Knowledge about self-care and associated factors among heart-failure patients in Ayder Referral Hospital, Ethiopia, 2018: A cross-sectional study

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Abstract

Background: Good knowledge of self-care related to heart failure (HF) is key to improve patient outcomes. However, information regarding how much patients know about self-care is lacking in developing countries, particularly in the study setting.

Objective: The objectives of this study were to assess HF patients’ knowledge about self-care and to explore predictors among HF patients in Ayder comprehensive specialised referral hospital, Tigray, Ethiopia.

Methods: This hospital-based cross-sectional study design was undertaken in Ayder comprehensive specialised referral hospital, Tigray, Ethiopia. A total of 408 HF patients participated, and the study was done between February and April 2018. An interviewer-assisted structured questionnaire was used to collect data. Bivariate logistic regression and multivariable logistic regression were conducted to identify the predictors associated with knowledge about self-care.

Results: The mean age of the participants was 45.4 years (standard deviation=19 years). Around 255 (62.5%) of the participants had poor self-care knowledge. Age, New York Heart Association classes, duration of the disease and previous hospitalisation were the factors associated with knowledge about self-care.

Conclusion: More than half of all participants had poor knowledge about self-care. Improving existing prevention strategies and strengthening patients’ knowledge are recommended to address this knowledge deficit.

Keywords

Heart failure, knowledge, self-care, Tigray, Ethiopia

Introduction

Heart failure (HF) is defined as a chronic and progressive disease in which the heart muscles are unable to pump sufficient blood to meet the body’s needs for oxygen and blood. Globally, nearly one million new cases of HF are diagnosed annually, and about 26 million people are living with HF.1,2 According to the American Heart Association’s (AHA) 2017 heart disease statistics report, the number of HF patients increased from 5.7 million between 2009 and 2012 to 6.5 million between 2011 and 2014, and it is expected to rise by 46% by 2030.3

Compared to developed nations, HF is an especially challenging problem in developing countries such as Sub-Saharan Africa. The fatality rate of HF ranges from 9% to 12.5%, and it tends to occur at reproductive age.4,5 In Ethiopia, studies have shown that HF related to structural heart disease (66.7%), rheumatic heart disease (52%) and congenital heart disease (44.5%) are common in younger age groups, while adult hypertension (38.8%) and diabetes mellitus (20.3%) are common in the adult population.6,7 Another study indicated that HF was related with valvular heart disease (50.8%), cardiogenic shock (12.5%), cor pulmonale (9.4%), HF secondary to dilated cardiomyopathy (8.6%) and hypertensive heart disease (3.9%).8

Knowledge about self-care is an essential component for HF patients to prevent HF complications, improve quality of life and health outcomes, as well as decrease medical costs.9-11

Self-care in HF involves compliance with diet, fluid restriction,
medication adherence, weight monitoring, physical activity and symptom recognition and contacting health professionals when symptoms worsen. So, comprehensive and competent care for patients with HF needs a strong emphasis on the education of patients as well as their families in order to improve their knowledge about self-care. Many studies in different parts of the world have indicated that the prevalence of knowledge about self-care varies, and generally ranges from 10.7% to 27%. Although there is inconsistency among studies, many factors were found to affect knowledge about self-care. Educational level, age, sex, living arrangements, social support, lack of information in the context of HF and clinical factors such as co-morbidities are among the major contributing factors related to knowledge about self-care.

Previous data revealed that HF admission episodes were related to low knowledge of self-care. However, research has shown that fatalities and hospital readmissions might be reduced if patients with HF had better knowledge about self-care. A study conducted in Ayder comprehensive specialised referral hospital showed that HF was the leading cause for hospital admission in the intensive care unit (16%). Besides, there are limited results in the Ethiopian context, especially in the study area, regarding patients’ knowledge about self-care and preventive action in decreasing hospital admissions. Therefore, this study aimed to assess HF patients’ knowledge about self-care and to explore predictors influencing their knowledge level in Ayder comprehensive specialised referral hospital, Tigray, Ethiopia.

