

Factors Associated with Practices of Recommended Lifestyle Modification among Hypertensive Patient

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Abstract

Background: Proper adherence to recommended lifestyle change is a non-pharmacological option and plays great role to decrease comorbidity and expenditure of healthcare assets. Data regarding practices of recommended lifestyle change among hypertensive patients in Ethiopia is scarce. Therefore, this study aimed to assess practices of lifestyle change and its associated factors among diagnosed hypertensive patients.

Methods: This hospital-based cross-sectional study was conducted among 299 hypertensive patients in Hawassa University comprehensive, specialized hospital, Southern-Ethiopia from April to August 2019. A pre-structured interviewer-administered questionnaire was used to collect socio-demographic and clinical related data and study subjects were selected by systematic random sampling technique.

Results: The study indicated that only 37.8% (95% CI: 31.9-43.1) of the patients practiced recommended lifestyle changes. The study revealed the duration since the diagnosis of hypertension (Adjusted Odds Ratio (AOR)=2.3, 95% Confidence Interval (CI): 1.2-4.4), home blood pressure check-up (AOR=3.5, 95% CI: 1.7-7.1), hypertension controlling status (AOR=2.8, 95% CI: 1.6-5.4) and counseling (AOR=4.5, 95% CI: 1.7-11.7) were significantly associated with practice of lifestyle modification. Besides self-efficacy (AOR=2.4, 95% CI: 1.2-4.7), appointment follows up status (AOR=29.8, 95% CI: 1.8-52.2) and knowledge on hypertension and related consequences (AOR=4.3, 95% CI: 2.1-9.3) also were significantly associated with the practice of lifestyle change.

Conclusion: In general, this study revealed that the practices of lifestyle change among hypertensive patients were very low. Therefore, proper awareness creation and health education on the recommended lifestyle modifications might support patients to control their hypertension and to prevent comorbidity with different diseases.

Keywords: Hypertension; Healthy lifestyles; Adherence; Southern-Ethiopia

Abbreviations

CI: Confidence Interval; DBP: Diastolic Blood Pressure; ETB: Ethiopian Birr; HTN: Hypertension; NCDS: Non-Communicable Diseases; NGO: Non-Governmental Organizations; SBP: Systolic Blood Pressure; SPSS: Statistical Package For Social Sciences; WHO: World Health Organization

Introduction

Hypertension (HTN) is a progressive risk factor of cardiovascular diseases, which is characterized by raised both

systolic and diastolic blood pressures. HTN is associated with serious complications like coronary artery disease, cerebrovascular accidents, congestive heart failure, renal failure and peripheral arterial diseases. According to the World Health Organization (WHO), HTN is defined as Systolic Blood Pressure (SBP) \geq 140 mmHg and Diastolic Blood Pressure (DBP) \geq 90 mmHg or individuals taking antihypertensive agents. HTN is one of the public problems and global prevalence in adults was about 1.13 billion with 24% in men and 20% in women in 2015. About 9.4 million deaths expected every year due to HTN complications in the world [1]. Besides HTN accounts for nearly 50% of coronary

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heart disease and 67% of the cerebral vascular problems. In Africa, HTN is one of the leading cause of heart failure and accounts for more than half of the deaths from stroke. The prevalence of HTN in developing countries, particularly in African was about 46% in adults and around 13.7% living in rural and 20.7% in urban areas of sub Saharan Africa. Several community-based studies in Ethiopia showed the prevalence ranging from 16.9% to 31.5%, while WHO revealed a 35.2% probability of being hypertensive in Ethiopia. Around 40% of adults aged ≥ 25 years were reported to have raised blood pressure in 2008, 15 and HTN is responsible for 3.5% of all types of deaths in Ethiopia [2].

Socio-demographic, economic, biological and behavioral characteristics, environmental, unhealthy lifestyle and rapid growth of urbanization, were risk factors of HTN. Therefore, effective lifestyle modification can lower blood pressure to the maximum use of single antihypertensive agent. Besides, interventions like reduce of tobacco utilization and alcohol consumption are an important limiting factor of HTN. Decrease in dietary sodium intake plays an important role to lower blood pressure. Conversely, poor practice to recommended lifestyle change is associated with comorbid illness and expenditure of health care resources [3].

The national Non-Communicable Diseases (NCDs) guideline of Ethiopia recommends both pharmacological and non-pharmacological interventions for hypertensive patients. However, non-pharmacological options can be prioritized and suggested for all patients who are found in any classes of hypertension. These healthy lifestyle modification include reduction of body weight to normal Body Mass Index (BMI), performing moderate-intensity physical activity, restriction of salt intake, avoiding behavioral factors and diet modifications [4].

