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Factors Influencing Lifestyle Modification Practice among Hypertensive Patients: A Cross-Sectional Study in two Selected Eritrean Hospitals

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Results: The study revealed that 258 (71.7%) of the respondents attained the recommended lifestyle modification practices, while the remaining 28.3% had poor practice. The study found that being female [AOR (CI): 1.8 (0.63, 4.85), p<0.05], Having higher educational status[AOR (CI): 2.02 (0.69, 4.28), p value< 0.001], Being married[AOR (CI): 3.2 (0.79, 7.26), p<0.05], Less than 5 years duration since diagnosis [AOR (CI): 1.92 (0.65, 4.89), p<0.05], and Being educated about the importance of lifestyle modifications[AOR (CI): 2.3 (1.14, 5.89), p≤ 0.05)] were factors significantly influenced the practice of lifestyle modification.

Conclusion: Lifestyle modification practices among hypertensive patients were relatively high in this study. Therefore, patients should be given a sustainable advice and support to achieve and maintain best outcomes of lifestyle modification practices.

Keywords: hypertension, lifestyle modification, practice, hospital, halibet, asmara.

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I. Background

Hypertension is a global public health challenge due to its high prevalence and the associated risk of stroke and cardiovascular diseases in adults. Out of the total 7.5 million deaths caused by hypertension worldwide, about 12.8% of the total annual deaths occur in Sub-Saharan Africa (SSA)[1, 2]. Recently, hypertension has emerged as a major public health problem in SSA [3] due to the globalization and modernization trends, characterized by a sedentary style of life and consumption of diet rich in refined carbohydrates and animal fat. Hypertension has been found to be a significant cause of renal and cardiovascular diseases [4]. On the top of being the highest risk factor for death globally, hypertension is found responsible for 62% of cases of cerebrovascular disease and 49% of cases of ischemic heart disease [5, 6].

Adoption of a life style modification is of critical importance for preventing and managing hypertension. It does not only reduce blood pressure but can delay the incidence of hypertension, enhance antihypertensive drug efficacy, and decrease cardiovascular risk [7]. In patients with hypertension, life style modification can serve as initial treatment before the start of drug therapy and as an adjunct to medication-controlled blood pressure (BP), these therapies can facilitate drug step-down and drug withdrawal in highly motivated individuals who achieve and sustain lifestyle changes [8, 9]. The recommended practice of a lifestyle modification includes weight reduction, salt restriction, and physical activity, smoking cessation and abstaining from alcohol [7, 10].

As reported in different studies age, marital status, gender differences, income, getting health information, the existence of co-morbidity, knowledge on hypertension, duration of treatment and educational status were factors found to influence lifestyle modification practice [11–16]. Little is known about life style modification practice among hypertensive patients in Eritrea. It is to this view that, the determination of practice to lifestyle modifications among hypertensive patients becomes crucial. This current study therefore pursued to assess the practice rate of lifestyle

modifications and its influencing factors among individuals living with hypertension in Asmara, Eritrea.

II. Methods

a) Study Design/Setting

This was a hospital based cross-sectional study conducted among hypertensive patients at the hypertension clinics of Hazhaz and Halibet hospitals from February through May 2018. These two hospitals located in Asmara (the capital of Eritrea) are the only hospitals providing follow up care for hypertensive patients. Hazhaz hospital is located in North West of Asmara; while Halibet hospital is located in the North East of the city. Both the hospitals provide a comprehensive out-patient and in-patient services.

b) Study Population and Sample Recruitment

The target population was hypertensive patients who were on antihypertensive therapy attending the hypertensive clinic. There were about 5860 registered hypertensive patients in Halibet and Hazhaz Hospital taking antihypertensive medication regularly as outpatient follow-up. Among these patients, 3410 were from Hazhaz Hospital and the remaining 2450 were from Halibet hospital. The sample size was determined using a single population proportion by assuming 50% proportion of the patients practiced lifestyle modifications with 95% confidence interval and 5% margin of error. To attain a strongest statistical power and effect size, adding a population correction formula and non-response rate, the sample size was projected to 360 participants. The sample size for Halibet and Hazhaz hospital was calculated as per proportion of the population of each hospital. Patients were approached during their follow up time using a consecutive non probability sampling method until the required sample size was reached. Pregnancy induced hypertension, health professionals under antihypertensive and patients diagnosed of hypertension for less than three months were excluded.

c) Research Variables

Dependent variable: Patients practice level to life style modification was the outcome variable.