Method
Study design, setting and population

This cross-sectional study design was conducted from February to April 2018 in Ayder comprehensive specialised referral hospital which is located in the Tigray region of northern Ethiopia. All adult (≥18 years) patients were included, except those who were mentally unstable or seriously ill during the data-collection period. In our set-up, there daily health education/morning counselling at the cardiac clinic to all patients regarding knowledge about self-care such as: low-salt diet, weight monitoring, avoiding alcohol intake and other activities that are adapted for all participants, including for those who cannot read and write.

A single population proportion formula was used to determine the required sample size: $n = \left(\frac{Za}{2}\right)^2 \cdot \left(\frac{1-P}{P}\right) / d^2$

where $n$ is the sample size, $Z$ is the standard error of the mean corresponding to a 95% confidence level (1.96), $P$ is the estimated proportion of patients with good self-care knowledge (0.107) taken from a previous study and $d$ is margin of error taken as 3%. Therefore:

$n = \left(\frac{1.96}{0.107}\right)^2 \cdot \left(1-0.107\right) / (0.03)^2 = 408$

A simple random-sampling method was used to select the study participants, and the sampling frame was prepared based on the patients’ registration number from the registration book. Two nurses holding a Bachelor of Science degree and with previous experience in data collection were assigned to collect the data under the supervision of a senior public-health professional. The principal investigator also undertook continuous follow-up in order to maintain the quality of the data.

Data-collection tools

To collect the data, we used an interviewer-administered structured questionnaire and document review. The questionnaire contained five parts. Part I was used to collect sociodemographic data (age, sex, living arrangements, marital status, educational level, occupation, religion and ethnicity). Part II was the Modified Dutch Heart Failure Knowledge scale (DHKS) which consists of 15 multiple-choice questions about knowledge of HF in general (four items), HF treatment (six items) and symptom/symptom recognition (five items). For each item, patients could choose from three options, with one of the options being the correct answer. A score of one was given for each correct answer, and zero was given for incorrect answers. The total score ranged from 0 to 15. A DHKS score of £10 was used as the cut-off for good knowledge about self-care, with a score of <10 indicating poor knowledge about self-care. Part III was used to assess the behavioural characteristics of the participants (smoking and alcohol status). Part IV was the Multidimensional Scale of Perceived Social Support (MSPSS). This is a 12-item instrument to measure three subscales of social support: (a) the significant other subscale (four items), (b) the family subscale (four items) and (c) the friends subscale (four items). Each item is based on a seven-point Likert-type scale ranging from 1=’very strongly disagree’ to 7=’very strongly agree’, with high social support being defined as an MSPSS score above the mean and low social support as a score below the mean. The internal consistency in the present study was a Cronbach’s alpha of 0.877. Part V was a medical record review checklist that was used to collect clinical data such as duration of the disease, co-morbidity, previous hospitalisation and clinical staging of the disease. A preliminary study assessed the feasibility of the questionnaire, after which it was used in its final form. Patients undergoing the preliminary studies were excluded from the main study. The patients were asked to provide detailed demographic information, modified DHKS, behavioural characteristics and social support. Clinical data were obtained from the patients’ hospital charts.

Definition of variables

An alcohol drinker was defined as a person who drinks ≥10.5 units of alcohol per week. Patients who had smoked within the past three months were defined as smokers. With regard to previous hospitalisation, ‘yes’ was recorded if the patient’s had a readmission rate of more than twice after they knew about their condition, and ‘no’ otherwise.

Data quality control

The data collectors and supervisor were given two days of training by the principal investigator on the study’s data-collection approach. To check the meaning and consistency of the data, first, the questionnaire was prepared in English by the principal investigator and then translated into the local language Tigrigna in order to collect the actual data. It was
then back-translated into English by a language expert who was a teacher from the Department of English. A pretest was done in Axum University comprehensive specialised hospital in 10% of the sample size to see the applicability of the tools and was modified accordingly. The collected data were checked and reviewed daily for completeness as well as consistency during the data-collection period.

Data analysis and management

Data were coded, entered, checked, cleaned and analysed using IBM SPSS Statistics for Windows v22 (IBM Corp., Armonk, NY). First, bivariate logistic regression was computed to see the association between each independent variable and the outcome variable. Then, those variables with a p-value of <0.25 in bivariate logistic regression were selected for multivariable logistic regression analysis in order to assess the association between independent variables with the dependent variable. Odds ratios (OR) with 95% confidence intervals (CI) and p-values of <0.05 were declared statistically significant.