However, studies are scarce on the practices of lifestyle modification among hypertensive patients in Ethiopian and the trend might vary from one place to another. Therefore, the finding of this study would create awareness for health professionals as well as other responsible bodies on the lifestyle modifications and associated factors with the practice of lifestyles in order to control hypertension before developing any complications [5].

Materials and Methods

Study setting and study population

This cross-sectional study was conducted in Hawassa university comprehensive specialized hospital, Southern-Ethiopia from April to August 2019. Hawassa is the capital city of the Southern-Ethiopia region and located 275 km away from Addis Ababa. This hospital established in November 2005 for the purpose of health professionals training and health care service delivery. Currently, it has more than four hundred beds and expected to serve more than 18 million population of Southern-Ethiopia and nearby regions. The source population was all hypertensive patients who were attending in the hospital, while adult hypertensive

patients with age ≥ 18 years old were included in the study. However, unconscious and critically sick patients were excluded from the study [6].

Sample size determination and sampling technique

A single population proportion formula was applied using 23% of the practiced lifestyle modifications at 95% confidence interval and a 5% marginal error. In addition, 10% non-response rate was considered and then final sample size was calculated to be 299. Then, the study subjects were selected using a systematic random sampling technique [7].

Data collection and assessments

Data on socio-demographic, anthropometric, practices of lifestyles, individuals' knowledge of hypertension and patients' health status were collected by pre-structured questionnaire. The questionnaire concerning the measurement of practices of lifestyle modification was primarily prepared by adapting several studies and WHO stepwise surveillance questionnaires. In addition, clinical nurses who were working at chronic disease follow up clinic were measured the Blood Pressure (BP) and anthropometric variables. SBP and DBP were measured using Omron automatic blood pressure monitor after individuals rested for at least 5-10 minutes in the clinic. However, those patients who received caffeine or alcohol and those who did physical exercises at the time of clinic arrival were rested for 30 minutes before BP measurement [8].

Assessments

The healthy weight management: The weight was calculated as Body Mass Index (BMI) and it derived from individuals' height and weight using standard measuring scales. Then an individual with a BMI range 18.5 kg/m²-24.9 kg/m² was considered to have a good weight management practice.

A healthy salt diet: It was assessed by asking patients on the ingesting of non-salty foods or less than 6-gram salt per food palate. If the subjects utilized non-salty foods or less than half of the teaspoon salt per food palate were considered as having a good/healthy salt diet practice [9].

Healthy physical exercise: It was measured by performing activities with increase breathing or heart rate including brisk walking, jogging or running, riding a bicycle or exercise bicycle, swimming, aerobic exercise, aerobic dancing and the like. The requirement was doing one of the above-mentioned exercises for a minimum of 30 minutes per day; at least three times per week. If the patients responded yes answer to the exercise-related question considered as having a good physical activity practice.

Smoking: It was evaluated as self-report of never smoked or stopped smoking before 12 months. If a patient, who responded yes answer for never smoked or stopped smoking before 12 months were considered as a non-smoker/a good practice of smoking [10].

Alcohol consumption: Alcohol consumption frequency was assessed by 4 items and a score of (0-4 scale) depending on individuals response. That means 0 for never drink, 1 for drink less than monthly, 2 for drink monthly, 3 for drink weekly and 4 for drink daily or almost daily. If a patient who scored less than or equal to 3, considered as having a good practice of alcohol consumption.

Healthy diet allowance: Diet Allowance to Stop Hypertension (DASH) is a diet rich in fruits, vegetables, reduced saturated and total fat. The respondents were evaluated by asking questions like (do you eat fruit, vegetable, completely grain and low-fat diet a minimum of 3 times per week). If a patient, who responded yes answer was considered as having a good practice to diet recommendation [11].

Knowledge on hypertension and related consequences: All patients were asked whether the following statements were true or false to assess individuals knowledge like (high blood pressure can damage blood vessels and lead to heart attacks and strokes, being overweight affects blood pressure? Can salt consumption raises blood pressure? Can physical activity helps reduce blood pressure? Is the medication needed to treat hypertension). If a patient responded yes answer on $\geq 75\%$ of the total knowledge questions was considered as having a good knowledge on hypertension and related consequences [12].

