

Health-Related Quality of Life and Associated Factors Among Adult Patients With Heart Failure in Tertiary Hospitals, Tigray Region, Northern Ethiopia, 2020.

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Research Article

Keywords: Health, Quality of life, Heart failure, Tigray, Ethiopia

Posted Date: June 7th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-548193/v1>

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Abstract

Background

Heart failure is a major public health issue for many countries in Sub-Saharan African which causes enormous public health relevance resulting in significant disability, loss of economic productivity, and poor health-related quality of life. Although there is a dated improvement in heart failure management, the morbidity and mortality remain unacceptably high, and a lot of patients are affected by debilitating symptoms which adversely influence their quality of life. Therefore, the main aim of this study was to assess health-related quality of life and associated factors among adult patients with heart failure in tertiary hospitals, Tigray region, Ethiopia, 2020.

Methods

An institutional-based cross-sectional study was conducted from March 01-April 30, 2020. A simple random sampling method was used to enroll the 301 participants. Data were collected using a structured questionnaire-based interview. The health-related quality of life measuring tool was adapted from the medical outcomes study. Data was entered to and cleaned by Epi-Data manager version 4.4.2.1 and exported to a statistical package of social science version 22 for analysis. Binary logistic regression model (Adjusted Odds ratio, 95% Confidence Interval, and P-value < 0.05) was used to determine the factors that influence health-related quality of life.

Results

This study showed that 142(47.2%) patients had a poor health-related quality of life. The overall mean score of health-related quality of life was 61.7 ± 20.5 among patients. Age above 60 years (AOR; 4.47, 95% CI; 1.87-10.68), no formal education (AOR; 3.45, 95% CI; 1.31-9.12), New-York Heart Association class-III (AOR; 6.50, 95% CI; 2.62-16.13) and the absence of social support (AOR; 2.52, 95% CI; 1.33-4.79) were significantly associated with poor health-related quality of life.

Conclusions

Health-related quality of life among heart failure patients was poor for almost half of the participants. Patients with older age, no formal education, and higher New York Heart Association class need special attention in each follow-up evaluation. Furthermore, health professionals and governments should inform the benefit of social support to family members and friends who are involved in the care process among heart failure patients.

Introduction

Heart failure (HF) is a serious condition in which the heart is unable to pump enough blood to meet the needs of the body (1). Heart failure is a major public health issue that affects an estimated 26 million people worldwide and 5.8 million individuals in the United States of America (USA) (2). Heart failure is a

major public health issue for many countries in Sub-Saharan African (SSA) which causes enormous public health relevance resulting in significant disability, loss of economic productivity, and poor health-related quality of life (3).

Health-related quality of life (HRQoL) is a health-focused quality of life concept that encompasses health aspects that influence the quality of life ratings which excludes issues not directly related to health (4). It is a relatively new scientific measure to evaluate the effectiveness of treatment strategies and the course of a disease (5). It should be assessed only after a minimum treatment period of three months to allow sufficient time for any clinically relevant treatment effects to develop (6). Measures of health-related quality of life in chronically ill patients can be served as an input of medical information and for objective evaluations of how and how much the disease influences a patient's life and how patients cope with it (7, 8).

People with heart failure have a lower HRQoL than the general population due to progressive symptoms, disability, and frequent hospitalization. This leads to trouble of maintaining a social life, engaging activities of daily living and greater use of healthcare services, a high rate of hospital admission, and higher mortality (9, 10). Lower health-related quality of life can cause long-term morbidity which leads to greater mortality among older adults with heart failure (11).

Economic status such as financial situations and physical symptoms such as shortness of breath, chest pain, and fatigue, are factors that influence the quality of life among heart failure patients. Besides, social factors such as social support and social activities, spirituality related to faith in God and praying, health-related behaviors, primarily self-care activities, psychological factors such as positive or negative perspectives, or outlooks are factors that affect health-related quality of life among heart failure patients (12).

Self-management interventions such as taking patients an active role in their treatment and being responsible for day-to-day disease management have been found the potential to promote quality of life in heart failure patients (13). Moreover providing education on quality of life by health professionals among heart failure patients has been found to improve quality of life (14).

