Factors influencing antihypertensive medication adherence among hypertensive patients: A cross-sectional study in two selected Eritrean hospitals

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Introduction

Objective: Hypertension is a major modifiable cause of cardiovascular and cerebrovascular disease affecting more than one billion individuals worldwide. Adherence to recommended antihypertensive medications is central to control hypertension. The purpose of this study was to assess medication adherence and its influencing factors among hypertensive patients in Halibet and Hazhaz Hospitals in Asmara, Eritrea.

Methods: Hospital-based cross-sectional study was conducted among 360 hypertensive patients in Halibet and Hazhaz Hospitals of Asmara from February through May 2018. A convenience sampling was used to select study participants. Data related to medication adherence were collected using a structured 8-item Morisky Medication Adherence Scale. Data were analyzed using SPSS version 22. A bivariate and multivariate analysis was done to determine independent predictors of medication adherence among hypertensive patients. Adjusted odds ratio (at 95% CI) and p value < 0.05 was used to assert the effect of the independent variables.

Results: Out of 360 patients enrolled in the study, two hundred forty nine (69.2%) had good medication adherence and the remaining 30.8% had poor adherence. The study found that Being female (AOR (95% CI): 1.8 (0.63, 4.85), p<0.05), having Monthly income ≥ 1000 nakfa (AOR (95% CI): 2.85 (0.76, 5.61), , p<0.05), having comorbid disease (AOR (95% CI): 2.7 (0.98, 4.23), p<0.05), family history of hypertension (AOR (95% CI): 2.12 (0.78, 5.76), p <0.05), longer duration of hypertension (AOR (95% CI): 1.32 (0.65, 4.89), p< 0.05), BP < 140/90 mmHg (AOR (95% CI): 2.4 (1.41, 8.73), P<0.05), and taking only one pill per day (AOR (95% CI): 2.7 (0.97, 6.84),P<0.05) were factors significantly influenced good medication adherence.

Conclusion: Medication adherence among hypertensive patients was relatively high in this study. Increasing adherence counseling and patient education about the disease and its treatment are important measures to scale-up adherence status of patients.

Background

Despite considerable improvements in the detection and management of high blood pressure, hypertension causes considerable morbidity and mortality worldwide, contributing to 57 million disability adjusted life years, and 7.5 million premature deaths annually [1,2]. It is a major modifiable cause of cardiovascular and cerebrovascular disease affecting more than one billion individuals worldwide [3]. The reasons for uncontrolled hypertension are multifactorial with a number of patient and provider contributory factors, non-adherence to treatment being the major factor [4,5]. Though many adults aware that hypertension could result in stroke and heart disease, non-adherence to their medication was found prevalent [2]. Adherence to recommended antihypertensive medications is central to adequately control hypertension resulting in reduced cardiovascular morbidity and mortality and lower healthcare costs [6]. Socio-economic factors, healthcare system-related factors, context-dependent factors, physician/treatment-related factors, and patient-related factors were found to influence medication adherence [7-9].

Studies conducted in Eritrea in this subject are scarce and very limited. One national survey conducted in 2006 reported that, the prevalence of hypertension among adults aged 15 to 64 years was 15.9 [10]. Another recent report on analysis of data from Health Information Management System (HIMS) highlighted an increasing burden of non-communicable diseases (NCDs) in Eritrea, with the incidence of hypertension doubling in a period of 6 years [11]. With the increasing burden of hypertension cases, medication non-adherence could lead to substantial worsening of disease, death and increased health care costs. This study was therefore aimed to assess patients' adherence level towards antihypertensive medication and the factors associated among diagnosed hypertensive patients in Asmara.

Methods

Study design

The study was hospital based cross-sectional quantitative study.

Study setting

The study was conducted at the hypertension and diabetes clinic of Hazhaz and Halibet Hospitals from February to May 2018. These two hospitals found in Asmara are the only hospitals providing follow up care for hypertensive patients.

Study population and sampling procedures

The target population were known hypertensive patients who were registered and taken antihypertensive medication for more than three months. There were 5860 registered hypertensive patients in Halibet and Hazhaz Hospital taking antihypertensive medication. Among these patients, 3410 were from Hazhaz Hospital and the remaining 2450 were from Halibet hospital. The study sample was calculated using Krejcie & Morgan formula and it was 360 [12]. The sample size for Halibet and Hazhaz hospitals were allocated as per proportion of the population of each hospital. Patients were approached during their follow up time using a convenience sampling method until the required sample size was reached. Pregnancy induced hypertension, health professionals under antihypertensive therapy and patients diagnosed of hypertension for less than three months were not included.

Variables

Dependent variable: Patients adherence to their antihypertensive medication 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).