Self-Efficacy: it was evaluated based on self-efficacy for the managing chronic disease-item scale. It assesses a measure of how confident hypertensive patients with chronic disease are in doing their day-to-day activities. This assessment consists of 6 items were graded on a 10-point scale that starting from the lowest (not at all confident=1 point) to the highest (totally confident=10 points). The assessment scale is applied by calculating a mean score of total and as a minimum of four of the six items. If a patient, missing a maximum of two response items considered as having a good self-efficacy.

Practices of healthy lifestyle modifications: It was assessed by the six recommended lifestyles that were advised by a Joint National Committee (JNC) to prevent and manage hypertension. These include physical exercise, Diet Allowance to Stop Hypertension (DASH), moderation of alcohol intake, low dietary sodium intake, termination of smoking and maintaining a healthy weight of the body. If a patient who have adherences on a minimum of five items

considered as “having a good practice of lifestyle modifications” while those who adherent for less than five items were considered as “having a poor practice of lifestyle modifications [13].

Data quality control

The pre-test was done on 10% questionnaires in Adare general hospital that is 5 km away from the study site. Then all necessary rearrangement of the questionnaire was done following pre-test feedback. Besides, training was given for data collectors (nurses who were working in the clinic) concerning the data collection approach and ways of blood pressure measurements.

Statistical analysis

Data coded and entered in to and analyzed using Statistical Package for Social Science (SPSS) version 22. Descriptive statistics were used to describe the study population with different variables. Bivariate and multivariate logistic regression analysis was used to evaluate the differences in the distribution of independent variables in comparison with the outcome variable. In addition, a variable with P-value <0.25 in the bivariate analysis was considered for multivariable analysis. Furthermore, the Hosmer-Lemeshow goodness-of-fit was evaluated for each variable in the logistic regression model. A p-value <0.05 was considered as statistical significance at 95% CI.

Results

Socio-demographic characteristics of the study population

Of 299 study subjects, more than half of 176 (58.9%) were females and the mean age of the study subjects was 51 (± 13) years. Two-hundred twenty nine (76.6%) of the study subjects were ≥ 40 years old. Majorities, 235 (78.6%) of patients were urban inhabitants and regarding educational status, 50 (16.7%) were unable to read and write and 93 (31.1%) were college and above. Two-hundred thirty nine (79.9%) of participants were married and 239 (79.9%) of subjects' monthly income was less than 3000 Ethiopian Birr (ETB) (Table 1) [14].

Table 1: Socio-demographic characteristics of hypertensive patients.

Variable	Frequency	Percent
Gender	Male	176
	Female	123
Age, years	18-39	70
	40-60	102
	≥ 60	127
Residence	Rural	64
	Urban	235

Education	Unable to read and write	50	16.7
	Non-formal education	44	14.7
	Primary level (grade1-8)	39	13
	Secondary level (grade 9-10)	73	24.4
	College or university	93	31.1
Marital status	Single	32	10.7
	Married	239	79.9
	Divorced	13	4.3
	Widowed	12	4
	Separated	3	1
Occupational status	Government employed	101	33.8
	NGO employed	24	8
	House wife	64	21.4
	Farmer	37	12.4
	Merchant	34	11.4
	Daily laborer	8	2.7
	Student	3	1
	Pensioner	25	8.4
	Other	3	1
Monthly household income	<1000 ETB	37	12.4
	1000-1999 ETB	89	29.8
	2000-2999 ETH	113	37.8
	≥ 3000 ETB	60	20.1
A distance of hospital from their residence	<5 km	56	18.7
	5 to 10 km	62	20.7
	>10 km	181	60.5

Note: ETH: Ethiopian birr; NGO: Non-Governmental Organization

Co-morbidities and other characteristics of the study subjects

Out of 299 study subjects, 162 (54.2%) have type-2 hypertension, 119 (39.8%) have type-1 hypertension and 18 (6%) have pre-hypertension. Thirty-seven (12.4%), 102 (34.1%), 155 (51.8%) and 5 (1.7%) of participants were obese (BMI: ≥ 30 kg/m²), overweight (BMI: 25 kg/m²-29.9 kg/m²), normal weight (BMI: 18.5 kg/m²-24.9 kg/m²) and underweight (BMI: <18.5 kg/m²), respectively. One-hundred ninety-one (63.9%, 95% CI: 58.7-69.2) of participants had a

good knowledge of HTN and its related consequences. In addition, 52.5% (46.3-57.9) of the participants have controlled blood pressure with an acceptable limit. Regarding comorbidity, 85 (55.6%), have diabetes, 29 (19%) have cardiac diseases, 22 (14.4%) have neurological problems, 7 (4.6%) have asthma and 4 (2.6%) have HIV. Moreover, 112 (37.5%) had a family history of hypertension and 34 (11.4%) of patients were khat chewers (Table 2).