Assessment of health-related quality of life is also an essential aim of treatment to Hf patients, in addition, to control symptoms and prolong the life of patients. Although heart failure is incurable, many cases are preventable, and most patients can be treated promptly to improve their quality of life and survival (5). The ability to identify indicators of poor HRQoL is essential to improve clinical care and determine targets of intervention for the prevention and treatment of disease (15). Furthermore assessing HRQoL is also proofed to be a more strengthful indicator of mortality and morbidity than many objective measures of health (16).

Although there is a dated improvement in heart failure management, the morbidity and mortality remain unacceptably high, and a lot of patients are affected by debilitating symptoms which adversely influence their quality of life (17). At present to include measures of the influence of disease and impairment on

routine activities and behavior, perceived health measures and disability, functional status measures there has been a widening focus in the measurement of health beyond traditional health predictors such as mortality and morbidity.

Moreover, the increasingly mechanistic model of medicine, interested only in the eradication of disease and symptoms, re-emphasized the need for the introduction of a humanistic element into health care called quality of life assessment (18). Furthermore, to the best of the author's knowledge, there is little information on this regard in SSA and there is no published article in the study area as well. Therefore, the main aim of this study was to assess health-related quality of life and factors influencing it among heart failure patients in tertiary hospitals, Tigray region, Ethiopia, 2020.

Methods

Study Area and Period

The study was conducted in tertiary hospitals of the Tigray region from March 01 – April 30, 2020. ACSH and AUCSH are university hospitals in Mekelle and Axum, Tigray region respectively commenced rendering all the specialized and non-specialized services including special clinic services (19, 20). The hospital provided follow-up care for 950 heart failure patients according to data registered in 2019 before the data collection period.

Study design

An institutional-based cross-sectional study was employed.

Source population

All adult patients with heart failure on follow-up at the cardiology unit of ACSH and AUCSH during the data collection period.

Study population

All selected adult patients with heart failure on follow-up at the cardiology unit of ACSH and AUCSH.

Inclusion and Exclusion criteria

All adult patients with heart failure who were on follow-up for three months and above were included in the study. However, patients who were critically ill during the data collection period were excluded from the study.

Sample size determination

The sample size for the study was determined by using single population proportion formula assuming 5% marginal error (d), 95% CI ($\alpha = 0.05$), and 50% proportion (p) of poor HRQoL in HF patients as

there is no previously conducted study in a similar setting to or in Ethiopia.

$$n_1 = \frac{(Z\alpha/2)^2 * p(1-p)}{d^2},$$

Where

n_1 = required initial sample size

z = the desired level of confidence interval 95% ($Z = 1.96$)

P = proportion of poor HRQoL in HF patients

q = proportion of good HRQoL in HF patients ($1 - 0.5 = 0.5$)

d = Marginal error (0.05)

A correction formula was introduced as

$$n_1 = \frac{(1.96)^2 * 0.5(1-0.5)}{0.05^2} = 384$$

,

$$n_2 = \frac{(n_1)}{(1 + \frac{n_1}{N})}, n_2 = \frac{384}{1 + \frac{384}{950}}$$

which gives a sample size of 274 and considering 10% for the non-response rate, the final sample size was 301.

Sampling techniques and procedures

The sample size of each tertiary hospital was determined using proportional sample allocation. A systematic random sampling method was used to enroll study participants. Sampling interval (K) was calculated then by selecting a random number from one up to “ k ” using the lottery method, study samples were selected.

Study variables

Independent variables

The independent variables were socio-demographic variables (age, sex, marital status, educational level, income, occupation, number of household members, religion, ethnicity, and place of residence), clinical

characteristics of patients (NYHA class, duration of HF, previous hospitalization, and presence of comorbidity), behavioral practices of patients (smoking and salt consumption) and presence of social support.

Dependent variable

Health-related quality of life was the dependent variable.

Data collection tools and procedures

Data were collected through interviews using pretested structured questionnaires and documentary reviews from patient medical charts. Two trained BSc nurses were employed as data collectors and two experienced BSc nurses were assigned as supervisors. Study participants were informed about the length of time the questionnaire needed, anonymity & confidentiality. The questionnaire had five parts, socio-demographic-related questions, clinical related questions, behavioral-related questions, questions related to the presence of social support, questions related to assessing HRQoL adapted from medical outcomes study SF-36 health survey (21).

