IJPSR (2013), Vol. 4, Issue 3 (Research Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 22 November, 2012; received in revised form, 25 December, 2012; accepted, 23 February, 2013

ASSESSMENTS OF ADHERENCE TO HYPERTENSION MANAGEMENTS AND ITS INFLUENCING FACTORS AMONG HYPERTENSIVE PATIENTS ATTENDING BLACK LION HOSPITAL CHRONIC FOLLOW UP UNIT, ADDIS ABABA, ETHIOPIA-A CROSS-SECTIONAL STUDY

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Keywords:
Hypertension, lifestyle changes, adherence status, Diet management, Medication management

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ABSTRACT:

Background: In Ethiopia 10.6% and Addis Ababa, 30% of the population has been estimated to have hypertension. Adherence to medication therapy and lifestyle change is an aspect of patients' care that is often overlooked and should be evaluated as a crucial part of cardiovascular management.

Objective: The aim is to assess adherence and influencing factors of adherence to hypertensive management among hypertensive patients in Black Lion Hospital chronic follow up unit, Ethiopia.

Methods: A cross-sectional study was conducted. Systematic sampling technique was used to select 286 study subjects. A structured standard interviewer administered questionnaire was used after some modifications. Analysis was done using SPSS 16. P-value <0.05 was considered significant association. Scoring method was used to classify patients' level of adherence.

Results: Of 286 subjects included in the study 165(57.7%) were female and mean age was 52±13 year. The adherence level of respondents to medication, diet and exercise were 69.2%, 64.7%, and 43.7% respectively. The medication and diet related adherence were found to be better in patients who had been informed about their medicine. There was significant association between marital status, work status, Health care facilities, duration of Hypertension and its treatment and medication adherence.

Conclusion: The rates of adherence to medication and life-style changes were generally found to be low in these study participants.

INTRODUCTION: Hypertension is an overwhelming global challenge with high morbidity and mortality rate. Analysis of the global burden of hypertension revealed that over 25% of the world's adult population had hypertension in 2000, and the proportion is expected to increase to 29% by 2025.

The prevention and control of high blood pressure has not received due attention in many developing countries. Adherence to therapies is a primary determinant of treatment success. Poor adherence attenuates optimum clinical benefits and therefore reduces the overall effectiveness of health systems [1, 2, 4].

Despite its importance, adherence to medication therapy is an aspect of patients' care that is often overlooked and should be reevaluated as a crucial part of cardiovascular management. Although reliable, large-scale, population-based data on high blood pressure in SSA are limited, recent studies provide important and worrisome findings in both epidemiology and clinical outcomes. Although overall hypertension prevalence is between 10%-15%, prevalence rates as high as 30%-32% have been reported in middle-income countries. Importantly, hypertension awareness, treatment, and control rates as low as 20%, 10%, and 1%, respectively have also been found. Rapid urbanization and transition from agrarian life to the wage-earning economy of city life continue to fuel increases in average blood pressure levels and prevalence of HTN [2, 3].

The epidemiology of high blood pressure among adults in AA (Addis Ababa) was studied. About 20% of males and 38% of females were overweight, with 10.8 % of the females being obese. Similarly, 17% of the males and 31% of the females were classified as having low level of total physical activity. Reported use of anti-hypertensive medication, was 31.5% among males and 28.9% among females. High blood pressure is widely prevalent in AA and may represent a silent epidemic in this population.

In Africa, 15% of the population has hypertension. Although there is shortage of extensive data, 6% of the Ethiopian population has been estimated to have HTN. Approximately 30% of adults in Addis Ababa have hypertension above 140/90mmHg or reported use of anti-hypertensive medication This indicates an urgent need for strategies and programmes to prevent and control high blood pressure, and promote healthy lifestyle behaviors primarily among the urban populations of Ethiopia [1, 4].

A WHO report estimates that adherence to antihypertensive medications ranges from 52% to 74% when adherence is defined as possession of a medication at least 80% of the time. It also identified non adherence to medical treatment as a major public health concern, especially in patients with chronic conditions, e.g. hypertension. It is now evident from WHO data that coronary heart disease and cerebrovascular disease are increasing so rapidly that they will rank No. 1 and No. 5 respectively as causes of global burden by the year 2020. In Africa only 5-10% have a blood pressure control of hypertension of <140/90 mm Hg [5, 6].