Data collection tool

A well-reviewed, pretested and structured questionnaire which consisted of three sections was used to collect the data. The first section covered the socio-demographic data of the study participants. The second section was comprised of clinical and medication characteristics, and the third section addressed questions pertaining to medication adherence. Medication adherence was measured using the structured self-report 8-item Morisky Medication Adherence Scale (MMAS-8) [13-15]. This validated questionnaire was used to assess patient's adherence level towards antihypertensive medication. The MMAS-8 has been demonstrated to have good concurrent and predictive validity and might function as a screening tool in outpatient settings as has been widely used in various other studies to measure medication adherence [9,15]. Hence, MMAS-8 was used in this study for its validity, quick and easy to complete.

Ethical approval

Approval of the study was obtained from "Research and Ethical Committee" of the Ministry of Health. Each study participant was 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 fully respected.

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. After ensuring that the questionnaire was consistent, clear in language and comprehendible, data was collected by the researchers using face to face interview method.

Data analysis

Data analysis was performed using SPSS (Statistical Package for Social Sciences) version 22. Descriptive statistics of the demographic and other clinical variable were described using frequencies and percentages. As illustrated in Table 3, MMAS-8 questionnaire contains eight questions with the seven questions having "Yes" or "No" responses, and for each positive answer

the score was 1 and for negative answer the score was 0. The eighth question had three responses: 'none of the day', 'Sometimes' and 'Often'. The response 'none of the day' was considered as positive response and scored as "1", and 'Sometimes' or 'Often' responses were considered as negative responses and scored "0". Hence, the scores range from 0 to 8. A score less than 6 has been shown to be associated with poor antihypertensive medication adherence [14]. Hence, medication adherence was classified as a 'Good Adherent' for those who scored 6 and above from the 8 questions. Whereas those who scored five and below were categorized as 'Poorly Adherent'. Bivariate analysis was done to find out the strength of the associations of each independent variable with the rate of medication adherence. 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.

Results

Socio-demographic characteristics

A total of 360 patients participated in the study. The age of the respondents ranged from 20 to 85 years old, with a mean age of 62.90 years (SD =11.963). The majority of (49.2%) of the subjects were 52-68 years old. More than half (54.4%) of the respondents were females. Two hundred eighty five (79.2%) were married and 57.5% of the respondents had monthly income below thousand nakfa. Illiterate and unemployed respondents accounted for 35.6% and 78.3% of the participants respectively. Medication adherence was reported higher among respondents who were females (70.4%), having ≥ 1000 nakfa monthly income (73.2%), Muslims (76.5%), unemployed (70.9%) and reached secondary school (74.5%) (Table 1).

Table 1: Socio-demographic characteristics and medication adherence rate, Asmara, Eritrea, 2018 (N=360).

Variables		Frequency (%)	Medication Adherence	
			Good N (%)	Poor N (%)
Age in years (Mean±SD: 62.90±11.963))				
	18-34	6(1.7)	4 (66.7)	2 (33.3)
	35-51	54 (15)	39 (72.2)	15 (27.8)
	52-68	177 (49.2)	120 (67.8)	57 (32.2)
	69-85	123 (34.1)	86 (69.9)	37 (30.1)
Sex				
	Male	164 (45.6)	111 (67.7)	53 (32.3)
	Female	196 (54.4)	138 (70.4)	58 (29.4)
Marital status				
	Married	285 (79.2)	199 (69.8)	86 (30.2)
	Single	75 (20.8)	50 (66.7)	25 (33.3)
Monthly income in nakfa				
	< 1000	207 (57.5)	137 (66.2)	70 (33.8)
	≥ 1000	153 (42.5)	112 (73.2)	41 (26.8)
Religion				
	Christian	326 (90.5)	223 (68.4)	103 (31.6)
	Muslims	34 (9.5)	26 (76.5)	8(23.5)
Employment status				
	Unemployed	282 (78.3)	200 (70.9)	82 (29.1)
	Employed	78 (21.7)	49 (62.8)	29 (31.2)
Educational status				
	Illiterate	128 (35.6)	85 (66.4)	43 (33.6)
	Primary	95 (26.4)	64 (67.4)	31 (32.6)
	Secondary	106 (29.4)	79 (74.5)	27 (25.5)
	Tertiary	31 (8.6)	21 (67.7)	10 (32.3)

Medication and clinical variables

One-fifth (19.2%) of the respondents had history of hospitalization due to hypertension and 42.5% had comorbid disease. Majority of the respondents (56%) had blood pressure reading <140/90. Eighty-nine (24.7%) of the study subjects had taken the medication for more than ten years. More than a third (35.6%) had family history of hypertension. Good adherence was reported higher among patients whose blood pressure was <140/90 (78.7%), had more than ten years hypertension treatment (73%), had comorbid disease (85.1%), had family history (67.2%), and taking only one pill per day (71.6%) (Table 2).