Table 2: Co-morbidities and other characteristics of hypertensive patients.

Variable	Frequency	Percent	
Years since the diagnosis of HTN	<2 years	70	23.4
	2 to 4 years	102	34.1
	>4 years	127	42.5
Family history of HTN	Yes	112	37.5
	No	187	62.5
Comorbidity	Yes	153	51.2
	No	146	48.8

Type of comorbidity (n=153)	Diabetes	85	55.6
	Cardiac disease	29	19
	Neurologic disease	22	14.4
	Asthma	7	4.6
	HIV/AIDS	4	2.6
	Other	6	3.9
Blood pressure status during diagnosis	Pre-HTN (SBP 120-139/DBP 80 mmHg-89 mm Hg)	18	6
	Stage 1-HTN (SBP140-159/DBP 90 mmHg-99 mmHg)	119	39.8
	Stage 2 HTN (SBP \geq 160/DBP \geq 100 mmHg)	162	54.2
Blood pressure status	Good control	157	52.5
	Poor control	142	47.5
Knowledge on HTN	Good	191	63.9
	Poor	108	36.1
Use of medication	Yes	294	98.3
	No	5	1.7
Number of medication	One	164	55.8
	Two	110	37.4
	Three or more	20	6.8
Counseling	Yes	238	79.6
	No	61	20.4
Self-efficacy	Good	187	62.5
	Poor	112	37.5
Regular follow-up	Yes	268	89.6
	No	31	10.4
Khat (Catha edulis leaves)	Yes	34	11.4
	No	265	88.6
Home blood pressure checkup	Yes	206	68.9
	No	105	35.1
Presence of stress	Yes	107	35.8
	No	192	64.9
Got social support	Not at all	88	28.8
	A little	114	38.1
	Somewhat	20	6.7
	Very much	79	26.4

Note: AIDS: Acquired Immunodeficiency Syndrome; HIV: Human Immunodeficiency Virus; HTN: Hypertension; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure

The practice of recommended lifestyle modification

The overall 113 (37.8%, 95% CI: 31.9-43.1) patients practiced recommended lifestyle modification. Regarding patients practice, 286 (95.7%), 286 (95.7%), 273 (91.3%), 182 (60.9%), 155 (51.8%) and 73 (24.4%) have good practice on salt diet reduction, cessation of smoking, moderation of alcohol intake, diet modification, weight reduction and physical exercise, respectively (Figure 1). All patients practiced at least one item of lifestyle

recommendations and only 24 (8%) practiced all six items of lifestyle recommendations (Figure 2) [15].

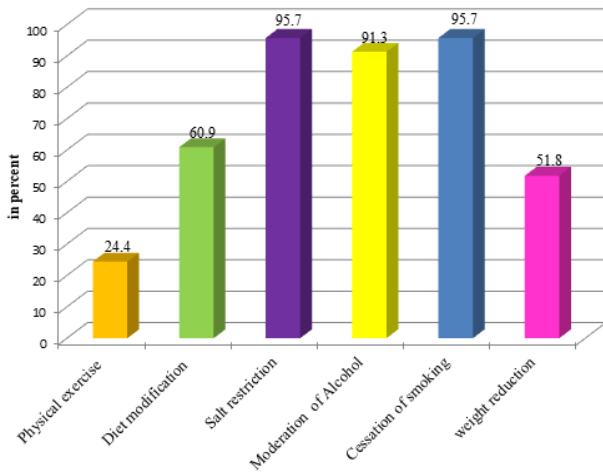


Figure 1: Rate of good practices to an individual type of lifestyle recommendations.

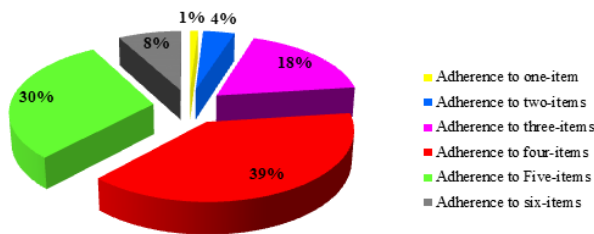


Figure 2: Percentage of respondents' practice of lifestyle modification items.