The independent variables include: Patients socio demographic characteristics (age, sex, religion, occupation, monthly income and marital status) and Blood pressure and medication characteristics (current BP, number of drugs, hospitalization history, comorbid disease, duration of disease, dosage and number of pills per day).

d) Data Collection Tool

A well-reviewed, pretested and structured questionnaire which consisted of three sections was used to collect data. The first section covered the demographic data of the study participants which includes age, gender, socioeconomic level, marital status, occupation status and religion. The second section comprised clinical and medication characteristics. The third section constituted questions pertaining to life style modification practices which include: adopting low salt healthy diet, avoiding smoking, avoiding alcohol consumption, physical activity and weight management. The lifestyle modification practices were measured using questionnaires adapted from WHO STEPS questionnaires [10]. Hypertension self-care activity scales [7] were specifically adopted to measure the lifestyles practices questions in the local context.

e) Life Style Modification Practice Measurements

Physical activity: Physical activity was assessed by two items. "How many of the past 7 days did you do at least 30 minutes total of physical activity?" and "how many of the past 7 days did you do a specific exercise activity (such as walking, aerobics or biking) other than what you do around the house or as part of your work?" Responses were summed (Range 0–14) patients who scored eight and above were coded as a having good physical activity practice. All others coded as poor practice.

Low-salt diet: Ten items were used to assess practices related to eating a healthy diet, avoiding salt while cooking and eating or any kind of added salt, and avoiding foods high in salt content. A mean score was calculated. Scores of five or above indicate that patients followed the low-salt diet and considered as having good low salt diet practice.

Smoking: Smoking status was assessed with one item, "How many of the past 7 days did you smoke a cigarette?" Respondents who reported none were considered as "nonsmokers".

Weight management: Ten items assessed using activities undertaken to manage weight through dietary practices such as reducing portion size and making food substitutions (low fat and high fiber intake) as well as exercising to lose weight during the past 30 days.

Response categories ranged from strongly disagree (1) to strongly agree (5). Responses were summed creating a range of scores from 10 to 50. Participants who report that they agreed or strongly agreed with all ten items (score $\geq$40) were considered to have a good weight management practice.

Alcohol- Alcohol intake was assessed using 3-items. Not drinking any type of alcohol containing drinks was considered as good practice with regard to alcohol consumption.

f) Ethical Approval

After Approval of the study was obtained from "Research and Ethical Committee" of the School of Nursing, Asmara College of Health Sciences (ACHS), support letter from the School of Nursing, ACHS, was

taken to Hazhaz and Halibet medical officers for allowing data collection. Each study participant was adequately informed about the purpose, method and anticipated benefit of the study by the data collectors. Verbal and written consent was obtained from study participants and anonymity was maintained to ensure confidentiality. The responders' right to refuse or withdraw from the study was also respected fully. And all patients who were able to give informed consent by their signature (could be thumb signature) were invited to participate in the study.

g) Data Collection Procedures

The questionnaire was translated from English to Tigrinya (native language) and then back to English by other translator to ensure its consistency. In order to recognize the weakness, strength and consistency of the questionnaire, the questions were first piloted in Halibet hospital at the hypertension clinic on 36 hypertensive patients selected randomly. The questionnaire was found consistent, clear in language and comprehendible, thus no modifications was done during the main study. However, due to increased absenteeism and non-response rate of the randomly selected individuals, the researchers decided to adopt a non-probabilistic convenience sampling during the main study. Data were collected by the researchers using face to face interview method.