The SF-36 health survey is one of the most widely used measures of HRQoL consisting of 36 items and covering eight dimensions: physical functioning, role limitations due to physical health problems, bodily pain, general health perception, vitality, social functioning, role limitations due to emotional health problems, and emotional well-being/mental health. Scores on all the subscales are transformed linearly to a possible range of 0-100 where higher scores represent better HRQoL (21, 22).

The Cronbach's alpha value of the scales of the instrument was 0.88 which indicates that the instrument has acceptable internal consistency reliability. Furthermore, external validity was addressed through the use of probability sampling technique, strong inclusion and exclusion criteria. The content validity was also assured through conducting a relevant literature review before the development of the instrument, adapting a validated questionnaire from Medical care, evaluating the tool by senior researchers, and translating the questionnaire into local language to suit the language ability.

Operational definitions

Good HRQoL is defined as when the patient scored a mean score of SF-36 \geq 60 (22).

Poor HRQoL is defined as when the patient scored a mean score of SF-36 $<$ 60 (22).

Comorbidity is defined as the presence of one or more disorders in addition to the index disease (23).

Smoking is defined as the experiences of ever cigarette smoking status (24).

Salt-free is defined as the use of spices other than salt when cooking and avoid eating foods prepared outside the home (24).

Social support is defined as the real resources provided by others that enable a person to feel cared for or when family members and friends are involved in the care process (25, 26).

Data quality assurance

Data quality was ensured by giving training for data collectors and supervisors and by providing day-to-day supervision. The questionnaire was translated into the local language (Tigrigna) and retranslated into English by experts to ensure its consistency. Each questionnaire was checked for completeness, missed values, and unlikely responses at the spot. A pre-test was conducted on 5% of the sample size in Suhul general hospital to see the applicability of the instruments and necessary amendments were done. Every questionnaire was checked by the principal investigator at the spot (27).

Data processing and analysis

Data were checked visually for its completeness and the questionnaire was coded, entered, and cleaned using Epi-Data manager version 4.4.2.1 for windows and exported to SPSS version 22.0 for statistical analysis. Multi-collinearity was checked among predictor variables and a Variance Inflation Factor (VIF) value greater than 1.42 did not appear in this study, indicating that serious multi-collinearity did not exist.

Descriptive statistics were computed through percentage, frequency, mean and standard deviation, and results were summarized and presented by texts, tables, and figures. Binary logistic regression was used to determine the statistical association between a set of independent variables and the outcome variable. Variables with P-values < 0.25 in the bivariate regression analysis were included in the multivariable analysis. Adjusted odds ratio with a 95% CI was computed and statistical significance was declared at p-value < 0.05 (27).

Ethical considerations

Ethical clearance was obtained from the Mekelle University College of Health Sciences Institutional Review Committee (IRC). The purpose and objective of the study were described to the study participants and written consent was obtained. Respondents have been informed of all the necessary information and they decided freely by themselves to involve, refuse, or discontinue participation at any time they want. Information was collected anonymously; confidentiality and privacy were assured and maintained throughout the study period.

Results

Socio-demographic characteristics

A total of 301 participants were involved in the study making a 100% response rate. The mean and standard deviation of the age of the respondents was 51.2 ± 17.0 years. Among these participants, 158(52.5%) were females. Of all participants, 162(53.8%) were rural residents, two hundred ninety-one (96.7%) were Tigrians and 253(84.0%) were Orthodox Christian followers. Regarding their marital status

and household numbers, 103(34.2%) were married, and 171(56.8%) had up to 5 household numbers respectively. The mean and standard deviation of household numbers of the respondents was 5.1 ± 2.1 . In their educational status, 138(45.8%) of the respondents had no formal education and 36(12.0%) were college and above level. Furthermore, 124(41.2%) had no occupation, and 86(28.6%) earned an average income of up to 600 ETB (see table 1).

