Self-care practice and associated factors among hypertensive patients in public health facilities in Harar Town, Eastern Ethiopia: A cross-sectional study

Feysal Mohammed Hussen[1,2], Hassen Abdi Adem[2] iD,
Hirbo Shore Roba[2], Bezatu Mengistie[2] and Nega Assefa[3] iD

Abstract

Background: Self-care practice is the activity that a hypertensive patient undertakes intending to improve their health. Poor self-care practice leads to uncontrolled hypertension. Therefore, strategies designed to prevent and control hypertension-related death, disability, and morbidity should consider the level of the patient's self-care practice and risk factors. This study assessed self-care practice and associated factors among hypertensive patients in public health facilities of Harar Town in eastern Ethiopia.

Method: An institution-based cross-sectional study was conducted among 398 randomly selected hypertensive patients from 25 March 2019 to 16 April 2019. Pretested structured questionnaires adapted from validated tools were used to collect data from participants using electronic Open Data Kit software through face-to-face exit interview. Data were analyzed by SPSS version 24. Bivariable and multivariable logistic regression analyses were conducted to identify factors associated with self-care practice. Adjusted odds ratio with 95% confidence interval was used to report association and the significance was declared at p-value < 0.05.

Results: Level of good self-care practice was 29.9% (95% confidence interval: 25.3% and 34.7%). Age $\geqslant 60$ years (adjusted odds ratio = 3.4, 95% confidence interval: 1.2 and 9.3), formal education (adjusted odds ratio = 2.3, 95% confidence interval: 1.3 and 4.2), absence of comorbidities (adjusted odds ratio = 1.8, 95% confidence interval: 1.1 and 3.1), adequate knowledge about hypertension (adjusted odds ratio = 4.7, 95% confidence interval: 2.5 and 8.8), good social support (adjusted odds ratio = 2.7, 95% confidence interval: 1.6 and 4.7), and being khat abstainer (adjusted odds ratio = 1.9, 95% confidence interval: 1.1 and 3.5) were significantly associated with good self-care practice.

Conclusion: The prevalence of good self-care practice was low. In this study, good self-care practice was significantly associated with age, formal education, comorbidities, knowledge about hypertension, social support, and current khat chewing condition. Regular check-up and follow-up of patients' compliance with self-management protocol, and more emphasis should be given to identify factors that potentially impeding patients' adherence to hypertension self-management protocol.

Keywords

Self-care practice, hypertension, hypertensive patients, predictors, Ethiopia

Introduction

Hypertension is a chronic noncommunicable disease with high global health challenges,[1,2] due to its high prevalence,[3] and the resulting cardiovascular, stroke, and chronic renal complications.[3,4] It is the third leading preventable risk factor for premature death and disability worldwide.[4,5] Globally, the burden of disease attributable to hypertension has significantly increased from 4.5% in 2000 to 7% in 2010.[4] This makes hypertension is the single most common cause of

[1]Department of Public Health, College of Health Science, Kebridehar University, Kebridehar, Ethiopia
[2]School of Public Health, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia
[3]School of Nursing and Midwifery, College of Health and Medical Sciences, Haramaya University, Harar, Ethiopia

Corresponding author:
Hassen Abdi Adem, School of Public Health, College of Health and Medical Sciences, Haramaya University, P.O. Box 235, Harar, Oromia, Ethiopia.
Email: hassenxiqqa32@gmail.com

morbidity, death, and disability in the world and this highlights the urgent need for action to address the problem.[4,6]

Globally, one-third of adults have hypertension,[7] and by 2025, the prevalence of hypertension among the adult population predicted to be 29% (1.56 billion).[8] Three-fourth of them resides in low and middle-income countries (LMIC) where resources are limited, patients have little knowledge, and poor control over the condition.[2,3] In sub-Saharan Africa (SSA), the number of hypertension cases projected to be between 125.5 and 162.8 million by 2025.[9,10]

In Ethiopia, countrywide STEPS survey conducted in 2016 showed the magnitude of hypertension was 15.8%; 16.3%, and 15.5% among male and female, respectively.[11] However, the magnitude of hypertension varies widely in studies conducted across different parts of the country and study population. For example, the prevalence of hypertension was 41.9% among adults aged 50 years or older,[12] 27.3% among civil servants,[13] and 30% in a community-based study.[14]

Uncontrolled hypertension accounts for nearly half-million annual deaths worldwide.[15] A recent study in SSA revealed that 77.4% of hypertension patients had uncontrolled blood pressure. In Ethiopia, the result of a systematic review and meta-analysis showed that 48% of patients had controlled blood pressure.[16] However, the magnitude of uncontrolled hypertension showed wide variations ranging from 11%[17] to 70%[18] in individual studies.