h) Data Analysis

Data analysis was performed using SPSS (Statistical Package for Social Sciences) version 22. Descriptive statistics of the demographic and other clinical variable was illustrated using frequencies and tables. Lifestyle modification practices containing physical exercise, low salt diet, alcohol consumption, smoking and weight management practices was classified as a 'good practice' and 'poor practice'. Participants who scored above the mean in all recommended lifestyle questions were labeled to have "good" 'lifestyle modification practices. Bivariate analysis was done to find out the strength of the associations of each independent variable with the rate of lifestyle modification practice. Significant variables at the bivariate level were further analyzed using multivariate analysis to adjust the confounding effect. A p-value of < 0.05 was considered significant during the analysis.

III. Result

a) Socio Demographic Characteristics

The study included 360hypertensive patients. The mean age (±SD) of the participants was 62.4 years (±8.6) with majority (49.2%) of the participants were within the age range of 52 - 68 years. Most of the participants were married (79.2%), females (54.4%), unemployed (78.3%), and have had secondary and above educational level (38%). Majority of the participants (83.3%) were orthodox Christians (Table 1).

Table 1: Socio-demographic characteristics of hypertensive patients in Hazhaz and Halibet Hospitals, Asmara, May 2018 (N = 360)

Variables		Frequency (N= 360)	Percent (%)
Age in years (Mean±SD: 62.4±8.6)			
	18-34	6	1.7
	34-51	54	15
	52-68	177	49.2
	69-85	123	39.1
Sex			
	Male	164	45.6
	Female	196	54.4
Marital status			
	Married	285	79.2
	Single	21	5.8
	Divorced/widowed	54	15
Religion			
	Orthodox	300	83.3
	Catholic	21	5.8
	Muslim	34	9.5
	Protestant	5	1.4

Employment status			
	Unemployed	282	78.3
	Employed	78	21.7
Educational status			
	Illiterate	128	35.6
	primary	95	26.4
	Secondary and above	137	38

The mean duration of hypertension among the participants was 5.2 years (SD±2.3). Only 19.2% of the respondents had history of hospitalization due to hypertension and more than half (57.5%) had comorbidities like heart disease and diabetes. Majority of the respondents (56%) had a controlled blood pressure <140/90. eighty nine (24.7%) of the study subjects had taken the medication for more than ten years and only 8.3% of the respondents had taking the medication for less than one year. More than one-third of the participants (35.6%) had family history of hypertension. Majority of the participants (84%) have taken a routine education by health personnel about the practices of lifestyle modification (Table 2).

Table 2: Medication and health related factors among hypertensive patients in Hazhaz and Halibet Hospitals, Asmara, May 2018 (N = 360)

Variables		Frequency (N=360)	Percent (%)
Hospitalization history			
	Yes	69	19.2
	No	291	80.8
Blood pressure			
	<140/90	202	56
	>=140/90	158	44
Duration of hypertension (Mean±SD: 5.2±2.3)			
	≤ 2 year	30	8.3
	2-4 years	92	25.6
	5-7 yrs.	70	19.4
	8-10 yrs.	79	21.9
	> 10 yrs.	89	24.7
Family history of hypertension			
	Yes	128	35.6
	No	232	64.4
Having comorbid disease*			
	Yes	153	42.5
	No	207	57.5
Dosage frequency per day			
	Once daily	140	38.9
	Two times a day	179	49.7
	Three times or more	41	11.4
Number of pills per day			
	One pill	109	30.3
	Two pills	158	43.9
	Three pills	51	14.2
	Four and above pills	42	11.7
Being educated on lifestyle modifications by health personnel			
	Yes	302	84
	No	58	16

**Comorbid disease:Diabetes and Heart Disease*

b) Lifestyle Modification Practice

Two hundred and fifty eight (71.7%) of the respondents attained the recommended lifestyle modification practices, while the remaining 28.3% had poor practice (Figure 1).