Clinical characteristics

Out of the 301 study participants, 80(26.6%) were categorized as NYHA class-III and 68(22.6%) were categorized as NYHA class-II. The median and interquartile range (IQR) of the duration of HF of the respondents was 48 months; IQR (24, 102). Besides, 131(43.5%) of the participants had a history of previous hospitalization and 117(38.9%) of the study participants had comorbidities (see table 2).

Behavioral and social support characteristics

Out of the 301 study participants, 280(93.0%) were never cigarette smokers in their life, while regarding their salt use 152(50.5%) of the study participants suggested that they use salt in their food. Furthermore, 206(68.4%) of the participants suggested that they did not get the social support to find someone looking for them and care about them while 95(31.6%) stated that they had got support from their families and friends such as looking and caring at them, helping financial support for transport, treatment, and other expenses (see table 3).

Health-related quality of life of HF patients

The overall mean score of health-related quality of life was 61.7 ± 20.5 among the HF patients. In this study, 142(47.2%) (95% CI; 41.1-52.8) patients scored less than the mean score of 60 which shows a poor health-related quality of life among the HF patients (see figure 1). This study also assessed the eight domains of HRQoL using the generic tool SF-36 questionnaire. The physical functioning, role limitation due to physical health problems, role limitation due to emotional problems, emotional wellbeing, and bodily pain mean score were found to be above the mean score, but there are marked differences between the domains. The role limitation due to emotional problems mean score (72.5) was recorded to be the highest score from all domains. The general health perception mean score of (50.2) was recorded as the lowest score from all of the domains (see table 4).

Factors associated with health-related quality of life

Logistic regression has been done to identify predictor variables. At the beginning of using bivariate logistic regression, the association of all independent variables with HRQoL has been assessed. Among all the predictor variables age of the respondent, household numbers, level of education, occupation, and average monthly family income, NYHA class, history of previous hospitalization, presence of any comorbidities, salt consumption and presence of social support showed P-value < 0.25 in bivariate analysis.

Multivariable logistic regression analysis was performed by constructing a model for HRQoL as an outcome variable to identify the effect of independent factors after controlling other confounding variables. Variables with P-values < 0.25 in the bivariate analysis were included in the multivariable analysis. The adjusted odds ratio with a 95% CI was computed and statistical significance was declared at p-value < 0.05. When assessing the multivariable analysis it was revealed that HRQoL was significantly influenced by patients' age, level of education, NYHA class, and absence of social support.

The findings of this study revealed that the odds of having poor HRQoL among patients who were at the age of 60 years and above were 4.47 times higher than patients who were at the age of 18-40 years (AOR; 4.47, 95% CI; 1.87-10.68, P; 0.001). Regarding the level of education, the current study showed that those who had no formal education were found 3.45 times more likely to have a poor HRQoL compared to those who had completed college and above (AOR; 3.45, 95% CI; 1.31-9.12, P; 0.012).

The other finding from this study is the odds of having poor HRQoL among patients who were in NYHA class-III heart failure was 6.50 times higher than patients who were in NYHA class-II heart failure (AOR; 6.50, 95% CI; 2.62-16.13, P < 0.01). Furthermore, this study showed that those patients who had not got social support were found to be 2.52 times higher to have a poor HRQoL compared to those who had got social support from their families, friends, and others (AOR; 2.52, 95% CI; 1.33-4.79, P; 0.005) (see table 5).

Discussion

This study showed that 47.2% (95% CI; 41.1–52.8) of participants had a poor health-related quality of life. This finding is similar to a study conducted in Ethiopia at the University of Gondar (28). But this finding is lower than a study done in Taiwan. This may be due to study participant differences as in Taiwan study participants were NYHA class-III to NYHA class-II and had the previous hospitalization for at least two times (22).

From the eight domains of health-related quality of life vitality and general health perception found below the mean score. This finding is consistent with a study conducted in Saudi Arabia, Iran, Turkey, Japan, and Germany (29–32). This lower vitality domain of HRQoL may be related to various physical, emotional symptoms and the effects of drugs such as dyspnea, fatigue, edema, sleeping difficulties, depression, and chest pain (33). The lower general health perception may be related to its subjective nature of HRQoL, based on the patient's perception of health and subjective patient's point of view (34). The social functioning domain was found below the mean score similarly to vitality and general health perception domains. This finding is consistent with a study conducted in Turkey (35). But this finding is inconsistent with studies conducted in Germany and Japan (29, 32). This difference may be related to believes of patients to consider themselves sick which affect their social activities negatively in a remarkable way (36).