Results

Sociodemographic characteristics and clinical characteristics

From a total of 408 participants, 136 (33.3%) were ≥55 years of age, and the mean age was 45.4 years (standard deviation (SD)=19 years). The majority of the participants were female (n=224; 54.9%), Orthodox Christians (n=368; 90.2%) and married (n=219; 53.7%). A third of participants (n=132; 32.4%) were not formally educated. Most participants had lived with the disease for more than a year (n=235; 57.6%), and HF classifications based on the New York Heart Association (NYHA) showed that 143 (35%) of the participants were in stage 1 (class 1). More than half of the HF cases were caused by non-ischaemic cardiomyopathy (n=236; 57.8%). The majority of patients were taking diuretics (n=182; 44.6%), beta blockers (n=69; 16.9%) or angiotensin- converting enzyme inhibitors (n=48; 11.8%). In addition, study subjects were taking other medication such as anticoagulants, insulin, antibiotics or analgesics. Just over half (n=219; 53.7%) of the respondents had been readmitted to hospital more than twice (Table 1).

Knowledge, social support and behavioural characteristics of respondents

In this study, more than half of HF patients (n=255; 62.5%) had poor knowledge about self-care, with a mean score of HF knowledge of 8.47 (SD=2.0). The three areas of knowledge identified in this study were: HF in general, HF treatment and HF symptom recognition. From the treatment regimen, participants indicated misunderstanding about weight monitoring. Only 32.4% of participants knew that those with severe HF symptoms must weigh themselves every day. About 41.2% of study subjects knew that they should have a low-salt diet. From the total study participants, more than half (n=239; 58.6%) of the respondents revealed that their educational level was below primary school. However, respondents who had an educational level of secondary school and above recorded higher in all scales of the three categories of knowledge than those who had an educational level below primary school (Table 2).

Nearly two-thirds (n=155; 62%) of study participants had low social support. Family (n=173; 42.4%), friends (n=149; 36.5%) and significant other (n=86; 21.1%) constituted the sources of support. Most respondents (n=407; 99.8%) were non-smokers (Table 2). In addition, there was a correlation between level of knowledge and the hospital readmission rate. Just over half (n=140; 54.9%) of HF patients who had no history of hospitalisation were found to have poor self-care knowledge. Similarly, 149 (71.3%) participants with low social support had a history of hospital readmission.

Factors associated with knowledge about self-care on HF

After conducting bivariate and multivariable logistic regression, four variables indicated an overall significant effect on knowledge about self-care among the study subjects at the 5% significance level: age, clinical staging, duration of disease and previous hospitalisation. Respondents between 18 and 27 years old were 75% less likely to have poor knowledge compared to those ≥55 years old (adjusted OR (AOR)=0.25, 95% CI 0.10–0.61).

On the other hand, participants whose NYHA clinical staging was class 1 had 4.2 times worse knowledge compared to participants whose NYHA clinical staging was class 4 (AOR=4.2, 95% CI 1.63–11). Study participants who had had a diagnosis of HF for less than a year were 2.1 times more likely to be at risk for poor knowledge compared to participants who had had a diagnosis for a year or more (AOR=2.1, 95% CI 1.244–3.56; Table 3).

Discussion

In this study, we determined the prevalence of self-care behaviour and associated factors among HF patients. The prevalence of self-care behaviour appears to vary within and across countries. In this study, the prevalence of poor knowledge about self-care was 62.5% (95% CI 57.8–67.2). This result is lower than that found in the Netherlands, Vietnam and Jimma University in Ethiopia in which poor knowledge was recorded at 73%, 76% and 89.3%, respectively.14–16 This difference could be due to the variation in study design and population sample size.

In our study, respondents aged 18–27 years old were 75% less likely to have poor knowledge about self-care compared to respondents ≥55 years old (AOR=0.25, 95% CI 0.10–0.61). This is similar to research done in California and Kentucky that showed that younger age was associated with better knowledge.18 This could be because many older individuals may suffer from visual and hearing impairments that interfere with self-care activities. Similarly, participants with a
history of previous hospitalisation were 60% less likely to have poor knowledge than those with no history of previous hospitalisation (AOR=0.4, 95% CI 0.25–0.75). This might be because repeated hospitalisation may give an opportunity to increase knowledge about HF and to encourage patients to place more emphasis on self-care.18

Another finding of this study was a significant relationship between duration of HF and knowledge of self-care.