Though the exact cause of hypertension is unknown, evidence indicates modifiable factors, such as harmful use of alcohol, physical inactivity, high salt intake, tobacco use, and higher body mass index, increase the risk of hypertension.[5,9] The avoiding of these factors is the critical component of self-care practice,[19] which is considered an important activity undertaken by an individual in order to improve health or prevent disease.[20] Self-care practice is a non-pharmacologic strategy that not only reduces the blood pressure but also the risk of other cardiovascular risk factors.[7]

Hypertension prevention and control strategies require joint efforts not only from the patients and families but also from the governments and policymakers.[5,21–23] Hypertensive patients should start implementing self-care practices before initiating prescribed medications and must continue thereafter. Hence, compliance with self-care practices helps hypertensive patients to control their blood pressure; prevent and reduce complications; and subsequent morbidities, disabilities, and death.[21,24–26] However, limited previous studies showed that sex, age, occupational status, and time since diagnosis, comorbidities, knowledge about the disease, self-efficacy, social support, smoking, and khat chewing are associated with components of self-care practice of hypertension.[26–28] Yet, there is no clear comprehension of the magnitude of self-care practice and factors that influence the self-management practice of hypertensive patients. Therefore, this study assessed the magnitude of self-care practice and associated factors among hypertensive patients in public health facilities in Ethiopia in general and the study area in particular.

Methods

Study design and study setting

An institution-based cross-sectional study was conducted in Harar Town in Ethiopia from 25 March 2019 to 16 April 2019. Harar Town is located 525 km East of Addis Ababa, the Capital of Ethiopia. Administratively, it has six districts and 19 kebeles in 2019. Based on the 2007 Central Statistical Agency population census, the total population of the town was projected to be 122,000 in 2019. According to the Harari Regional Health Bureau annual report of 2018, there were four government hospitals and four government health centers in the study area.

Population

All hypertensive patients on follow-up at four public health facilities, that is, two hospitals and two health centers in the Harari Region were involved in this study. This study included adult patients aged ⩾18 years and taking antihypertensive medications for six or more months in selected public health facilities.

Sample size and sampling procedures

The sample size was calculated with Epi Info version 7.1 using a single population proportion formula to assess the prevalence of self-care practice among hypertension patients and a double population proportion formula to identify factors associated with self-care practice among hypertension patients. Accordingly, the minimum required sample size for the prevalence of self-care practice was computed with the following assumptions: 95% confidence level, 5% margin of error, 22.4% proportion of good self-care practice among hypertensive patients,[26] and 10% non-response rate and accordingly, a minimum of 294 participants were required to conduct this study. Similarly, the minimum required sample size for factors associated with self-care practice of hypertensive patients was determined with the following assumptions: the power of the study 80%, confidence level with 95%, 33.2% proportion of good self-care practice among unexposed hypertensive patients, and adjusted, odds ratio (AOR) of 1.87 with a 10% non-response rate[27] and accordingly, a minimum of 398 participants were required to conduct this study. Finally, we compared those two sample sizes and considered the larger sample size for this study. Accordingly, 398 participants were required to conduct this study.

We applied a stratified sampling technique to select the study participants. First, public health facilities were stratified as hospitals and health centers, and then, two out of four

hospitals and two out of four health centers were randomly selected. Then, the sample size was proportionally allocated to each selected facility based on number of registered hypertensive patients who would visit the facility for follow-up during the study period. We prepared a sampling frame for each facility using hypertension follow-up registries and finally, actual participants were drawn by a simple random sampling technique.

Data collection tools and measurements

Pretested structured questionnaires adapted from validated scales and published literature[27–38] were used to collect data from participants. The tool contains sociodemographic characteristics (sex, age, religion, marital status, education, main occupation, and residence area and wealth index), health profiles of the patients (comorbidity and follow-up duration), knowledge about hypertension, social support, and khat chewing and self-care practice (Supplementary File 1).

Self-care practice. Self-care practice was measured using a validated hypertensive self-care activity level effect (H-SCALE) scale that contains six domains (subscales) of self-care practice activities (medication adherence, weight management, physical activity, smoking, alcohol intake, and low salt diet).[36,37] Responses computed from six domains (subscales) were summed (range: 0–6) and self-care practice was considered as good when the patients positively adhered to four or more domains (subscales) out of six domains of self-care practice and poor unless otherwise.[26]

Medication adherence. It was measured by three items containing the number of days in the last 7 days that the patients take antihypertensive medications, takes antihypertensive medication at the same time every day, and takes the recommended dosage. Responses were summed (range: 0–21) and the participants were considered adhered when she/he scored 21 from a total of three items each rated from a minimum score of 0 to maximum score of 7 and not adhered unless otherwise.[36,37]

Weight management. It was measured using 10 items used to assess weight control through diet control and physical exercise. Items assessed agreement with weight control activities in the last 30 days. Responses were summed (range: 10–50) and the patient was practicing good weight management when she/he scored ≥40 from 50 total score computed from 10 Likert-type scale items rated from 1 (strongly disagree) to 5 (strongly agree) and poor unless otherwise.[36,37]

Physical activity. It was measured using two items (how many of the past 7 days did you do at least 30 min total physical activities and how many of the past 7 days did you do at the specific exercise activities other than that you did around the house or as part of your work. Responses were scored (range: 0–14) and the patient adhered to physical activity when she/ he scored ≥8 from 14 total scores computed from two items each rated from a minimum score of 0 to maximum score of 7 and not adhered unless otherwise.[36,37]

Smoking. It was measured using one item (how many of the past 7 days did you do smoke cigarettes, even just a puff). The patient was considered as a non-smoker if she/he smokes 0 days or did not have a single puff in the past 7 days and smoker unless otherwise.[36,37]