Besides, this study revealed that the physical functioning, role limitation due to physical health problems, role limitation due to emotional problems, emotional well-being, and bodily pain were found above the

mean score. This finding is consistent with a study conducted in Japan (32). However, this finding is inconsistent with studies conducted in Iran and Saudi Arabia (30, 31). Besides, this finding is inconsistent with studies conducted in Turkey except for the bodily pain domain and Germany except for bodily pain and emotional well-being domains (29, 35). This difference may be related to differences in clinical characteristics of patients, and culture as well as belief differences (37, 38).

This study revealed a significant association between age and health-related quality of life. Older age was significantly associated with poor HRQoL. This finding is consistent with the study done in Taiwan (22). A cross-sectional study from Saudi Arabia and a systematic review from Iran also reported a significant relationship between age and health-related quality of life (30, 31). This may be related to older age causes a decline in most physiological systems that are limited to perform activities of daily living which adversely affect their HRQoL (39).

Besides, this study showed a significant relationship between the level of education and health-related quality of life. A lower level of educational status is significantly associated with poor HRQoL. This finding is consistent with a study done in Taiwan and other cardio-vascular diseases conducted in Ethiopia (22, 40). A systematic review conducted in Iran also reported a significant relationship between educational status and health-related quality of life (30). This may be education develops a level of interest and concern in patients related to improving their health, which is a key determinant of successful medical treatment. Also, better-educated patients are more likely to adapt to lifestyle modification and preventive measures which result in an improvement of HRQoL (41).

This study also showed that the NYHA class was statistically associated with health-related quality of life. Patients with a higher NYHA classification had a worse health-related quality of life than a lower NYHA classification. This finding is consistent with a previous study done in Taiwan (22). Evidence from a cross-sectional study conducted in Sudan also reported a significant relationship between NYHA class and health-related quality of life (42). Besides, a cross-sectional study from Serbia and Korea also reported a significant relationship between NYHA class and health-related quality of life (43, 44). This may be due to patients with advanced heart failure (AHF) have frequent hospitalization, progressive debilitating symptoms with decreasing levels of activity, a complication of heart failure and HF therapy (medication side effects), susceptibility to the destabilization of other medical conditions that negatively affect their health-related quality of life (45).

Furthermore, this study revealed that social support was significantly associated with health-related quality of life. Those participants who did not get social support had a poor health-related quality of life than those who got social support from their families, relatives, and friends. This finding is supported by a qualitative study conducted in Jordan (46). A cross-sectional study conducted in Saudi Arabia also supported this finding (31). Besides, this finding is also supported by different studies done on social support and its association with health-related quality of life (25, 30, 47). This relationship may be related to social support is important to enhance healthy lifestyles, provide a buffer against adverse life events, and improve quality of life (48).

Limitation Of The Study

Since our study design is a cross-sectional study it doesn't show a temporal relationship. Hence, it also precluded a cause-effect analysis. There might be recall bias and social desirability bias since the behavioral practice of the study participants and presence of social support were based on self-reports and performance of these was not observed and could not be confirmed. Although a variety of factors were included, other factors, such as exercise, Alcohol consumption, body weight, ejection fraction, and self-care practice that may also influence HRQoL were not included. Furthermore, the study was conducted in a relatively small sample size which may affect generalizability.

Conclusion

Health-related quality of life among HF patients was poor for almost half of the participants. In this study, the energy, social functioning, and general health perception domains were the most affected domains of HRQoL. Besides, elder age, lower level of education, higher NYHA class, and the absence or lower social support had a marked negative effect on HRQoL. So that health care professionals should focus strictly on patients of older age, no formal education, and Advanced Heart Failure (AHF). Furthermore, health care professionals should inform families and friends looking and care for HF patients is crucial to improve their HRQoL.

