, had an association with medication adherence with a significance value of P-less than 0.05.

Respondents who were received education about medications was 2 times more likely to adhere to medications when compared to those who were not received education about medication at (AOR = 2.127, 95% CI = 1.038 - 4.357, P = 0.039). With regard to educational level, no formally educated (AOR = 6.044, 95% CI = 1.952 - 18.708) and primary education level (AOR = 3.865, 95% CI = 1.374 - 10.872, P = 0.039) were found more likely to be adherent than preparatory, college diploma and university degree. Participants who stopped medication when heart failure symptoms controlled (AOR = 0.044, 95% CI = 0.006 - 0.304, P = 0.002) were 96% less likely to adhere to medication when compared with those who are not ceased the prescribed drugs when the symptoms were controlled. In addition, respondents who were sometimes forgot to take medications (AOR = 0.064, 95% CI = 0.034 - 0.121, P < 0.001) was 94% less likely to be adherent than those who did not sometimes forgot to take prescribed medications. As shown in table 2 below, for those participants the cost of drugs expensive AOR = 0.413, 95% CI = 0.208 - 0.820 P = 0.012) were 59% less likely to adhere to medications compared with cost of drugs were not expensive.

		Medication Adherence		(COR 95%CI)	(AOR 95%CI)	P-value
		Poor Adherence	Good Adherence			
Education about medication	Yes	81 (69.2)	237 (88.4)	4.056 (2.206, 7.456)	2.127 (1.038, 4.357)	0.039*
	No	36 (30.7)	31 (11.5)	1	1	
Educational status	No formal education	13 (11.1)	58 (21.6)	4.015 (1.672, 9.641)	6.044 (1.952, 18.708)	0.039*
	Primary	28 (23.9)	87 (32.5)	2.796 (1.300, 6.016)	3.865 (1.374, 10.872)	
	Secondary	16 (13.7)	31 (11.6)	1.747 (0.736, 4.148)	2.004 (0.636, 6.314)	
	Preparatory	17 (14.5)	33 (12.3)	1.604 (0.709, 3.629)	2.555 (0.862, 7.579)	
	College diploma	18 (15.4)	29 (10.8)	1.45 (0.609, 3.450)	3.001 (0.929, 9.697)	
	University degree and above	18 (15.4)	20 (7.5)	1	1	
Fewer HF symptom	Yes	8 (6.8)	2 (0.7)	0.102 (0.021, 0.490)	0.044 (0.006, 0.304)	0.002*
	No	109 (93.1)	266 (99.3)	1	1	
Patient forgetfulness	Yes	98 (83.7)	68 (25.4)	0.060 (0.034, 0.105)	0.064 (0.034, 0.121)	< 0.001**
	No	19 (16.2)	205 (76.5)	1	1	
Cost of drugs	Yes	40 (34.1)	47 (17.5)	0.409 (0.250, 0.672)	0.413 (0.208, 0.820)	0.012*
	No	77 (65.8)	221 (82.5)	1	1	
Regimen complexity	Yes	8 (6.8)	5 (1.8)	0.259 (0.083, 0.809)	0.408 (0.084, 1.974)	0.265
	No	109 (93.2)	263 (98.1)	1	1	
Cigarette smoking	Yes	4 (3.4)	4 (1.5)	0.428 (0.105, 1.742)	0.301 (0.031, 2.903)	0.299
	No	113 (96.5)	264 (98.5)	1	1	
Symptom severity	Yes	13 (11.1)	5 (1.7)	0.152 (0.053, 0.437)	0.298 (0.078, 1.140)	0.077
	No	104 (88.9)	263 (98.1)	1	1	
Drug unavailability	Yes	78 (66.7)	135 (50.4)	0.508 (0.323, 0.798)	0.845 (0.456, 1.568)	0.594
	No	39 (25.6)	133 (49.6)	1	1	

Table 2: Binary logistic analysis of factors associated with medication adherence among adult heart failure clients on follow up at public hospitals in Addis, Ethiopia, (n = 385).

P-value significant at P < 0.05.

Discussion

Many governmental and non-governmental organizations have recommended that heart failure can be managed by effective self-care practice including strictly achieving the principles of medication adherence. However, the present study finding revealed that the practice of adherence to prescribed medication among adults with heart failure attending public hospitals in Addis Ababa was low. The finding of this study adherence level to the prescribed medication among heart failure patients was vary among educational level, symptoms of heart failure, patient forgetfulness and cost of the prescribed drugs.