Factors associated with practices of recommended lifestyle modifications

Education (Crude Odds Ratio (COR)=1.7, 95% CI: 1.1-2.8), patients duration \leq 4 years since the diagnosis of HTN (COR=2.3, 95% CI: 1.4-3.8), self-efficacy (COR=3.9, 95% CI: 2.2-6.7), appointment follow up status (COR=9.9, 95% CI: 2.3-42.4) and knowledge on HTN and related consequences (COR=8.0, 95% CI: 4.2-15.3) were associated with practice of lifestyle changes. In addition, home blood pressure check-up and overall control rates of hypertension were associated with the practice of lifestyle recommendations. While the multivariable analysis was adjusted for potential confounding factors and patients duration \leq 4 years since the diagnosis of HTN was found to be 2 times more likely to be practiced recommended lifestyle modifications when compared to their counterparts (Adjusted Odds Ratio (AOR)=2.3, 95% CI: 1.2-4.4). Patients who had a trend of home BP check-up were 3 times more likely to be practiced recommended lifestyle recommendations when compared to their counterparts (AOR=3.5, 95% CI: 1.7-7.1). Moreover, overall control rate of hypertension (AOR=2.8, 95% CI: 1.6-5.4), counselling of patients (AOR=4.5, 95% CI: 1.7-11.7), self-efficacy (AOR=2.4, 95% CI: 1.2-4.7), appointment follow up status (AOR=29.8, 95% CI: 1.8-52.2) and knowledge on HTN and related consequences (AOR=4.3, 95% CI: 2.1-9.3) also were significantly associated with practice of lifestyle changes (Table 3).

Table 3: Factors associated with adherence to lifestyle modifications in hypertensive patients.

Variable	Healthy lifestyle adherence	COR	AOR	Non-adherent
		(95% CI)	(95% CI)	
Educational status	\leq Primary level	41 (13.7)	1	1
	Secondary and above	72 (24.1)	1.7 (1.1-2.8)*	1.6 (0.9-3.0)
Duration since the diagnosis of HTN	1-4 years	79 (26.4)	2.3 (1.4-3.8)**	2.3 (1.2-4.4)**
	> 4 years	34 (11.4)	1	1
Home BP checkup	Yes	97 (32.4)	4.3 (2.3-7.8)***	3.5 (1.7-7.1)**
	No	16 (5.4)	1	1
Counseling	Counseled	105 (35.1)	5.2 (2.0-10)***	4.5 (1.7-11.7)**
	Not counseled	8 (2.7)	1	1
BP controlling status	Good	80 (26.8)	3.4 (2.1-5.6)***	2.8 (1.6-5.4)**
	Poor	33 (11.0)	1	1
Regular follow-up	Yes	111 (37.2)	9.9 (2.3-42.4)**	29.8 (1.8-52.2)**
	No	2 (0.7)	1	1
Social support	Supported	54 (18.1)	2.9 (1.7-4.7)**	1.2 (0.65-2.4)
	Not supported	59 (19.7)	1	1
Self-efficacy	Good	91 (30.4)	3.9 (2.2-6.7)***	2.4 (1.2-4.7)*
	Poor	22 (7.4)	1	1
Knowledge on HTN	Good	100 (33.4)	8 (4.2-15.3)***	4.3 (2.1-9.3)***

	Poor	13 (4.3)	95 (31.8)	1	1
Khat chewing	Yes	8 (2.7)	26 (8.8)	1	1
	No	105 (35.1)	160 (53.5)	2.2 (0.95-5.0)	0.66 (0.22-1.9)

Note: AOR: Adjusted Odds Ratio; CI: Confidence Interval; COR: Crude Odds Ratio; HTN: Hypertension; *: p<0.05; **: p<0.01; ***: p<0.001

Discussion

The present study revealed 63.9% (95% CI: 58.7-69.2) of the participants had good basic knowledge concerning hypertension and related problems that are almost similar to the study conducted in the Jimma-Oromia region, Ethiopia, which was 67.7%. However, the finding is higher than the rate reported by different studies like 44.9% in Hosanna, South-Ethiopia, 34.9% in Nedjo, West Ethiopia and 12.9% in Egypt. A higher rate also was reported from Harar, Eastern Ethiopia that was 83.8%. From the study subjects, 52.5% (95% CI: 46.3-57.9) had the overall rate of controlled of hypertension and the finding is higher than the study conducted in Addis Ababa (41.1%), Northwest Ethiopia (42.9%), Eastern Ethiopia (22.2%), Southwest Ethiopia (22.4%) and survey of the USA (37%). This indirectly might reflect the adherence rate of hypertensive patients' to therapeutic agents or practices of recommended lifestyle modification.