Alcohol intake. It was assessed using three items used to assess the quantity and frequency of alcohol intake.[37] The patient was considered as alcohol abstainer when she/he was not drinking any alcohol in the last 7 days or patients consider she/he as abstainer and drinker unless otherwise.[36,37]

Low salt diet. It was measured using 12 items related to eating a healthy diet, avoiding salts while cooking and eating, and avoiding foods with high salt content in the last 7 days. Nine negatively phrased items were reverse coded before computing the total score. A patient is considered as adhered to the low salt diet when she/he scored ≥6 (indicating participant was followed low salt diet practice on 6 out of 7 days) and not adhered unless otherwise.[36,37]

Knowledge about hypertension. It was measured using a validated Hypertension Evaluation of Lifestyle and Management (HELM) scale.[34] The patient was considered to have adequate knowledge about hypertension when she/he scored above the mean computed from contextualized 10 HELM scale questions (three true/false and seven multiple choices items) dichotomized to 0 (wrong response) and 1 (right response) and inadequate unless otherwise.[34]

Level of social support. It was measured using Duke's social support and stress scale.[30] The level of social support was considered good when the patients scored above mean computed from 11 Likert-type scale items each rated from 0 (never or there is no such person) to 2 (always) and poor unless otherwise.[30]

Current khat chewing. It was measured using one item (how many of the last 7 days did you chew khat, even just a single stick). The patient was considered not-chewing khat when she/he did not chew khat in the last 7 days or abstainer and chewer unless otherwise.

Data collection procedure

Data were collected electronically through face-to-face exit interviews which were conducted over a month using Open Data Kit (ODK) software loaded on the data collector's Smartphone. Five trained nurses collected data, and two experts holding a first degree in Public Health supervised overall data collection with the principal investigator.

Data quality control

To maintain the data quality, standard questionnaires were adapted from validated scales and published literature that contextualized to the study purpose. We pretested questionnaire on 5% of the total sample (20 hypertension patients on follow-up) to check its validity in Babile Health Center in East Hararghe, Ethiopia. The ODK software used for data collection thereby minimized potential errors that could occur. During data collection, strict supervision of data collectors and validations of collected data were carried out by supervisors and investigators.

Statistical analysis

After checking for completeness, data were directly transported from electronic data collection (ODK) software to excel-sheet using ODK's briefcase offline application and analyzed using SPSS version 24. Descriptive statistics, such as frequency, the measure of central tendency, and measures of dispersion, were used to characterize the participants. Before analysis, the internal consistencies of items were checked for each domain scale using reliability analysis (Cronbach's α). The principal component analysis was used to compute the wealth status of the participants. Bivariable and multivariable logistic regression analyses were conducted to identify factors associated with good self-care practice. AOR with a 95% confidence interval (CI) was used to report association, and the significance was declared at p-value < 0.05.

Results

Characteristics of participants

A total of 391 (98.2%) hypertension patients participated in the study. Two hundred seventeen (55.5%) participants were male. The mean age $\pm$ SD was 52 ± 9.5 years, and more than half (57.3%) of participants were in the age group of 40–59 years. Half (50.3%) of participants had a formal education, 33.2% of participants were poor, 46.8% had chronic diseases other than hypertension, and 84.7% participants were on the follow-up for less than 5 years. The median of follow-up duration (self-reported) was 4 years and the interquartile range was 2 years (Q1 = 3 and Q3 = 5). In total, 60% of the participants had adequate knowledge about hypertension, 61.5% had good social support, and 36.6% were currently khat chewers (Table 1).

Self-care practice

Initially, we checked for the internal consistency of the six domains of self-care practice and computed the summary statistics, mean $\pm$ SD, minimum and maximum scores, and standard error. We observed high internal consistency across all domains with the minimum in medication adherence items

Table 1. Characteristics of hypertensive patients in public health facilities in Harar town, eastern Ethiopia, 2019 (n = 391).

Characteristic	Frequency	Percentage
Sex		
Male	217	55.5
Female	174	44.5
Age (years)		
18–39	38	9.7
40–59	224	57.3
⩾60	129	33.0
Marital status		
Married	291	74.4
Single	22	5.6
Divorced	35	9.0
Widowed	43	11.0
Religion		
Muslim	183	46.8
Non-Muslim	208	53.2
Educational status		
Formal education	228	58.3
No formal education	163	41.7
Occupational status		
Employed	232	59.3
Unemployed	159	40.7
Wealth index		
Low	130	33.2
Medium	126	32.2
High	135	34.6
Residence area		
Urban	344	88.0
Rural	47	12.0
Comorbidity		
Yes	209	53.5
No	182	44.5
Duration of follow-up (self-reported, years)		
<5	331	84.7
⩾5	60	15.3
Knowledge about hypertension		
Adequate	235	60.1
Inadequate	156	39.9
Level of social support		
Good	240	61.4
Poor	151	38.6
Current khat chewing condition		
Abstainer	248	63.4
Chewer	143	36.6

(Cronbach's $\alpha = 0.73$) items and the maximum in weight management items (Cronbach's $\alpha = 0.96$) (Supplementary File 2).