The number of adults with hypertension in 2025 was predicted to increase by about 60% to a total of 1.56 billion. According to the WHO, more than 80% of deaths from hypertension and associated cardiovascular diseases now occur in low and middle-income countries and this is particularly common among people of low socio-economic status [7, 8]. In spite of many advances made in adherence research, non-adherence rates have remained nearly unchanged in the last decades. Poor adherence is associated with bad outcome of the disease and wastage of healthcare resources [1, 9].

The objective of this study was to assess adherence and associated factors of adherence to hypertension managements (medication and lifestyle changes) among hypertensive patients attending Black Lion Hospital chronic follow up unit, Addis Ababa, Ethiopia 2012.

METHODS AND MATERIALS: The study was conducted in BLH (Black Lion Hospital) chronic follow up unit in Addis Ababa, Ethiopia. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), Addis Ababa city has a total population of 3,384,569. It lies at an altitude of 7,546 feet (2,300 meters). The City has surface area of about 530.14 km^2. Languages spoken include Amharic (71.0%), Oromiffa (10.7%), Gurage (8.37%), Tigrigna (3.60%), Silt'e (1.82%) and Gamo (1.03%). The area was selected because it is central referral hospital that provides organized hypertension follows up care. The study period was from September 2011 to May 2012.

A cross-sectional study design was conducted in BLH chronic follow up unit. Source population was all hypertensive patients during the study period. Study subjects were all HTN patients who fulfilled the inclusion criteria and selected by systematic random sampling. A single population proportion formula was used to estimate the total sample size and 286 was included. Every other two patients were interviewed when they come for follow up at the chronic care clinic using systematic random sampling technique from the

registration list of patients. A structured standard interviewer administered questionnaire was used after some modifications. The questionnaire was initially prepared in English and then translated in to Amharic version. The Amharic version was again translated back to English to check for consistency of meaning. During data collection supervision was carried out and daily checking of the collected data was made by principal investigator.

The Independent Variables Socio demographic variables: Age, sex, income, educational level, marital status and work status.Clinical Status: Duration of hypertension (Dx and Rx), Co-morbidity, Number of pills, BMI and Blood pressure Behavioral variables: perceived susceptibility (risk), Perceived severity, perceived threat, Perceived benefits, perceived barriers and cues to action. Structural Variables: Knowledge of disease. Dependent Variables: Adherence to medication and lifestyle changes

To assure data quality, data collectors were recruited; training and orientation were given to data collectors and supervisor. About 5% of the data were verified by the principal investigator during the initial stage of data collection and appropriate instruction was given to the data collectors and supervisor. Supervisor and principal investigator were closely followed the data collection process at the spot. Data were entered to Epi-info version 3.5.1 and analyzed by using SPSS 16.0 software. Ethical approval was received from Addis Ababa University (AAU), college of health sciences department of nursing research committee for this study prior to enrollment.

Permission was asked from the responsible body of the unit. Each study participants was adequately informed about the purpose, methods, and anticipated benefits of the study by the data collectors. Questionnaires were filled only by volunteer respondents who were available at the time of data collection without writing their name which ensure confidentiality during the data collection. Rudd (2000) suggests adherence is the willingness and ability of the individual to follow the clinical prescription. Medicine related adherence: to receive all the prescribed medications regularly in the last month. Diet-related adherence: to consume a low-fat and low-sodium diet and increase vegetables and fruits; exercise-related adherence: to exercise 30 minutes/ days at least three times a week; Substance-related adherence: not to smoke (either never smoked or stopped smoking), decrease coffee taking and stop alcohol. The adherence score for each item was obtained by calculating the mean [10]. A cut-off point was set at 3 and the respondents were categorized in to adherence and non adherence groups, the respondents with a score of 3 and above were considered as adherent and a score of below 3 were considered as non-adherent.