About 11.4% of the respondents were khat (*Catha edulis* leaves) chewers. The rate was lower than the study conducted in Harar, which was 33.7%. The differences might be attributed to the socio-cultural variations concerning the practice of khat chewing from place to place. The overall practices of lifestyle change among hypertensive patients were 37.8% (95% CI: 31.9-43.1). Conversely higher rate was reported from Northwest Ethiopia (77.3%), East Shewa, Ethiopia (59.5%), Southwest Ethiopia (60.5%), Eastern Ethiopia (62.1%) and Ghana (72%). Lower rates also were reported from different studies like 23%, 27.3% and 31.4%. The variations in practices of recommended lifestyle modification might be attributed to methodological differences, socioeconomic status of individuals, provision of health education, behavioral characteristics of individuals and willingness of individuals to act recommended lifestyle moderation.

The present study found that no statistical association between education and practices of lifestyle modality. Conversely, the study conducted in another part of South-Ethiopia and West Ethiopia revealed that the association between education and practice lifestyle modification. The variation may be attributed to differences in the classification of education level for the purpose of statistical analysis. The studies conducted in South Ethiopia, Addis Ababa and Ghana were reported the association between the duration since the diagnosis of hypertension and practices of lifestyle modality. This in line with the current study finding that revealed the experience of hypertension \leq 4 years since its diagnosis was associated with the practices of lifestyle modification (AOR=2.3, 95% CI: 1.2-4.4).

In addition, those patients who had basic good knowledge on hypertension and its consequences were 4 times more likely to be practiced lifestyle modification (AOR=4.3, 95% CI: 2.1-9.3) when compared to poor-knowledge patients. In similar studies conducted in Addis Ababa, West Ethiopia and South West Ethiopia reported a significant association between patients' knowledge and practices of recommended lifestyle change. However, this study indicated no association between residence and practice of recommended lifestyle change. The finding is inconsistent with the study reported from West Ethiopia and Addis Ababa. Moreover, Tibebu et al. reported that the association between self-efficacy and practices of lifestyle change, and this in line with the finding of the current study (AOR=2.4, 95% CI: 1.2-4.7). Social support was not associated with the practices of recommended lifestyle modification in this study and the finding is not in line with the study conducted in Addis Ababa. The variation might be attributed to the differences in social support approach from culture to culture and the sympathetic level of individuals.

One study revealed the association of gender and occupation with the practice of lifestyle modification, In addition, Obirikorang et al. reported the association between marital status and the practice of lifestyle modifications. However, the present study revealed no association gender, marital status and occupation with the adherence of practice of lifestyle change.

Good control rate of hypertension upsurgues adherence to the healthy lifestyle modalities. This is consistent with the finding of the present study. Furthermore, almost 75% of people living with hypertension in developing countries with limited resource settings have low awareness of hypertension control rate. Therefore, hypertension control status plays a critical role to avoid its side effects.

Conclusion

This study revealed the practice of recommended lifestyle modification among hypertensive patients was very low. Duration since the diagnosis of HTN, home-based BP check-up, counseling, overall hypertension controlling status, the status of social support, self-efficacy and knowledge on HTN were important significant predictors of adherence to practices of lifestyle modifications. Therefore, proper awareness creation and health education on the recommended lifestyle modifications might support patients to control their hypertension and to prevent comorbidity with different diseases.

Limitations of the Study

The practices of lifestyle modification in hypertensive patients was assessed using only patients' responses alone. The other limitation was the cross-sectional nature of the study that signifying it cannot provide adequate evidence of association about practices of lifestyle modification. Irrespective of the described limits, this study eventually adds helpful information on practices of lifestyle modification in an inadequate situation of Ethiopia.

Data Sharing Statement

The data set of this article is not openly accessible, but it can be accessible on reasonable request from the corresponding author with the permission of the clinical and academic director of Hawassa university's comprehensive specialized hospital clinical.

Author Contributions

All stated authors participated in the research project. SK hypothesized and designed the study did data collection including data analysis; ST was the main advisor throughout the project and ATH did required data analysis, manuscript preparation including with manuscript review. All authors read and approved the final version of the manuscript.

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Disclosure

The authors declare that they have no competing interests in this work.

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Ethics Approval and Consent to Participate

The study was approved by the Institutional Review Board (IRB) of Hawassa university college of medicine and health sciences (IRB-2019). All the study participants were well known about the protocol of the study and written informed consent was obtained from study participants. In addition, the confidentiality of the participants' information was well kept.

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