The overall prevalence of good self-care practice was 29.9% (95% CI: 25.4% and 34.7%). Regarding the six domains of self-care practice, 57.5% were taking prescribed medications as recommended, 46.8% had good weight management, 30.2% of the patients had adhered to the recommended level of physical activity, 81.5% of patients were

Table 2. Self-care practice components of hypertensive patients in public health facilities in Harar town, eastern Ethiopia, 2019 (n = 391).

Characteristic	Frequency	Percentage
Self-care practice		
Good	117	29.9
Poor	274	70.1
Adherence to medication		
Adhered	225	57.5
Not adhered	166	42.5
Weight management		
Good	183	46.8
Poor	208	53.2
Physical activity		
Adhered	121	31.0
Not adhered	270	69.0
Smoking		
Smoker	71	18.2
Non-smoker	320	81.8
Alcohol consumption		
Abstainer	79	20.2
Drinker	312	79.8
Low salt diet		
Adhered	212	54.2
Not adhered	179	45.8

non-smokers, 79.8% of patients were alcohol abstainers, and 54.5% of the patients have adhered to low salt diet intake (Table 2).

Factors associated with self-care practice

The bivariable analysis showed that sex, educational status, occupational status, comorbidity, knowledge about hypertension, level of social support, and current khat chewing condition were significantly associated with good self-care practice while age, marital status, and religion were not significant at $p < 0.05$. Predictors with $p < 0.25$ were included in our multivariable model.

Accordingly, older age (AOR = 3.4, 95% CI: 1.2 and 9.3), attending formal education (AOR = 2.3, 95% CI: 1.3 and 4.2), absence of comorbidities (AOR = 1.8, 95% CI: 1.1 and 3.1), having adequate knowledge about hypertension (AOR = 4.7, 95% CI: 2.5 and 8.8), having good social support (AOR = 2.7, 95% CI: 1.6 and 4.7), and being khat abstainer (AOR = 1.9, 95% CI: 1.1 and 3.5) were positively associated with good self-care practice (Table 3).

Discussion

This study showed that 29.9% of patients exercised good self-care practice as recommended by the hypertension management protocol. This finding is higher than studies conducted in several parts of Ethiopia; 24% in Debre Berhan,[26] 24% in Durame,[39] and 20% in Mekele.[40] This discrepancy

could be due to methodological differences. For instance, the study conducted in Durame Town measured the self-care practice using only lifestyle-related items without considering medication adherence. However, the finding of our study was lower than studies done in Dessie Town, Ethiopia, which was 49%[27] and 37% in a study conducted in West Bengal.[41] The observed difference may be attributed to the difference in data collection instruments used between studies. For instance, the study done in Dessie Town used a hypertensive self-care practice tool containing 20 items each rated four points in Likert-type scale points. Besides, the difference in socio-economic status and settings may explain the observed differences.

This study revealed that 57.5% of patients adhered to medication which was consistent with the results of a study done in North Carolina, 58.6%.[38] However, the finding was lower than the results of a study conducted in Jimma, 61.9%[31], and Addis Ababa, 69.2%.[29] Compared to the results of a study done in southern India, 36.1%,[42] the finding in our study was higher. The discrepancy could be due to differences in patients' self-care awareness about hypertension and accessibility to information and health services in predominantly tertiary hospitals. In addition, the discrepancy could be to the difference in sociodemographic characteristics, the study setting, and variation in sample size between studies.

This study showed that 46.8% of patients have controlled their weight as per management protocol which was higher than the result of the study done in South Ethiopia, 41.9%[39] and West Bengal, India, 29%.[41] A lower level of weight control was observed when compared to the study done in Addis Ababa, which was 74.8%,[29] Debra Berhan, 71.9%,[26] and North Carolina, 65.1%.[38] The possible explanation could be due to the difference in socio-economic status and lifestyle. In addition, methodological differences may explain the observed difference.

In this study, adherence to recommended physical activity was 30.9% which was consistent with the study conducted in Addis Ababa, which was 31.4%.[29] The higher prevalence was observed when compared with the result of a study conducted in South India, which was 24.5%.[42] However, the lower prevalence was observed in our study when compared to the previous study conducted in the same setting, which was 62.3%.[28] Similarly, the higher prevalence of adherence to recommended physical activity was in a study conducted in North Carolina, 52.2%.[38] This difference could be explained by the methodological differences, especially, the difference in instruments used to assess the level of physical activity level. For instance, in this study, we used items on a Likert-type scale to measure the level of physical activity, whereas the latter study used yes or no questions. In addition, the absence of organized community-based support and facilities for exercise in Ethiopia might have played a significant role in hindering patients to achieve the recommended level of physical activity.

This study revealed that 81.6% of patients were non-smoker which was consistent with the results of a study

Table 3. Factors associated with self-care practice of hypertensive patients in public health facilities in Harar town, eastern Ethiopia, 2019 (n = 391).