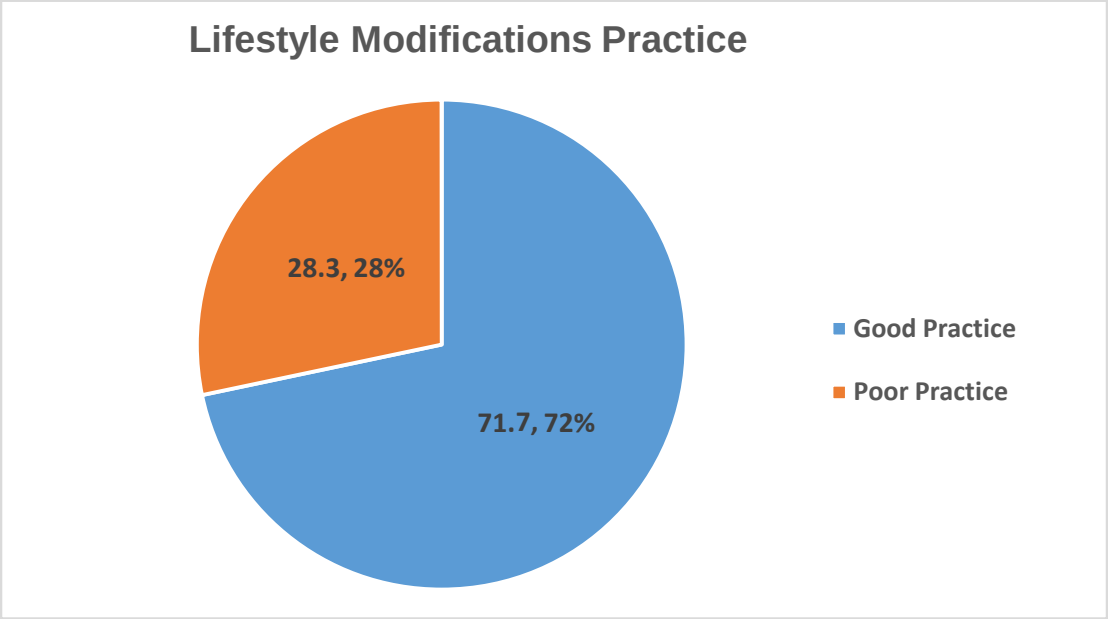

Figure 1: Prevalence rate of Life style modification practice among hypertensive patientsin Hazhaz and Halibet Hospitals, Asmara, May 2018 (N = 360)

The mean (±SD) score for physical activity was 6.36(±2.45), with the maximum score of 14. Out of the total participants, two hundred and seven (57.5%) had a good physical exercise practice. The mean (±SD) score for low salt diet was 6.59(±2.03). From the patients, 318 (88.3 %) practiced the recommended healthy diet with low diet salt. From the items with a maximum score of 50, the mean (±SD) score of weight management practice of the respondents was 39.6(±8.43). Two hundred forty eight (68.9%) patients had good weight management practices. One hundred eighty (87.8%) did not drink alcohol and One hundred eighty-seven (95.8%) were non-smokers (Table 3).

Table 3: Distribution of Life style modification practices among hypertensive patients in Hazhaz and Halibet Hospitals, Asmara, May 2018 (N = 360)