The results of this study reveal that prevalence rate of prescribed medications adherent is 48.6%. However, the finding of current study is higher than a study conducted from Tanzania, India and California respectively [17,19]. Moreover, the result of this study is corroborating with similar studies conducted in Yemen and Saudi Arabia where they investigated the low level of adherence to medication among adults with heart failure [20,21]. On the contrary, the prevalence rate of this finding is lower than the study conducted in Oromia region, South Africa and Pakistan. whereby the majority of patients were adherent to prescribed medications [3,22,23]. The difference might be linked to low attention of participants with heart failure to their health, limitation of health care service (lack of adequate cardiac clinic-for follow up) and lack of adequate counselling about the benefits of medication adherence. This is due to poor adherence of standardized care for treatment and management of heart disease in study area in related to lack of gap filling training or Inservice training for health care professionals in regard to the management of any cardiac disease. For instance, a pervious study from Sudan reported that the reasons for poor medication adherence among the study participants were found to be lack of adequate training provided for health professionals to provide best instruction on using prescribed drugs appropriately [26]. In line with previous studies [24], this study found no statistically significant association between age and medication adherence. However, we argue that respondents might have had poor perception that medication adherence has very important for the treatment of heart failure than other self-care activities like physical exercise. Besides, respondents who were received education about medications are more likely to adhere to medications compared to those who were not received education about medications. This finding is consistent a study conducted in USA [25]. However, contrasting the finding was reported from Saudi Arabia [21]. Thought, effective health education is needed, younger adult patients may be less interested in managing their disease condition because lack of adequate knowledge and sufficient time to comply with healthy lifestyle and medication.

Furthermore, our study finding showed that participants who have attended primary education level were more likely to adhere to medication compared to those attended high educational level, this finding is consistent with the study result reported from Los Angeles [27]. Another study indicate that, participants who has no formal education had greater trust in prescribed medication and those who are highly educated mostly employed with many life burdens made them not to remember their prescribed medication regularly [21]. The finding of this study not consistent with the study conducted in Iran where patients with high education level had higher medication adherence than low education level [28]. On this condition, we believe that the reason might be patients with higher education level have greater health related awareness and therefore adhere to their prescribed medication more strictly.

This study found that participants who interrupted the prescribed medication when they are free from symptoms of heart failure were less likely to adherent to medication compared with those who did not stopped drugs when the symptoms were free. This is consistent study conducted in USA, California and India [27] and Saudi Arabia [21] where a majority of patients stopped medications when they felt better. The reason for non-adherence during symptom free might be due to lack of adequate information and counselling about the severity of disease and proper utilization of prescribed medications.

This study shows that respondents who were sometimes forgot to take medications were less likely to adherent to their prescribed medications compared with those who did not sometimes forget to take prescribed medications. This result is supported with a study

conducted in USA, Netherland s New York, California and Saudi Arabia [21,27,28] respectively. The reasons of forgetfulness for patient that make it difficult for taking their prescribed medications might be lack of sufficient time (younger peoples are busy at home and when they are in work place). Moreover, forgetfulness for medication adherence may likely be due to the fact that lack of adequate health education/ information or lack of appropriate family support.

High costs of drug and unaffordability have consistently identified in several studies as a reason for non-adherence to prescribed medication among adult with heart failure [17,26,27]. On the other hand this study revealed that participants shared that high cost of drugs were less likely to adhere to medications compared with those the cost of drugs that was not expensive. The reason for this finding may be due to irregular availability of the drugs in the hospitals. Hence, most patients bought the drugs out of the hospitals with high cost and more than half of the patients have got the drugs in private pharmacy by paying out of their pocket rather than free charge, and the other possible reason may be the prescribed medication is not affordable (very expensive). Consequently, many patients who can't afford the price of prescribed medications are likely to go without treatment till they are able to purchase the prescribed medications or the next scheduled visit with their health care provider.

Conclusion

Almost half of the study respondents have no good medication adherence and the factors affecting adherence were educational status, education about medication, unavailability of drug, high cost of drug and forgetfulness major factors that affect medication adherence among heart failure patients.

Recommendations

- Human resource office and CEOs of each hospital should develop action plan and implement to provide patient education about medication adherence (use, outcome of nonadherence on patients' health and related issues).
- All concerned bodies including ministry of health, hospital managers, physicians, pharmacists and nursing professionals should consider institutional factors to increase medication adherence and provide capacity building or gap filling training for health care workers of cardiac units.

Ethics Approval and Consent to Participate

Ethical clearance and approval obtained from Institutional Review Board of Addis Ababa University, College of Health Sciences, School of Nursing, and Midwifery, Permission was obtained from clinical director of each study hospitals, Matron and heads of the respective cardiac. After explaining the purpose of the study, possible benefit of the study and time to complete the questionnaire and why the participants are chosen, oral and written informed consent was obtained from each participant before proceeding the procedure. The participants were fully explained that they have the right not to participate in the study, to stop at any time in between or not to answer any questions they were not willing to answer. Confidentiality was maintained; no unauthorized person had access to the information and names or other identifiers were not recorded. Methods were carried out in accordance with Helsinki guidelines and regulations.

Consent for Publication

Not applicable.

Availability of Data and Materials

All relevant data are included with in the manuscript document. If it is necessary, it is possible to contact the corresponding author to get additional materials.

Competing Interests

This thesis is submitted in partial fulfilment of the requirement for the MSc degree from the School of Postgraduate Studies at Addis Ababa University, School of Nursing and Midwifery. The thesis is deposited in the Library of Addis Ababa University and is made available to the user under the rules of the library. The authors do not have any competing interests.

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Authors' Contributions

The paper is the result of joint research, the contribution of every author is comparable to the others. AD. searched the literature, trained field researchers for data collection, and wrote draft results and reviews of the manuscript and YA. and BD. have participated in the data analysis, interpretation, review of the manuscript for publication. TH. Data analysis, Conceptualized the paper (report) and Manuscript preparation and other necessary document preparation for publication. All authors read and approved the final manuscript.

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