Characteristic	Self-care practice		COR (95% CI)	AOR (95% CI)
	Good, n (%)	Poor, n (%)		
Sex				
Male	56 (25.8)	161 (74.2)	1	1
Female	61 (35.1)	113 (64.9)	1.55 (1.01, 2.40)*	1.18 (0.70, 1.99)
Age (years)				
18–39	11 (28.9)	27 (71.1)	1	1
40–59	53 (23.7)	171 (76.3)	0.76 (0.35, 1.64)	1.18 (0.46, 3.08)
≥60	53 (41.1)	76 (58.9)	1.71 (0.78, 3.75)	3.35 (1.21, 9.26)*
Marital status				
Married	81 (27.8)	210 (72.2)	1	1
Single	9 (40.9)	13 (59.1)	1.80 (0.74, 4.36)	1.05 (0.35, 3.11)
Divorced	9 (25.5)	26 (74.5)	0.90 (0.40, 2.00)	1.21 (0.47, 3.13)
Widowed	18 (41.9)	25 (58.1)	1.87 (0.97, 3.60)	1.56 (0.69, 3.51)
Religion				
Muslim	58 (31.7)	125 (68.3)	1.17 (0.76, 1.81)	1.06 (0.634, 1.77)
Non-Muslim	59 (28.4)	149 (71.6)	1	1
Educational status				
Formal education	88 (38.6)	140 (61.4)	2.90 (1.79, 4.70)***	2.28 (1.26, 4.15)**
No formal education	29 (17.8)	134 (82.2)	1	1
Occupational status				
Employed	81 (34.9)	151 (65.1)	1.83 (1.16, 2.90)**	1.83 (0.98, 3.42)
Unemployed	36 (22.6)	123 (77.4)	1	1
Comorbidity				
No	68 (37.4)	114 (62.6)	1.95 (1.26, 3.02)**	1.78 (1.07, 3.07)**
Yes	49 (23.4)	160 (76.6)	1	1
Knowledge about HTN				
Adequate	101 (42.6)	136 (57.4)	6.41 (3.59, 11.42)**	4.77 (2.48, 8.80)*
Inadequate	16 (10.4)	138 (89.6)	1	1
Level of social support				
Good	85 (38.8)	134 (61.2)	2.78 (1.73, 4.44)**	2.71 (1.56, 4.69)**
Poor	32 (18.6)	140 (81.4)	1	1
Current khat chewing				
Abstainer	93 (37.5)	155 (62.5)	2.98 (1.79, 4.90)**	1.93 (1.06, 3.50)*
Chewer	24 (16.8)	119 (83.2)	1	1

COR: crude odds ratio; CI: confidence interval; AOR: adjusted odds ratio; HTN: hypertension.
Significant at *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

conducted in Harar, Ethiopia, 81.5%.[28] However, the finding was lower than the study conducted in Jimma University Specialized Hospital, which was 93%.[31] This discrepancy could be explained by the difference in the study settings, and the difference in societal beliefs toward smoking. Concurrent use of substances, such as smoking and khat consumption, may partly explain the observed difference. For instance, khat consumption is widely practiced in our study setting as demonstrated in the 2016 Ethiopian Demographic and Health Survey report that showed 52.5% of the residents in Harar chew khat, which was very high compared to any other part of the country.[43] There is ample evidence that show smoking is highly associated with khat chewing.[28,39,43,44]

It was observed that 79.8% of the patients were alcohol abstainers. This finding was comparable to the results of a study conducted among hypertensive patients at Ayder Comprehensive Specialized Hospital in Tigray Region, where 67.2% of patients were alcohol abstainers.[45] There was a similar observation of 82.3% in a study conducted among patients in follow-up at St. Paul's Hospital in Addis Ababa.[46] But, the finding of our study was higher than the result of a multicenter study conducted among ambulatory hypertensive patients in Addis Ababa and Tigray Region, which was 56.7%.[47] The difference could be explained primarily by variation in the study setting. For instance, the latter study conducted in six hospitals located in different regions, Addis Ababa and Tigray Region. The combined estimate for alcohol abstainers might have been underestimated due to the inherent variation of patients' characteristics between the two regions.

In this study, the habit of taking a low salt diet was 54%, which was lower than a study done in Harar, Ethiopia, which was 82%.[28] However, compared to the finding of a study conducted in North Carolina, USA, 22%[38] and India, 12%,[42] the practice of taking low salt diet was much high. The possible explanation for the discrepancy could be the difference in sociodemographic characteristics and dietary habits of the patients. The possible reason for this variation could be a methodological difference. For example, the latter study used consumption of never or less than 6 g salt per food palate to measure the level of adherence to low salt in the diet.

This study showed that aged ≥60 years or older were more likely to have good self-care practice. This finding was consistent with the results of a study done in Jimma Town[31] and Debra Berhan Town, Ethiopia.[26] However, the finding of our study contradicts the results of a study conducted in Dessie Town[27] that showed older patients less likely to have good self-care practice. The reason could be due to the increased self-awareness and the need to control hypertension, which in turn may be because patients were on follow-up for years and exposed to various instructions on hypertension. However, further investigation is needed to understand the effect of age on practicing optimum self-care practice.