Abbreviations

ACSH: Ayder Comprehensive Specialized Hospital; AOR: Adjusted Odds Ratio; AUCSH: Aksum University Comprehensive Specialized Hospital; CHF: Chronic Heart Failure; CI: Confidence Interval; COR: Crude Odds Ratio; HF: Heart Failure; HRQoL: Health-Related Quality Of Life; IQR: Interquartile Range; MLHFQ: Minnesota Living with Heart Failure Questionnaire; NYHA: New York Heart Association; OR: Odds Ratio; QoL: Quality of Life; SD: Standard Deviation; SF: Short Form; SPSS: Statistical Package for the Social Sciences; WHO: World Health Organization.

Declarations

Acknowledgments

First of all, we would like to acknowledge the Mekelle University College of Health Science for funding this project. Besides; we would like to appreciate health professionals working in the cardiology unit at ACSH and AUCSH for their unreserved cooperation during data collection. Furthermore, we would like to express our heartfelt gratitude to participants of this study, interviewers, and supervisors involved in this study.

Funding

None.

Availability of data and materials

The datasets used and/or analyzed during the current study available from the corresponding author on reasonable request.

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Contributions

Shibeshy AB conceived the study, designed the study protocol, acquisition, data collection, analyzed, and interpreted the data, and drafting the manuscript. WT and HT critically reviewed the design, analysis, interpretation, and the drafted manuscript. MH and KB also participated in reviewing the design, analysis, interpretation, and the drafted manuscript. All authors read and approved the final manuscript.

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Ethics approval and consent to participate

The ethical approval for the study was obtained from the Health Research Ethics Review Committee (HRERC) of Mekelle university college of health sciences (ERC 1533/2020). This study was conducted following the Declaration of Helsinki. Ahead of conducting the study, the purpose and objective of the study were described to the study participants, and written informed consent was also obtained from all participants. Respondents have been informed all the necessary information about the purpose or aim of the study and they decided freely by themselves to involve, refuse, or discontinue participation at any time they want. Information was collected anonymously; confidentiality was assured and maintained throughout the study period.

Consent for publication

Written informed consent was obtained from all participants for publication of the result.

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Tables

Table 1: Demographic characteristics of respondents (N=301) in tertiary hospitals, Tigray region, Ethiopia, 2020

Variable	Category	Total (N/%)	HRQoL (N/%)	
			Poor	Good
Age (years) (Mean=51.2±17.0(SD))	18-40	96(31.9)	31(32.3)	65(67.7)
	41-45	33(11.0)	10(30.3)	23(69.7)
	46-50	32(10.6)	13(40.6)	19(59.4)
	51-55	25(8.3)	10(40.0)	15(60.0)
	56-60	34(11.3)	17(50.0)	17(50.0)
	>60	81(26.9)	61(75.3)	20(24.7)
Sex	Male	143(47.5)	72(50.3)	71(49.7)
	Female	158(52.5)	70(44.3)	88(55.7)
Residence	Rural	162(53.8)	80(49.4)	82(50.6)
	Urban	139(46.2)	62(44.6)	77(55.4)
Ethnicity	Tigrians	291(96.7)	138(47.4)	153(52.6)
	Others	10(3.3)	4(40.0)	6(60.0)
Religion	Orthodox	253(84.0)	120(47.4)	133(52.6)
	Muslim	36(12.0)	15(41.7)	21(58.3)
	Protestant	12(4.0)	7(58.3)	5(41.7)
Marital status	Married	103(34.2)	44(42.7)	59(57.3)
	Single	82(27.3)	40(48.8)	42(51.2)
	Divorced	60(19.9)	29(48.3)	31(51.7)
	Widowed	56(18.6)	29(51.8)	27(48.2)
Household no	≤5	171(56.8)	75(43.9)	96(56.1)

(Mean=5.1±2.1(SD))	>5	130(43.2)	67(51.5)	63(48.5)
Educational level	No formal education	138(45.8)	96(69.6)	42(30.4)
	Primary(1-8)	69(22.9)	18(26.1)	51(73.9)
	Secondary(9-12)	58(19.3)	14(24.1)	44(75.9)
	College and above	36(12.0)	14(38.9)	22(61.1)
Occupation	Have a job	177(58.8)	70(39.5)	107(60.5)
	Have no job	124(41.2)	72(58.1)	52(41.9)
Average family monthly income (ETB) IQR=1000 (600, 2100)	<600	86(28.6)	52(60.5)	34(39.5)
	600-1000	86(28.6)	43(50.0)	43(50.0)
	1000-2100	55(18.3)	19(34.5)	36(65.5)
	>2100	74(24.5)	28(37.8)	46(62.2)