RESULT:

Socio-demographic Characteristics of the Study Subjects: A total of 286 eligible clients were seen in the chronic follow up unit during the study period, with the response rate of 100%. The study consisted of 165(57.7%) females. The mean age of the respondents was 52±13.03years. About 100(39.2%) respondents were Amhara by ethnicity. Majority of the respondents 177(61.9%) were orthodox by religion and 195(68.2%) were married. Out of the respondents 99(34.6%) attended tertiary school educational level and 103(36.0%) respondents were governmental employed. Eighty three (29%) of respondents have income ≥3000 Ethiopian Birr (ETB) and 57(19.9%) did not have regular income and live with support from others **(Table 1).**

TABLE 1: SOCIO DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS ON TREATMENT IN BLH CHRONIC FOLLOW UP UNIT, ADDIS ABABA, ETHIOPIA 2012 (N=286)

	Variables	Number	%
Age in years	20-39years	51	17.8
	40-59years	144	50.4
	≥60 years	91	31.8
	Total	**286**	**100**
Sex	Male	121	42.3
	Female	165	57.7
	Total	**286**	**100**
Ethnic group:	Amhara	100	35.0
	Oromo	70	24.5
	Gurage	49	17.1
	Tigire	38	13.3
	Others*	29	10.1
	Total	**286**	**100**
Marital status	Single	30	10.5
	Married	195	68.2
	Widowed	32	11.2
	Divorced	29	10.1
	Total	**286**	**100**

Religious	Orthodox	177	61.9
	Catholic	17	5.9
	Muslim	49	17.1
	Protestant	43	15.1
	Total	**286**	**100**
Educational level	Illiterate	56	19.6
	Primary school	47	16.4
	Secondary school	84	29.4
	Tertiary school	**99**	**34.6**
	Total	**286**	**100**
Live with	I live alone	34	11.9
	I live with husband/wife	193	67.5
	I live with other families*	59	20.6
	Total	**286**	**100**
Work status	Governmental employee	103	36.1
	Private business	69	24.1
	House wife	49	17.1
	Non-employed	59	20.6
	Retired	6	2.1
	Total	**286**	**100**
Monthly income	No regular income	57	19.9
	<999birr	30	10.5
	1000-1999birr	44	15.4
	2000-2999birr	72	25.2
	≥3000birr	83	29.0
	Total	**286**	**100**

Others*=Gamo,Silte, Adiya, Sumale Other families*=children and parents

Information on Hypertension and Patients' Condition: Of the respondents 80(28%) had blood pressure ≥160/100mmHg .Concerning health status, more than half of the respondents 158(55.2%) considered their health status as fair. Majority of the respondents 180(62.9%) gone to governmental hospital to receive health care service most of the time and 186(65%) were hypertensive for five or more years and 178(62.2%) were on hypertensive treatment for the same period. Near to two third of respondents 196(68.5%) were on one to two antihypertensive medications. Of the respondents 124(43.4%) never read written information about their medications and 235(82.2%) study subjects were understood very well the information provided by health care givers about their medication **(Table 2).**

Respondents BMI, 120(42%), 115(40.2%) and 51(17.8%) were normal, overweight and obese respectively. Those respondents 75(26.2%) denied of co-morbidity, 63(22%) had renal disorder, 61(21.3%) had DM, 15(5.5%) had cancer, 15(5.5%) had high cholesterol, 2(0.7%) had history of stroke, 22(7.7%) had more than one co-morbidities and 33(11.5%) had other co-morbidities.

TABLE 2: INFORMATION ON HYPERTENSION AND PATIENT CONDITIONS IN BLH CHRONIC FOLLOW UP UNIT , ADDIS ABABA, ETHIOPIA 2012 (N=286).

Items		Number	%
BP	≤139/89	112	39.2
	140/90-159/99	94	32.8
	≥160/100	80	28.0
	Total	**286**	**100**
Your health Status	Excellent	61	21.3
	Good	24	8.4
	Fair	158	55.2
	Poor	43	15.4
	Total	**286**	**100**
Health care	Private Hospital	18	6.3
	Governmental Hospital	180	62.9
	Health center	39	13.6
	Private clinic	30	10.5
	More than one	19	6.6
	Total	**286**	**100**
Duration of HTN	Less than two years	31	10.8
	Two to four years	69	24.1
	Five or more years	186	65.0
	Total	**286**	**100**
Duration of HTN Rx	Less than two years	64	22.4
	Two to four years	44	15.4
	Five or more years	178	62.2
	Total	**286**	**100**
Different medications do you currently take	**One to two**	**196**	**68.5**
	Three to five	72	25.2
	More than five	18	6.3
	Total	**286**	**100**
Read written information about your prescription medicines	Not at all	124	43.4
	Sometimes	105	36.7
	Often	57	19.9
	Total	**286**	**100**
Understand the information provided about your medicine	Somewhat	51	17.8
	Very well	235	82.2
	Total	**286**	**100**

Adherence Status:

1. **Medication Adherence:** From the total study participants 198(69.2%) were adherent to

medication regimen where as rest were not. After controlling possible confounding effects of other covariates marital status, work status, health care facility, duration of diagnosis and treatment and cues to action were found to be significantly associated with medication adherence. Married respondents were 2 times more likely to adhere to anti-hypertensive medication compared to divorced [AOR=2.00, 95%CI: 1.330-6.744, P=0.008]. Respondents who had private business were 72% less likely to adhere to medication management compared to governmental employed [AOR=0.28, 95% CI: 0.130-0.606, P=0.001]. Respondents who attended most of the time private clinic to receive health care were 6 times more likely to adhere to medication than who attended more than one health care facilities[AOR=6.34,95%CI: 1.173-33.962, p=0.032]. Respondents with the duration of diagnosis of five or more years were 89% less likely to adhere to treatment when compared to with diagnosis of hypertension less than two years [AOR=0.11, 95% CI: 0.013-0.955, P=0.045]. Those with treatment duration between two to four years were 4 times more likely to adhere to treatment compared to < 2years [AOR=3.81, 95% CI: 1.264-11.510, P=0.018]. Motivated respondents were 3 times more likely to adhere to the medication compared to those not motivated [AOR=2.84, 95% CI 1.470-5.435, P=0.002] **(Table 3)**

TABLE 3: ASSOCIATION OF MEDICATION ADHERENCE BY SELECTED CHARACTERISTICS, AMONG HYPERTENSIVE PATIENTS IN BLH CHRONIC FOLLOW UP UNIT, AA, ETHIOPIA 2012

Variables	Medication adherence		COR(95%CI)	AOR (95%CI)
	Adherent N (%)	Non-adherent N (%)		
Marital status				
Single	18(6.3)	12(4.2)	1.61(.573,4.509)	1.49(.520, 4.262)
Married	145(50.7)	50(17.6)	**3.11(1.402, 6.888)***	**2.00(1.330, 6.744)****
Widowed	21(7.3)	11(3.8)	2.05(.730,5.734)	2.303(.804, 6.594)
Divorced	14(4.9)	15(5.2)	1.00	1.00
Total	**198(69.2)**	**88(30.8)**		
Current work				
Non-employed	47(16.4)	12(4.3)	1.06(.483, 2.344)	1.08(.449-2.582)
House wife	35(12.3)	14(4.9)	0.68(.312, 1.479)	0.75(.328-1.730)
Private business	32(11.2)	37(12.9)	**0.23(.118, 0.459)***	**0.28(.130, .606)****
Retired	3(1.0)	3(1.0)	0.27(.051, 1.440)	0.28(.049,1.643)
Governmental emp.	81(28.3)	22(7.7)	1.00	1.00
Total	**198(69.2)**	**88(30.8)**		
Read written				
Often	46(16.1)	11(3.9)	**2.12(1.039, 4.320)***	1.30(.562, 3.006)
Not at all/ Sometimes	152(53.1)	77(26.9)	1.00	1.00
Total	**198(69.2)**	**88(30.8)**		
Understand information				
Very well	169(59.1)	66(23.1)	**1.94(1.042, 3.622)***	1.71(.855, 3.414)
Not at all/Somewhat	29(10.1)	22(7.7)	1.00	1.00
Total	**198(69.2)**	**88(30.8)**		
Health care				
Private Hospital	9(3.1)	9(3.1)	1.11(.306, 4.037)	0.96(.224, .095)
Gov. Hospital	131(45.9)	49(17.3)	**2.97(1.139, 7.746)***	1.44(.469, .406)
Health center	22(7.7)	17(5.9)	1.44(.478, 4.323)	1.01(.282, .616)
Private clinic	27(9.4)	3(1.0)	**10.00(2.243,44.574)***	**6.31(1.173,33.962)****
More than one	9(3.1)	10(3.5)	1.00	1.00
Total	**198(69.2)**	**88(30.8)**		
Duration of Diagnosis				
<2 years	17(5.9)	14(4.9)	1.00	1.00
2 to 4 years	39(13.6)	30(10.5)	1.07(.456, 2.511)	0.96(.313, 2.953)
5 / more years	142(49.7)	44(15.4)	**2.66(1.213, 5.821)***	**0.11(.013, .955)****
Total	**198(69.2)**	**88(30.8)**		