This study revealed that patients who had formal education were more likely to have good self-care practice which was consistent with the studies done in Dessie Town,[27] Bangladesh,[48] and Saudi Arabia.[49] This could be explained by the fact that the patients can read and understand hypertension-related instructions, which in turn improves practice good self-care practice.[27,48,49] Moreover, people who had formal education can have higher possibilities to follow different media and understand better than their uneducated counterparts.[27,48,49]

According to this study, the absence of comorbidities positively associated with good self-care practice. This could be explained by the fact that patients who had comorbidities may be overburdened with medication and hinder patients from practicing good self-care practices. Furthermore, comorbidities can worsen the conditions of the patient through a negative impact on the quality of life[50] and make them unable to engage in good self-care practice. A similar observation was made in a study conducted in Debra Berhan in Ethiopia,[26] but this finding disagrees with the study conducted in Addis Ababa, Ethiopia.[29] This difference is due to the differences in access to media[28,39,40,51] and can have better access to healthcare services than those living in small towns.[25,31,51]

In this study, having adequate knowledge about hypertension improves self-care practice. This finding was in line with the finding of a study conducted in Saudi Arabia[32] and Debre Berhan Town, Ethiopia.[26] However, this finding in contrast to the study done in the United States,[52] which could be explained by the difference in data collection instruments, sociodemographic characteristics, and study settings. In addition, a study conducted in the United Kingdom revealed along with advice and encouragement from the care provider is regarded as the most important aspect for better self-care practice.[53]

This study showed that the availability of good social support positively associated with good self-care practice which was consistent with the results of a study conducted in Durame[39] and Debre Berhan.[26] The existence of social support improves adherence to medication, diet control, and also accompanying during healthcare visits, which in turn creates a positive attitude toward good self-care practice. Evidence from previous studies showed the absence of social support has a detrimental effect on self-care practices. For instance, a study conducted in the United Kingdom showed that lack of social support was a barrier to good self-care practice.[53]

Abstaining from chew khat improves patients' self-care practice, which was consistent with the study done in Harari Regional state.[28] The possible reason for this is that those khat chewers more likely to engage in concurrent use of a substance which was reported in several studies,[28,39,43,44] and additionally, those who chew khat are stay seated all day long and may not have time to care for themselves. However, the finding of this study disagrees with the result of a study conducted in Debra Berhan.[26] This discrepancy could be attributed to the difference in socio-cultural attributes. For instance, the khat chewing practice is believed to increase social cohesion and bonds; however, there is long help belief that khat related to evil spirits and acts.[39]

As the strengths, first and foremost, to ensure data quality, we used ODK, electronic data collection tools to collect data. Second, we considered components of self-care practice including medication adherence which was mostly studied separately in other studies. We also included influencing factors such as khat chewing to see its effects on self-care practice. However, the study did not include hypertensive patients who were on follow-up care at private health facilities. Despite undertaken efforts to use validated tools for our data collection, social desirability bias might occur in this study as the research methodologies using self-reported measures which depend largely on what individuals and patients think desirable to answer self-care practice questions. In addition, this study did not consider some predictors of self-care practice such as the family history of hypertension and level of self-efficacy.

Conclusion

This study revealed that the level of good self-care practice among hypertension patients was low. Based on the analysis, it was observed that older age, formal education, absence of comorbidity, adequate knowledge about hypertension, good social support, and abstaining from khat significantly associated with good self-care practice. Regular check-up and follow-up of patients' compliance with self-management protocol, and more emphasis should be given to identify factors that potentially hinder the patients' adherence to hypertension self-care protocol. To make this happen, public health facilities should strengthen efforts to provide targeted education to patients and family members on all components of self-care practice. In addition, prospective studies should be

conducted to evaluate the effects of age and self-care practices in different settings.

Author contributions

F.M.H., H.A.A., H.S.R., B.M., and N.A. participated in the conception of the idea, development, and amendment of the proposal; data collection and analysis; and write-up of the draft results. H.A.A. and H.S.R. redid statistical analysis, drafted, edited, and revised the draft and final version of the article. All authors read and approved the final article.

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

Ethical approval for this study was obtained from the Institutional Health Research Ethical Review Committee of the College of Health and Medical Sciences, Haramaya University on 11 March 2019 with Ref. No. IHRERC/092/2019. Formal permission was obtained from Regional Health Bureau and selected health facilities.

Informed consent

Written informed consent was obtained from each participant after explaining the purpose and benefits of the study. In addition, formal permission (written letter approval) was also obtained from the Regional Health Bureau and selected facilities leader to include their selected facilities in this study. The authors interviewed participants in a separate area after informing the collected information would be kept confidential and not shared without permission.

ORCID iDs

Hassen Abdi Adem (iD) https://orcid.org/0000-0003-0582-4861

Nega Assefa (iD) https://orcid.org/0000-0003-0341-2329

Supplemental material

Supplemental material for this article is available online.

References

1. Narayan KM, Ali MK and Koplan JP. Global health: global non-communicable diseases where worlds meet. *N Engl J Med* 2010; 363: 1196–1198.

2. World Health Organization. *Global status report on no communicable diseases 2010*. Geneva: WHO, 2011.

3. Mills KT, Bundy JD, Kelly TN, et al. Global disparities of hypertension prevalence and control: a systematic analysis of population-based studies from 90 countries. *Circulation* 2016; 134: 441–450.

4. Lim SS, Vos T, Flaxman AD, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factors clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012; 380: 2224–2260.