Table 2: Medication and clinical variables in relation to medication adherence, Asmara, Eritrea, 2018 (N=360).

Variables		Frequency (%)	Medication Adherence	
			Good N (%)	Poor N (%)
Hospitalization history				
	Yes	69 (19.2)	48 (69.6)	21 (30.4)
	No	291 (80.8)	201 (69.1)	90 (30.9)
Blood pressure				
	<140/90	202 (56)	159 (78.7)	43 (21.3)
	>=140/90	158 (44)	90 (56.9)	68 (43.3)
Having comorbid disease				
	Yes	207 (57.5)	176 (85.1)	31 (14.9)
	No	153 (42.5)	113 (73.9)	40 (26.1)
Duration of hypertension treatment (Mean±SD: 5.2±2.3)				
	< 1 year	30 (8.3)	21 (70)	9 (30)
	2-4 years	92 (25.6)	61 (66.3)	31 (33.3)
	5-7 years	70 (19.4)	45 (64.3)	25 (35.7)
	8-10 years	79 (21.9)	57 (72.2)	22 (27.8)
	> 10 years	89 (24.7)	65 (73)	24 (27)
Dosage frequency per day				
	Once	140 (38.9)	100 (71.4)	40 (28.6)
	≥ 2 times	220 (61.1)	149 (67.7)	71 (32.3)
Number of pills per day				
	One pill	109 (30.3)	78 (71.6)	31 (28.4)
	≥ Two pills	251 (69.7)	171 (68.1)	80 (31.9)
Family history of hypertension				
	yes	128 (35.6)	86 (67.2)	42 (32.8)
	No	232 (64.4)	80 (34.5)	152 (65.5)

Medication adherence level

Two hundred forty nine (69.2%) of the respondent had good medication adherence and the remaining 30.8% had poor adherence (Figure 1).

Medication adherence using MMAS-8 questionnaire

As per the MMAS, more than a third (38.1%) of the participants were forgetting to take medicines, forty-five (12.5%) were stopping medication on feeling worse, fifty-four (15%) were stopping to take medication when they perceive their blood pressure was under control, and 18.3% were forgetting to take their medication while travelling or leaving home (See Table 3).
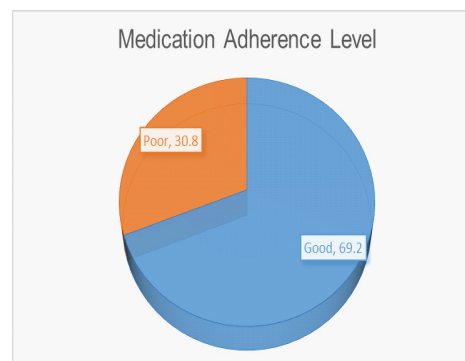

Figure 1: Medication Adherence Level, Asmara, Eritrea, 2018, (N=360).

Table 3: Medication adherence using MMAS-8 validated questionnaire, Asmara, Eritrea, 2018 (N=360).

Variable		Frequency	Percentage
Did you take your high blood pressure medicine yesterday?			
	Yes	295	81.9
	No	65	18.1
Over the past 2 weeks, were there any days when you did not take your medication?			
	Yes	93	25.8
	No	267	74.2
When you travel or leave home, do you sometimes forget to bring along your medication?			
	Yes	66	18.3
	No	294	81.7
Do you sometimes forget to take your high blood pressure pills?			
	Yes	137	38.1
	No	223	61.9
When you perceive your blood pressure is under control, do you stop taking your medicine?			
	Yes	54	15
	No	306	85
Have you ever stopped taking your medication without telling your doctor because you felt worse?			
	Yes	45	12.5
	No	315	87.5
Do you ever feel hassled about sticking to your blood pressure treatment plan?			
	Yes	63	17.5
	No	297	82.5
*How often do you have difficulty remembering to take all your blood pressure medication?			
None of the day	210	58.3
Sometimes	145	40.3
Often	5	1.4

Table 4: Medication Adherence using MMAS-8 Validated questionnaire, Asmara, Eritrea, 2018 (N=360).