Adherence to Lifestyle Modifications		Frequency (N=360)	Percentage (%)
Practicing regular physical exercise			
	Yes	207	57.50%
	No	153	42.50%
Alcohol consumption			
	Never drinks	316	87.80%
	Drinks	44	12.20%
Weight management practices			
	Good	248	68.90%
	Poor	112	31.10%
Smoking status			
	Non smokers	345	95.80%
	Smokers	15	4.20%
Lowering salt intake			
	Yes	318	88.30%
	No	42	11.70%

c) *Predicators of Lifestyle Modification Practice*

Factors related to educational level, marital status, gender, duration of disease, and being educated about lifestyle modifications were found to have significant association with lifestyle modification practices. The practice of lifestyle modification was 2.02 times better practiced among patients reached secondary and above educational level compared to the lower educated patients [AOR (CI): 2.02 (0.69, 4.28), p value< 0.001]. similarly, participants who reported of being educated by health personnel on lifestyle modifications were 2.3 times more likely to adhere on lifestyle modification practices [AOR (CI): 2.3 (1.14, 5.89), p≤ 0.05)]. Female [AOR (CI): 1.8 (0.63, 4.85), p<0.05] and married [AOR (CI): 3.2 (0.79, 7.26), p<0.05] patients were 1.8 and 3.2 times more likely to practice lifestyle modifications than their counter parts. Those who had hypertension for less than 5 years duration [AOR (CI): 1.92 (0.65, 4.89), p<0.05] were significantly associated with high rate of adherence to lifestyle modification practices. Factors related to age, religion, blood pressure reading, dosage and frequency of drugs, Family hypertension history and comorbidity of disease didn't had significant influence on practice of lifestyle modification (Table 4)

Table 4: Predicators of lifestyle modification practice among hypertensive patients in Hazhaz and Halibet Hospitals, Asmara, May 2018 (N = 360)

Characteristics	Lifestyle Modification Practice		COR (95% CI)	AOR (95% CI)
	Good N(%)	Poor N (%)		
Female sex	146 (74.5)	50 (25.5)	2.32 (0.95, 6.23)**	1.8 (0.63, 4.85)**
Age < 60 years	98 (66.2)	50 (33.8)	1.98 (0.65, 4.23)**	1.2 (0.03, 5.09)
Being employed	42 (53.8)	36 (46.2)	1.12 (0.23, 3.52)	
Married	217 (76)	68 (24)	3.62 (1.22, 8.65)***	3.2 (0.79, 7.26)**
Christian religion	125 (38.3)	201 (61.7)	0.83 (0.45, 3.12)	
Secondary/above education	93 (68)	44 (32)	2.4 (0.86, 5.29)***	2.02 (0.69, 4.28)***
Hospitalization history	35 (51)	34 (49)	0.98 (0.33, 2.51)	
Duration of disease < 5 years	88 (72)	34 (28)	2.85 (1.32, 7.89)**	1.92 (0.65, 4.89)**
Familyhypertensive history	59 (46)	69 (54)	0.85 (0.22, 2.43)	
BP < 140/90 mmHg	107 (52.9)	95 (47.1)	1.14 (0.63, 3.25)**	0.8 (0.41, 2.73)
Having comorbid disease	74 (48.4)	79 (51.6)	0.79 (0.11, 2.69)	
Taking drugs > twice/day	108 (49)	112 (51)	0.89 (0.31, 3.23)	
Educated about good lifestyle	224 (74)	78 (26)	2.6 (1.19, 6.89)***	2.3 (1.14, 5.89)**

*BP: Blood Pressure; **, **: P value < 0.05 and P value < 0.001 respectively*

IV. Discussion

This study determined lifestyle modification practices among hypertensive patients of Hazhaz and Halibet hospital. Findings of the study showed that out of the 360 participants enrolled, two hundred and fifty eight (71.7%) were adherent to life style modification practices. This finding is comparable with a study done in china[17] but higher than from study done in Saudi Arabia and Ethiopia [12, 15]. Among lifestyle modifications, about (56%) had good physical exercise practice; almost (69%) had good weight management practices and 88.3% had low salt intake. Other studies done in Saudi Arabia and USA reported lower results with regard to the lifestyle modification items [12,18]. The discrepancies in lifestyle modification practices between our study and the others may be attributed to settings difference. Another reason could be the socioeconomic and sedentary lifestyle differences between the populations.