Others includes: Amhara = 8; Afar = 1; and Eritrean refuge = 1

Table 2: Clinical characteristics of respondents (N=301) in tertiary hospitals, Tigray region, Ethiopia, 2020

Variable	Category	Total (N/%)	HRQoL (N/%)	
			Poor	Good
NYHA class	Class-I	84(27.9)	29(34.5)	55(65.5)
	Class-II	69(22.9)	27(39.1)	42(60.9)
	Class-III	80(26.6)	37(46.2)	43(53.8)
	Class-IV	68(22.6)	49(72.1)	19(27.9)
Duration of HF (months) IQR=48 (24, 102)	<24	98(32.6)	45(45.9)	53(54.1)
	24-48	62(20.6)	23(37.1)	39(62.9)
	48-102	59(19.6)	32(54.2)	27(45.8)
	>102	82(27.2)	42(51.2)	40(48.8)
Hx of the previous hospitalization	No	170(56.5)	70(41.2)	100 (58.8)
	Yes	131(43.5)	72(55.0)	59(45.0)
Presence of any co-morbidity	No	184(61.1)	78(42.4)	106(57.6)
	Yes	117(38.9)	64(54.7)	53(45.3)

Table 3: Behavioral and social-support characteristics of respondents (N=301) in tertiary hospitals, Tigray region, Ethiopia, 2020

Variable	Category	Total (N/%)	HRQoL (N/%)	
			Poor	Good
Ever cigarette smoking status	Never	280(93.0)	130(46.4)	150(53.6)
	Yes	21(7.0)	12(57.1)	9(42.9)
Ever use of salt	No	149(49.5)	65(43.6)	84(56.4)
	Yes	152(50.5)	77(50.7)	75(49.3)
Presence of social support	Yes	95(31.6)	33(34.7)	62(65.3)
	No	206(68.4)	109(52.9)	97(47.1)

Table 4: Mean and SD for domains SF-36 (N=301) in tertiary hospitals, Tigray region, Ethiopia, 2020

Domains SF-36 questionnaire	% of Poor HRQoL	% of Good HRQoL	Mean	SD
Physical functioning	39.5	60.5	65.3	23.4
RLDPHP	44.2	55.8	69.0	27.2
Emotional well being	35.2	64.8	64.6	20.7
RLDEP	22.6	77.4	72.5	28.8
Bodily pain	44.5	55.5	61.9	29.7
Social functioning	54.2	45.8	54.6	31.6
Energy/vitality	49.5	50.5	54.1	28.3
General health perception	59.1	40.9	50.2	23.1

Abbreviations: RLDEP-Role Limitation Due to Emotional Problems; RLDPHP-Role Limitation Due to Physical Health Problems; SD-Standard Deviation

Table 5: Bivariate and multivariable analysis of independent variables in tertiary hospitals, Tigray region, Ethiopia, 2020