Table 1. Sociodemographic characteristics and clinical characteristics of study participants.

| Variables                  | Categories                | Frequency | Percentage |
|----------------------------|---------------------------|-----------|------------|
| Sex:                       | Female                    | 224       | 54.9       |
|                            | Male                      | 184       | 45.1       |
| Age (years):               | 18–27                     | 96        | 23.5       |
|                            | 28–36                     | 66        | 16.2       |
|                            | 37–45                     | 58        | 14.2       |
|                            | 46–54                     | 52        | 12.7       |
|                            | ⩾55                       | 136       | 33.3       |
| Marital status:            | Married                   | 219       | 53.7       |
|                            | Single                    | 76        | 18.6       |
|                            | Divorced                  | 43        | 10.5       |
|                            | Widowed                   | 70        | 17.2       |
| Living arrangements:       | Living with someone       | 338       | 82.8       |
|                            | Living alone              | 70        | 17.2       |
| Level of education:        | Cannot read and write     | 68        | 16.7       |
|                            | No formal education       | 132       | 32.4       |
|                            | Primary school            | 39        | 9.6        |
|                            | Secondary school          | 76        | 18.6       |
|                            | Diploma and above         | 93        | 22.8       |
| Occupation:                | Farmer                    | 68        | 16.7       |
|                            | Housewife                 | 127       | 31.1       |
|                            | Governmental employee     | 82        | 20.1       |
|                            | Daily worker              | 47        | 11.5       |
|                            | Merchant                  | 56        | 13.7       |
|                            | Student                   | 21        | 5.1        |
|                            | Othera                    | 7         | 1.7        |
| Religion:                  | Orthodox                  | 368       | 90.2       |
|                            | Muslim                    | 40        | 9.8        |
| Ethnicity:                 | Tigray                    | 392       | 96.1       |
|                            | Amhara                    | 15        | 3.7        |
|                            | Otherb                    | 1         | 0.2        |
| Residence                  | Urban                     | 265       | 65         |
|                            | Rural                     | 143       | 35         |
| Duration of HF:            | < 1 year                  | 173       | 42.4       |
|                            | ⩾ 1 year                  | 235       | 57.6       |
| NYHA functional class:     | Class I                   | 143       | 35         |
|                            | Class II                  | 140       | 34.3       |
|                            | Class III                 | 90        | 22.1       |
|                            | Class IV                  | 35        | 8.6        |
| Co-morbidities:            | Yes                       | 261       | 64         |
|                            | No                        | 147       | 36         |
| Aetiology of HF:           | Ischaemic cardiomyopathy  | 172       | 42.2       |
|                            | Non-ischaemic cardiomyopathy | 236     | 57.8       |
| Type of medications:       | Diuretics                 | 182       | 44.6       |
|                            | ACEI                      | 48        | 11.8       |
|                            | Beta blockers             | 69        | 16.9       |
|                            | Digitals                  | 36        | 8.8        |
|                            | Calcium channel blockers  | 17        | 4.2        |
|                            | Othersc                   | 56        | 13.7       |
|                            | Yes                       | 219       | 53.7       |
|                            | No                        | 189       | 46.3       |

*aNo work, retired, and self employee
*bAfar
*cPatients took more than two combinations of medication.

HF: heart failure; NYHA: New York Heart Association; ACEI: angiotensin-converting enzyme.
Participants with a disease duration of less than a year were 2.1 times more likely to have poor self-care knowledge compared to participants with a disease duration of a year or more (AOR=2.1, 95% CI 1.24–3.56). This reflects that patients’ experience plays a significant role in increasing awareness about their condition. Participants whose NYHA staging was class 1 were also 4.2 times more likely to have poor knowledge of self-care compared to respondents whose NYHA staging was class 4 (AOR=4.2, 95% CI 1.63–11). This implies that advanced disease has a positive impact on knowledge of self-care.