5. World Health Organization. *A global brief on hypertension silent killer global public health crisis World Health Day 2013*. Geneva: WHO, 2013.

6. Van de Vijver S, Akinyi H, Oti S, et al. Status report on hypertension in Africa: consultative review for the 6th Session of the African Union Conference of Ministers of Health on NCD's. *Pan Afr Med J* 2013; 16: 38.

7. Weber MA, Schiffrin EL, White WB, et al. Clinical practice guidelines for the management of hypertension in the community: a statement by the American Society of Hypertension and the International Society of Hypertension. *J Clin Hypertens* 2014; 16: 1–13.

8. Kearney PM, Whelton M, Reynolds K, et al. Global burden of hypertension: analysis of worldwide data. *Lancet* 2005; 365: 217–223.

9. Okechukwu SO and Brian LR. Recent advances in hypertension in sub-Saharan Africa. *Heart* 2013; 99: 1390–1397.

10. Guwatudde D, Nankya-Mutyoba J, Kalyesubula R, et al. The burden of hypertension in sub-Saharan Africa: a four-country cross-sectional study. *BMC Public Health* 2015; 15: 1211.

11. Gebreyes YF, Goshu DY, Geletew TK, et al. Prevalence of high blood pressure, hyperglycemia, dyslipidemia, metabolic syndrome and their determinants in Ethiopia: evidences from the National NCDs STEPS survey, 2015. *PLoS ONE* 2018; 13(5): e0194819.

12. Shukuri A, Tewelde T and Shaweno T. Prevalence of old age hypertension and associated factors among older adults in rural Ethiopia. *Integr Blood Press Control* 2019; 12: 23–31.

13. Angaw K, Dadi AF and Alene KA. Prevalence of hypertension among federal ministry civil servants in Addis Ababa, Ethiopia: a call for a workplace-screening program. *BMC Cardiovasc Disord* 2015; 15: 76.

14. Asfaw LS, Ayanto SY and Gurmamo FL. Hypertension and its associated factors in Hosanna town, Southern Ethiopia: community based cross-sectional study. *BMC Res Notes* 2018; 11: 306.

15. Forouzanfar MH, Liu P, Roth GA, et al. Global burden of hypertension and systolic blood pressure of at least 110 to 115 mmHg, 1990-2015. *JAMA* 2017; 317: 165–182

16. Amare F, Hagos B, Sisay M, et al. Uncontrolled hypertension in Ethiopia: a systematic review and meta-analysis of institution-based observational studies. *BMC Cardiovasc Disord* 2020; 20: 129.

17. Abegaz TM, Abdela OA, Bhagavathula AS, et al. Magnitude and determinants of uncontrolled blood pressure among hypertensive patients in Ethiopia: hospital-based observational study. *Pharm Pract* 2018; 16: 1173.

18. Yazie D, Shibeshi W, Alebachew M, et al. Assessment of Blood pressure control among hypertensive patients in Zewditu memorial hospital, Addis Ababa, Ethiopia: a cross-sectional study 2018; 10: 80–87.

19. Chobanian AV, Bakris GL, Black HR, et al. The seventh report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. *Jama* 2003; 289: 2560–2572.