Association between factors and the practice of lifestyle modification showed that level of education and awareness about lifestyles, marital status, gender and duration of disease significantly influenced the general practice of lifestyle modifications. Participants who had secondary and above education and those who were educated about lifestyle modifications were more likely to practice lifestyle modifications. This is consistent with the study done Nigeria and Botswana in which the practice of lifestyle modification was higher as educational status increases [13, 14]. Similar study conducted in Ethiopia [19] reported that the level of lifestyle modification practice was significantly associated with higher educational status. This could probably be due to the fact that highly educated patients have better chance to come across

considerable information on the disease from different educational sources.

Some studies [15, 20] reported that longer duration of treatment were found to have had good lifestyle modification, while others reported to the reverse i.e. those patients with longer years of treatment were shown to have reduced odds of adherence. Findings of our study showed better practice of lifestyle modification among patients having hypertension treatment for less than 5 years than those living for more than 5 years with hypertension treatment. The reason of the difference could be due to the fact that those who have had hypertension for longer duration do not see the condition as life threating anymore (as they think that they adapted it normal) as compared to those with shorter duration who might follow strict lifestyle modification practices.

Patients without comorbidity were more likely to practice lifestyle modification in studies done in India and Ethiopia [11, 15]. Likewise, about 52% of the comorbid participants in our study were poorly adherent to practice lifestyle modifications, though the difference was not significant. This might be explained that the presence of comorbidities can worsen the conditions of the patientsand make them unable to adhere to practice lifestyle changes.

Various studies depicted an increased odd of adhering to lifestyle modification practices among married patients [16, 20]. Consistently, findings of our study indicated significantly good practice of lifestyle modification among married and female patients. The reason for the good practice of lifestyle modification in married couples could probably be due to the support they get from their spouse helping them to positively practice diet and exercise recommendations.

Findings from this study showed that participants who reported of being educated on the importance of lifestyle modifications were significantly associated with good practice of lifestyle modification.

V. Limitations of the Study

Lack of adequate studies in our country made comparison difficult for the lifestyle changes. The fact that the data was self-report from the participants, the results might be subjected to recall bias and there may be the denial of poor practices from the respondents, which affects the result of the study. Researchers have tried their top best to build a rapport with the patients to collect sincere data from the respondents. This was a quantitative study where a questionnaire was only used to collect information; therefore a qualitative study may be of value to explore the subject further. The study was conducted in the capital city only, hence generalizability of the results for the whole nation is difficult. Further nationwide study is recommended.

VI. Conclusion

This study revealed a relatively higher lifestyle modification practice among the hypertensive patients. Female gender, Duration of the hypertension diagnosis (< 5 years), Higher educational level, Married and being educated about lifestyle modifications were factors significantly associated with good lifestyle modification practice. In addition to their pharmacologic therapy, hypertensive patients should be given education, advice and support to achieve and maintain best outcomes of lifestyle modification practices to better control their blood pressure.

Declarations

Abbreviations

BP: Blood Pressure; SD: Standard deviation; COR: Crude odds ratio; AOD: Adjusted odds ratio; CI: Confidence interval; ACHS: Asmara College of Health Sciences; SPSS: Statistical Package for Social Sciences

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Availability of data and materials

The complete data set supporting the conclusions of this article is available from the corresponding author and can be accessed upon reasonable request.

Authors' contributions

All authors participated in all phases of the study including topic selection, design, data collection, data analysis and interpretation. Idris and Samuel contributed in critical revision of the manuscript. All the authors read and approved the manuscript.

Ethics approval and consent to participate

Ethical approval was obtained the "Research and Ethical Committee" of the School of Nursing, Asmara College of Health Sciences (ACHS). The purpose of the study was explained to the study participants at the time of data collection and informed consent was secured from each participant before the start of data collection. Confidentiality was ensured by excluding names or other personal identifiers in the data collection tool. The right of the participants to refuse participation or not to answer any of the questions was respected.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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