In this study, social support had a great impact on HF knowledge in bivariate analysis. Participants with low social support were 1.9 times more likely to have poor knowledge of self-care than respondents with high social support (crude OR=1.9, 95% CI 1.24–2.93). However, there was no association in multivariate logistic regression analysis. This might be because health education about the treatment of HR in our set-up is not inclusive of the families/friends or other significant others.

To improve HF management, effective education strategy programmes such as more interactive discussions, many communication platforms and follow-up with health professionals may help HF patients understand their condition better, promote retention of the knowledge taught and prevent misunderstandings. Educational and therapeutic interventions should focus on being individualised in order to improve and maximise the effectiveness of patient education. Educational intervention must also be inclusive of family, friends and other supporters. Similarly, educational activities should be tailored

### Table 2. Knowledge, social support and behavioural characteristics of patients with HF.

| Variables                | Categories                                      | Frequency | Percentage |
|--------------------------|-------------------------------------------------|-----------|------------|
| **Knowledge level**      | Good knowledge                                  | 153       | 37.5       |
|                          | poor knowledge                                  | 255       | 62.5       |
| **HF in general**        | What might be the cause of a rapid worsening of heart failure symptoms? (6) | 195 (47.8%) | 55         | 140       |
|                          | What does ‘heart failure’ mean? (7)             | 200 (49%) | 65         | 135       |
|                          | Do you know the function of the heart? (9)     | 185 (45.3%) | 70       | 115       |
|                          | What might be the main causes of heart failure? (11) | 157 (38.5%) | 43         | 114       |
| **HF treatment**         | How much fluid are you allowed to take at home each day? (3) | 189 (46.3%) | 59         | 130       |
|                          | Which of these statements/ideas is true? (4)   | 166 (40.7%) | 45         | 121       |
|                          | Why would someone with heart failure be recommended to follow a low-salt diet? (10) | 168 (41.2%) | 54         | 114       |
|                          | Do you know the function of the heart? (12)    | 165 (40.4%) | 18         | 147       |
|                          | Why are diuretics (e.g. Lasix) prescribed to someone with heart failure? (13) | 206 (50.5%) | 66         | 140       |
|                          | Why should alcohol be avoided to someone with heart failure? (15) | 158 (38.7%) | 42         | 116       |
| **HF symptoms/symptom recognition** | How often should be patients with severe heart failure weigh themselves? (1) | 132 (32.4%) | 57         | 75         |
|                          | What might be the cause of a rapid worsening of heart failure symptoms? (2) | 201 (49.3%) | 70         | 131       |
|                          | Do you know the function of the heart? (5)     | 181 (44.4%) | 61         | 120       |
|                          | Do you know why your legs might swell up when you have heart failure? (8) | 190 (46.6%) | 66         | 124       |
|                          | Which statement/idea about weight increase and heart failure is true? (14) | 178 (43.6%) | 54         | 124       |
| **Social support**       | Low                                             | 155       | 62         |
|                          | High                                            | 253       | 38         |
| **Source of social support** | Family                                         | 173       | 42.4       |
|                          | Friend                                          | 149       | 36.5       |
|                          | Other significant person                         | 86        | 21.1       |
| **Smoking status**       | No                                              | 407       | 99.8       |
|                          | Yes                                             | 1         | 0.2        |
| **Alcohol status**       | Not drinker                                      | 371       | 90.9       |
|                          | Drinker                                          | 37        | 9.1        |

Itemised breakdown of HF knowledge questionnaire comparing patients with below primary school and above secondary school educational level