Characteristics	Good adherence n (%)	COR (95% CI)	AOR (95% CI)
Female sex	138 (70.4)	2.02 (0.75, 6.03)**	1.8 (0.63, 4.85)**
Age < 51 years	43 (71.7)	1.2 (0.65, 3.23)	
Monthly income ≥ 1000 nakfa	112 (73.2)	3.4 (0.98, 6.73)***	2.85 (0.76, 5.61)**
Being employed	42 (62.8)	1.12 (0.23, 3.52)	
Married	199 (69.8)	1.06 (0.22, 5.65)	
Christian religion	223 (68.4)	0.83 (0.45, 3.12)	
Secondary and above education	100 (73)	2.4 (0.86, 5.29)**	2.02 (0.69, 4.28)
Having comorbid disease	176 (85.1)	2.92 (1.12, 5.67)***	2.7 (0.98, 4.23)**
Hospitalization history	48 (69.6)	0.98 (0.33, 2.51)	
Duration of hypertension (> 8 years)	122 (72.6)	1.83 (0.92, 4.89)**	1.32 (0.65, 4.89)**
Family history of hypertension	86 (67.2)	2.85 (0.42, 6.43)**	2.12 (0.78, 5.76)**
BP < 140/90 mmHg	159 (78.7)	2.72 (1.63, 9.25)***	2.4 (1.41, 8.73)**
Taking one pill/day	78 (71.6)	3.89 (0.31, 7.23)***	2.7 (0.97, 6.84)**

**, ***: P- value < 0.05, P-value < 0.001; BP: Blood Pressure, COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CI: Confidence Interval.

Discussion

Medication adherence is an important tool that can increase treatment effectiveness, however literature has shown that the rate of adherence in chronic disease like hypertension is very low and thus it is the main problem in the management of diseases which require long-term treatment like hypertensions. Poor adherence to medication and lifestyle modification are the main reasons for uncontrolled hypertension, serious complications and wastage of health care resources.

Generally, medication adherence varies from 20 to 80 percent in hypertensive patients [16]. In this study, the adherence rate of the respondents to their medication was 69.2%. It is higher than studies conducted in Ethiopia (64.6%) [17], Malaysia (53.4%) [18], and Iran 43.6%) [9]. However it is lower than the medication adherence rate reported in Sunderland (79%) [19]. Among the study subjects, female had significantly good adherence rate to medication than males. This finding was in line with the study Ethiopia showing that men were found to be less adherent when compared to women. Comparing the age groups, no significant difference of adherence was observed. Contrastingly, some studies showed that majority of the younger age group had high adherence rate [19]. Another important socio-demographic factor was the monthly income of the participants i.e. the higher the monthly income, the higher was the adherence rate. Socio-economic status was one of the factors affecting medication adherence in study done in rural Iran [9]. Medication adherence was significantly associated with increase in duration of hypertension treatment. Particularly, patients who had an experience of hypertension therapy

for more than ten years had the highest rate of medication adherence. Consistent to our findings, similar studies confirmed that prolonged history of hypertension was effective in medication adherence [9,20]. Better medication adherence among those with long history of hypertension might be due to high awareness and experience about the disease. Good medication adherence among experienced hypertensive patients can also be due to proper relationship between the physician and the patient, and high confidence in the doctor's advice [8]. Findings of our study also reported a significantly higher adherence rate among patients having comorbid disease. Similarly, concurrency of hypertension with other diseases showed a significant negative correlation with their medication adherence in studies conducted elsewhere [9,21,22]. The reason might be due to the fact that, patients with more than one disease are dually managed by health care providers. The dual efforts can potentially improve their medication adherence.

Those patients who were taking one pill per day were 2.7 times more likely to have good adherence than those who were taking more pills. As reported in previous studies, medication adherence was negatively associated with the number of tablets the patients' were taking [9,20]. Several studies indicated that, patients who were not able to control their blood pressure were the most non-adherent to their medication regimen [17,21,23]. Results of our study also showed that, those with BP < 140/90 were observed to be more adherent to their medication. The result could be discussed in the other way round i.e. patients' who were adherent to their medication might have controlled their BP well. The study also revealed that, those who were unemployed, Muslims and reached secondary educational level had good adherence rate. Though there were difference between adherence rate of the age, religion, marital status, and some other clinical characteristics of the respondents, there was no any statically signification association with adherence rate. The study had some limitations. First: The participants knew that the researchers were healthcare providers, so the results could be affected. Second: The results might be subjected to recall bias and there may be the denial of poor practices from the respondents, which affects the results of the study. To fill the gaps, researchers have tried their top best to build a rapport with the patients to collect sincere data from the respondents. This study didn't addressed the main barriers of adherence, therefore further study may be of value to explore the gap further. Since the study was conducted in Asmara only, it was difficult to extrapolate the results to that of the country.

Conclusion

The study participants had relatively good medication adherence. Those patients who were females, having family history of hypertension, better economic status, longer duration of hypertension, comorbid diseases, controlled blood pressure, and taking only one pill per day had significantly higher adherence level. Increasing adherence counseling and patient education about the disease and its treatment are important measures to scale-up adherence status of patients.

Declarations

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