20. Webber D, Guo Z and Mann SJS. Self-care in health: we can define it, but should we also measure it 2013; 4: 101–105.
21. Ezra AA, Sandhya V, Jonathan B, et al. Management of hypertension: JNC 8 and beyond. *Cardiovasc Innov Appl* 2011; 1: 409–416
22. Martin J. Hypertension guidelines: revisiting the JNC 7 recommendations. *The Journal of Lancaster General Hospital* 2008; 3: 91–97.
23. National Heart Foundation of Australia. *Guideline for the diagnosis and management of hypertension in adults: 2016.* Melbourne, VIC, Australia: National Heart Foundation of Australia, 2016.
24. Ramachandran SV, Alexa B, Sudha S, et al. Residual lifetime risk for developing hypertension in middle-aged women and men: the Framingham heart study. *JAMA* 2002; 287: 1002–1010.
25. Bekele T, Dessalegn H, Benalfew L, et al. Uncontrolled hypertension and associated factors among adult hypertensive patients on follow-up at Jimma University teaching and specialized hospital: cross-sectional study. *Dove Press* 2017; 8: 21–29.
26. Getnet M. *Self-care practices and associated factors among adult hypertensive patients attending at Debre Berhan Referral Hospital in North Shoa, Amhara Regional State, Ethiopia.* Haramaya: Adult Health Nursing, 2019, p. 77.
27. Ademe S, Fekadu A and Debela G. Hypertension self-care practice and associated factors among patients in public health facilities of Dessie town, Ethiopia. *BMC* 2019; 19: 1–9.
28. Atnafu NN and Biftu G. Adherence to healthy lifestyle among hypertensive patients in Harar region, eastern Ethiopia. *Prim Health Care* 2018; 8: 1–7.
29. Tibebu A, Mengistu D and Negesa L. Adherence to recommended lifestyle modifications and factors associated for hypertensive patients attending chronic follow-up units of selected public hospitals in Addis Ababa, Ethiopia. *Patient Prefer Adherence* 2017; 11: 323–330.
30. Parkerson GR Jr, Broadhead WE and Tse CK. Validation of the Duke social support and stress scale. *Fam Med* 1991; 23(5): 357–360.
31. Labata BG, Ahmed MB, Mekonen GF, et al. Prevalence and predictors of self-care practices among hypertensive patients at Jimma University Specialized Hospital, southwest Ethiopia: cross-sectional study. *BMC Res Notes* 2019; 12: 86.
32. Lama AB, Alshimaa AA, Maradi AM, et al. Awareness and knowledge on hypertension and its self-care practices among hypertensive patients in Saudi Arabia. *Annal Int Med Dent Res* 2017; 3: 58–62.
33. Salim H, Lee PY, Sazlina SG, et al. The self-care profiles and its determinants among adults with hypertension in primary health care clinics in Selangor, Malaysia. *PLoS ONE* 2019; 14: e0224649.
34. Schapira M, Fletcher K, Eastwood D, et al. The development and validation of the Hypertension Evaluation of Lifestyle and Management (HELM) knowledge scale. *J Clin Hypertens* 2012; 14: 461–466.
35. Shah SM, Loney T, Sheek-Hussein M, et al. Hypertension prevalence, awareness, treatment, and control, in male South Asian immigrants in the United Arab Emirates: a cross-sectional study. *BMC Cardiovasc Disord* 2015; 15: 30.
36. Warren-Findlow J, Basalik DW, Dulin M, et al. Preliminary validation of the hypertension self-care activity level effects (H-SCALE) and clinical blood pressure among patients with hypertension. *J Clin Hyper* 2013; 15: 637–643.
37. Warren-Findlow J and Seymour RB. Prevalence rates of hypertension selfcare activities among African Americans. *J Natl Med Assoc* 2011; 103: 503–512.
38. Warren-Findlow J, Seymour RB and Brunner Huber LR. The association between self-efficacy and hypertension self-care activities among African American adults. *J Community Health* 2012; 37(1): 15–24.
39. Eyasu SB, Lolemo KH, Robera OF, et al. Lifestyle modification practice and associated factors among diagnosed hypertensive patients in selected hospitals, south Ethiopia. *Biomed Central* 2017; 23: 26.
40. Gebremichael GB, Berhe KK, Beyene BG, et al. Self-care practices and associated factors among adult hypertensive patients in Ayder Comprehensive Specialized Hospital, Tigray, Ethiopia, 2018. *BMC Res Note* 2019; 12: 1–6.
41. Dasgupta A, Sembiah S, Paul B, et al. Assessment of self-care practices among hypertensive patients: a clinic based study in rural area of Singur, West Bengal. *Int J Community Med Publ Health* 2018; 05: 262–267.
42. Zinat Motlagh SF, Chaman R, Sadeghi E, et al. Self-care behaviors and related factors in hypertensive patients. *Iran Red Crescent Med J* 2016; 18(6): e35805.
43. Central Statistical Agency [Ethiopia] and ICF. *Ethiopia demographic and health survey 2016: key indicators report.* Addis Ababa, Ethiopia; Rockville, MD: CSA and ICF, 2016.
44. Farazian F, Moghadam ZE, Nabavi FH, et al. Effect of self-care education designed based on Bandura's self-efficacy model on patients with hypertension: a randomized clinical trial. *Evid Based Care J* 2019; 9: 44–52.
45. Gebremichael GB, Berhe KK and Zemichael TM. Uncontrolled hypertension and associated factors among adult hypertensive patients in Ayder comprehensive specialized hospital, Tigray, Ethiopia, 2018. *BMC Cardiovasc Disord* 2019; 19: 121.
46. Bacha D and Abera H. Knowledge, attitude and self-care practice towards control of hypertension among hypertensive patients on follow-up at St. Paul's Hospital, Addis Ababa, Ethiopia. *J Health Sci* 2019; 29: 421–430.
47. Berhe DF, Taxis K, Haaijer-Ruskamp FM, et al. Hypertension treatment practices and its determinants among ambulatory patients: a retrospective cohort study in Ethiopia. *BMJ Open* 2017; 7: e015743.
48. Akhter N. *Self-management among patients with hypertension in Bangladesh.* Songkhla: Prince of Songkla University, 2010, pp. 1–88.
49. Neminqani DM, El-Shereef EAA and Thubiany MMAL. Hypertensive patients: self-care management practices in Al-Taif, KSA. *Int J Sci Res* 2015; 4: 1705–1714.
50. Zygmuntowicz M, Owczarek A, Elibol A, et al. Comorbidities and the quality of life in hypertensive patients. *Pol Arch Med Wewn* 2012; 122(7–8): 333–340.
51. Bilal M, Haseeb A, Lashkerwala SS, et al. Knowledge, awareness and self-care practices of hypertension among cardiac hypertensive patients. *Glob J Heal Sci* 2016; 8: 9.
52. Lee JE, Han HR, Song H, et al. Correlates of self-care behaviors for managing hypertension among Korean Americans: a questionnaire survey. *Int J Nurs Stud* 2010; 47(4): 411–417.
53. Department of Health. *Public attitudes to selfcare baseline survey.* London: Department of Health, 2005, p. 66.