| Patients who answered correctly, n (%) | Educational level |
|----------------------------------------|-------------------|
| ⩽Primary school                        | ⩾Secondary school |
|HF in general                           |                   |
| What might be the cause of a rapid worsening of heart failure symptoms? (6) | 195 (47.8%) | 55 | 140 |
| What does ‘heart failure’ mean? (7)     | 200 (49%) | 65 | 135 |
| Do you know the function of the heart? (9) | 185 (45.3%) | 70 | 115 |
| What might be the main causes of heart failure? (11) | 157 (38.5%) | 43 | 114 |
| HF treatment                           |                   |
| How much fluid are you allowed to take at home each day? (3) | 189 (46.3%) | 59 | 130 |
| Which of these statements/ideas is true? (4) | 166 (40.7%) | 45 | 121 |
| Why would someone with heart failure be recommended to follow a low-salt diet? (10) | 168 (41.2%) | 54 | 114 |
| Do you know the function of the heart? (12) | 165 (40.4%) | 18 | 147 |
| Why are diuretics (e.g. Lasix) prescribed to someone with heart failure? (13) | 206 (50.5%) | 66 | 140 |
| Why should alcohol be avoided to someone with heart failure? (15) | 158 (38.7%) | 42 | 116 |
Table 3. Bivariate and multivariable logistic regression of factors affecting knowledge about self-care among HF patients.

| Variables                      | Knowledge level | COR (95% CI)          | AOR (95% CI)          |
|--------------------------------|-----------------|-----------------------|-----------------------|
|                                | Good            | Poor                  |                       |
|                                | n (%)           | n (%)                 |                       |
| Age (years):                   |                 |                       |                       |
| 18–27                          | 49 (32)         | 47 (18.4)             | 0.227 (0.126–0.41)    | 0.25 (0.1–0.61)<p |
| 28–36                          | 31 (20.3)       | 35 (13.7)             | 0.267 (0.14–0.51)     | 0.38 (0.16–0.9)<p |
| 37–45                          | 30 (19.6)       | 28 (11)               | 0.22 (0.113–0.13)     | 0.26 (0.11–0.61)<p |
| 46–54                          | 17 (11.1)       | 35 (13.7)             | 0.48 (0.237–1.00)     | 0.73 (0.29–1.86) |
| ≥55                            | 26 (17)         | 110 (43.1)            |                       |                       |
| Marital status:                |                 |                       |                       |
| Married                        | 99 (64.7)       | 120 (47.1)            | 1.02 (0.6–1.72)       | 0.48 (0.19–1.2)     |
| Single                         | 34 (22.2)       | 42 (16.5)             | 2.72 (1.27–5.79)      | 1.27 (0.3–3.13)     |
| Divorced                       | 10 (6.5)        | 33 (12.9)             | 4.95 (2.41–10.17)     | 1.24 (0.37–4.15)    |
| Widowed                        | 10 (6.5)        | 60 (23.5)             |                       |                       |
| Living arrangements:           |                 |                       |                       |
| Living alone                   | 15 (9.8)        | 55 (21.6)             | 2.53 (1.37–4.66)      | 1.34 (0.60–2.97)    |
| Living with someone            | 138 (90.2)      | 200 (78.4)            |                       |                       |
| Occupation:                    |                 |                       |                       |
| Farmer                         | 13 (8.5)        | 49 (19.2)             | 2.03 (0.67–6.12)      | 0.25 (0.03–2.31)    |
| Housewife                      | 38 (24.8)       | 82 (32.2)             | 1.16 (0.43–3.14)      | 0.25 (0.03–2.22)    |
| Government employee            | 48 (31.4)       | 48 (18.8)             | 0.53 (0.19–1.46)      | 0.21 (0.03–1.79)    |
| Daily worker                   | 16 (10.5)       | 26 (10.2)             | 0.87 (0.28–2.65)      | 0.16 (0.018–1.5)    |
| Merchant                       | 29 (19)         | 32 (12.5)             | 0.59 (0.21–1.69)      | 0.25 (0.03–2.16)    |
| Other<sup>a</sup>              | 2 (1.3)         | 5 (2.0)               | 1.34 (0.21–8.82)      | 0.28 (0.03–2.95)    |
| Student                        | 7 (4.6)         | 13 (5.1)              |                       |                       |
| Level of education:            |                 |                       |                       |
| Can read and write             | 26 (17)         | 42 (16.5)             | 2.14 (1.13–4.05)      | 1.9 (0.86–4.55)     |
| No formal education            | 29 (19)         | 103 (40.4)            | 4.7 (2.63–8.42)       | 2.15 (0.82–5.68)    |
| Primary school                 | 6 (3.9)         | 33 (12.9)             | 7.28 (2.78–19.1)      | 5.15 (1.55–17.05)   |
| Secondary school               | 39 (25.5)       | 37 (14.5)             | 1.26 (0.68–2.31)      | 1.39 (0.63–3.09)    |
| Diploma and above              | 53 (34.6)       | 40 (15.7)             |                       |                       |
| Residence:                     |                 |                       |                       |
| Urban                          | 119 (77.8)      | 146 (57.3)            | 0.38 (0.24–0.60)      | 0.54 (0.28–1.03)    |
| Rural                          | 34 (28.9%)      | 109 (42.7)            |                       |                       |
| Alcohol status                 |                 |                       |                       |
| Drinker                        | 10 (6.5)        | 27 (10.6)             | 1.69 (0.79–3.6)       | 2.09 (0.82–5.34)    |
| Not drinker                    | 143 (93.5)      | 228 (89.4)            |                       |                       |
| NYHA class:                    |                 |                       |                       |
| Class I                        | 31 (20.3)       | 112 (43.9)            | 4.29 (1.97–9.31)      | 4.2 (1.63–11)<p     |
| Class II                       | 52 (34)         | 88 (34.5)             | 2.01 (0.95–4.24)      | 2.5 (1.02–6.42)<p   |
| Class III                      | 51 (33.3)       | 39 (15.3)             | 0.91 (0.41–1.99)      | 0.8 (0.33–2.25)     |
| Class IV                       | 19 (12.4)       | 16 (6.3)              |                       |                       |
| Duration of HF:                |                 |                       |                       |
| <1 year                        | 39 (25.5)       | 134 (52.5)            | 3.23 (2.1–5.0)        | 2.1 (1.24–3.56)<p   |
| ≥1 year                        | 114 (74.5)      | 121 (47.5)            |                       |                       |
| Previous hospitalisation:      |                 |                       |                       |
| Yes                            | 94 (61.4)       | 115 (45.1)            | 0.52 (0.34–0.77)      | 0.4 (0.25–0.75)<p   |
| No                             | 59 (38.6)       | 140 (54.9)            |                       |                       |
| Social support:                |                 |                       |                       |
| Low social support             | 44 (28.8)       | 111 (43.5)            | 1.9 (1.24–2.93)       | 1.31 (0.75–2.29)    |
| High social support            | 109 (71.2)      | 144 (56.5)            |                       |                       |