variable	category	HRQoL (N/%)		Bivariate and Multivariable analysis		
		Poor	Good	COR(CI)	AOR(CI)	p-value
Age (years)	18-40	31(32.3)	65(67.7)	1	1	
	41-45	10(30.3)	23(69.7)	0.91(0.39-2.15)	0.77(0.27-2.15)	0.618
	46-50	13(40.6)	19(59.4)	1.43(0.63-3.27)	1.24 (0.45-3.41)	0.682
	51-55	10(40.0)	15(60.0)	1.39(0.56-3.46)	1.39(0.47-4.14)	0.555
	56-60	17(50.0)	17(50.0)	2.09(0.94-4.65)	0.92(0.33-2.56)	0.881
	>60	61(75.3)	20(24.7)	6.39(3.29-12.39)	4.47(1.87-10.68)	0.001
Household no	≤5	75(43.9)	96(56.1)	1	1	
	>5	67(51.5)	63(48.5)	1.36(0.86-2.15)	0.79(0.43-1.44)	0.439
Educational status	No formal education	96(69.6)	42(30.4)	3.59(1.68-7.69)	3.45(1.31-9.12)	0.012
	Primary(1-8)	18(26.1)	51(73.9)	0.55(0.23-1.31)	0.63(0.21-1.86)	0.404
	Secondary(9-12)	14(24.1)	44(75.9)	0.50(0.20-1.23)	0.40(0.13-1.22)	0.110
	College and above	14(38.9)	22(61.1)	1	1	
Occupation	Have a job	70(39.5)	107(60.5)	1	1	
	Have no job	72(58.1)	52(41.9)	2.12(1.33-3.38)	0.99(0.49-1.96)	0.975
Monthly income (ETB)	<600	52(60.5)	34(39.5)	2.51(1.33-4.76)	1.51(0.64-3.56)	0.347
	600-1000	43(50.0)	43(50.0)	1.64(0.87-3.09)	2.05(0.89-4.74)	0.093
	1000-2100	19(34.5)	36(65.5)	0.87(0.42-1.79)	1.19(0.46-3.04)	0.719
	>2100	28(37.8)	46(62.2)	1	1	
NYHA class	Class I	29(34.5)	55(65.5)	1	1	

	Class-I	27(39.1)	42(60.9)	1.22(0.63-2.36)	1.75(0.74-4.14)	0.201
	Class-II	37(46.3)	43(53.8)	1.63(0.87-3.06)	1.87(0.83-4.24)	0.132
	Class-III	49(72.1)	19(27.9)	4.89(2.44-9.79)	6.50(2.62-16.13)	0.000
Hx of Hospitalization	No	70(41.2)	100(58.8)	1	1	
	Yes	72(55.0)	59(45.0)	1.74(1.10-2.76)	0.76(0.40-1.43)	0.390
Presence of co-morbidity	No	78(42.4)	106(57.6)	1		
	Yes	64(54.7)	53(45.3)	1.64(1.03-2.62)	1.65(0.91-2.98)	0.097
Ever use of salt	No	65(43.6)	84(56.4)	1	1	
	Yes	77(50.7)	75(49.3)	1.33(0.84-2.09)	1.31(0.73-2.34)	0.370
Social support	Yes	33(34.7)	62(65.3)	1	1	
	No	109(52.9)	97(47.1)	2.11(1.28-3.49)	2.52(1.33-4.79)	0.005

Bold-indicates significant variables

Figures

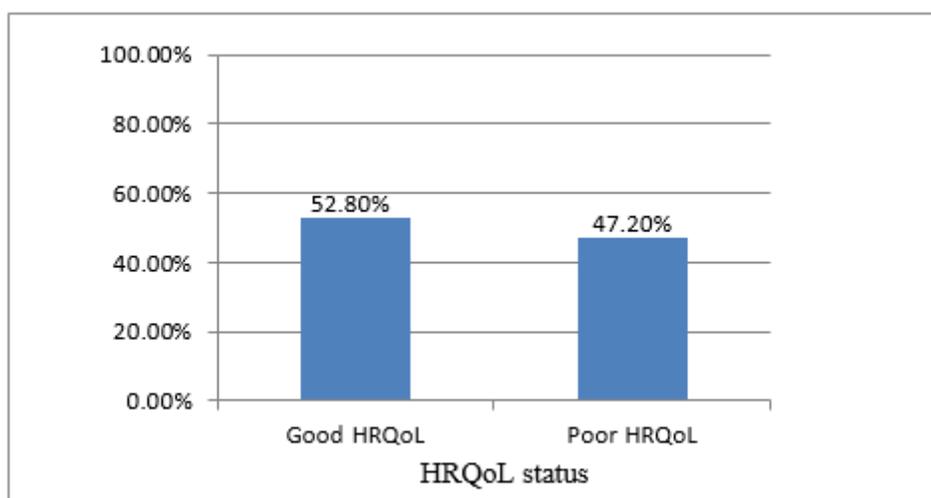


Figure 1

HRQoL among HF patients (N= 301) in tertiary hospitals, Tigray region, Ethiopia, 2020