<sup>a</sup>No work, retired, and self employee

<sup>p</sup>Statistically associated variable in multivariable logistic regression at \( p < 0.05 \).

1=Reference category.

COR: crude odds ratio; AOR: adjusted odds ratio; CI: confidence interval.
to suit the learning needs of different groups of patients followed by an evaluation of its effectiveness.

Limitations of the study
There may have been recall bias and social desirability bias, since participants’ knowledge about self-care was based on self-reports. There are no adequate similar studies, and most of the reports in the literature used different statistical analysis. Thus, comparisons about knowledge of self-care are difficult to make. Another limitation was that reliability was not tested by a third person.

Conclusion
Overall, this study found that more than half of the study subjects had poor knowledge of self-care. The finding indicates that duration of HF, younger age, history of hospitalisation and NYHA clinical staging are important predictors of knowledge about self-care. Based on this conclusion, the following recommendations are suggested. Policymakers and the regional health bureau should give due attention to increasing knowledge of self-care. In particular, those who are older, whose NYHA clinical staging is class I, whose disease duration is less than a year and who have repeated hospitalisation need critical attention. Furthermore, the hospital administration should establish daily morning discussions with the patients so that follow-up and education services can be well integrated. Nurses must also be trained and supported in using the clinical care guides that are specific to and of critical importance in the field of cardiology.

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Authors’ contributions
T.H.G. initiated the idea, developed the design and was involved in drafting the manuscript. H.H.M. revised the paper and wrote the manuscript. K.G.K. conducted the statistical analysis and interpretation of the results. All authors read and approved the final manuscript.

Availability of data and materials
The data sets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declaration of conflicting interests
The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval
The study was approved by Health Research Ethics Review Committee (ERC 1300/2018) of Mekelle University College of Health Science.

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Informed consent
All of the study participants were informed about the purpose of the study and their right to participate or to withdraw from the study at any time. Informed consent was provided by all participants.

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Supplemental material
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