Duration of Rx				
<2 years	32(11.2)	32(11.2)	1.00	1.00
2 to 4 years	33(11.5)	11(3.8)	**3.00(1.295, 6.950)***	**3.81(1.264, 1.510)****
5 / more years	133(46.5)	45(15.8)	**2.96(1.630, 5.360)***	0.33(.033, 3.357)
Total	**198(69.2)**	**88(30.8)**		
Cues to action				
Not motivated	93(32.5)	57(19.9)	1.00	1.00
Motivated	105(36.7)	31(10.9)	**2.08(1.236, 3.488)***	**2.84(1.470, 5.499)****
Total	**198(69.2)**	**88(30.8)**		

(*COR, Statistically significant but lost in AOR) and (**AOR= statistically significant), p<0.05.

2. Diet Adherence: Among all respondents 185(64.7%) were adherent to diet recommendations and the rest were not. After controlling possible confounding effects of other covariates, marital status, understanding information, health status, co-morbidity and perception of severity were found to be significantly associated with diet adherence. Respondents in widowed situations were 5 times more likely to adhere to diet compared to divorced (AOR=5.28, 95% CI: 1.255-22.245, P=.023). Those respondents who very well understood information given by their care givers were 4 times more likely to adhere to their diet management when compared to their counter parts (AOR=4.17,95% CI:1.862-9.340,P=.001).

Those respondents who considered their health status as good were 7times (AOR=7.37, 95% CI: 1.829-29.661, P=.005) and as fair health status were 3 times (AOR=3.43, 95%CI: 1.396-8.448, p=.007) more likely to adhere to their diet than those with poor health status. Respondents with none co-morbidity were 3 times (AOR=3.36, 95% CI: 1.161-9.746, P=0.025) and diabetes were 6 times (AOR=6.02 95% CI: 1.987-18.223, P=0.002) more likely to adhere to diet management than with other disease conditions **(Table 4).**

TABLE 4 ASSOCIATION OF DIET ADHERENCE BY SELECTED CHARACTERISTICS, AMONG HYPERTENSIVE PATIENTS IN BLH CHRONIC FOLLOW UP UNIT, AA, ETHIOPIA 2012

Variables	Diet adherence		COR (95%CI)	AOR (95%CI)
	Adherent N (%)	Non-adherent N (%)		
Marital status				
Single	19(6.6)	11(3.8)	2.826(.984, 8.121)	1.39(.376, 5.112)
Married	130(45.6)	65(22.8)	**3.27(1.460, 7.335)***	1.61(.569, 4.563)
Widowed	25(8.7)	7(2.4)	**5.84(1.898, 7.997)***	**5.28(1.255, 22.245)****
Divorced	11(3.8)	18(6.3)	1.00	1.00
Total	**185(64.7)**	**101(35.3)**		
Current work				
Non-employed	34(11.9)	25(8.7)	**0.48(.245, .952)***	0.34(.099, 1.174)
House wife	36(12.6)	13(4.5)	0.98(.455, 2.128)	0.90(.296, 2.743)
Private business	37(12.9)	32(11.2)	**0.41(.215, .783)***	0.64(.296, 1.380)
Retired	2(.7)	4(1.4)	0.18(.031, 1.026)	0.18(.019, 1.626)
Governmental	76(26.6)	27(9.4)	1.00	1.00
Total	**185(64.7)**	**101(35.3)**		
Income				
No regular income	36(12.6)	21(7.4)	0.87(.431, 1.766)	2.50(.722, 8.625)
< 999ETB	11(3.8)	19(6.6)	**0.30(.123, .704)***	0.73(.204, 2.596)
1000-1999ETB	30(10.5)	14(4.9)	1.09(.500, 2.381)	1.06(.365, 3.061)
2000-2999ETB	53(18.5)	19(6.6)	1.42(.709, 2.843)	1.33(.605, 2.935)
≥3000ETB	55(19.3)	28(9.8)	1.00	1.00
Total	**185(64.7)**	**101(35.3)**		
Understand information				
Very well	164(57.4)	71(24.8)	**3.30(1.769, 6.154)***	**4.17(1.862, 9.340)****
Somewhat	21(7.3)	30(10.5)	1.00	1.00
Total	**185(64.7)**	**101(35.3)**		

Health Status				
Excellent	36(12.6)	25(8.7)	**2.69(1.198, 6.033)***	2.58(.953, 6.986)
Good	19(6.6)	5(1.7)	**7.09(2.206, 2.805)***	**7.37(1.829, 29.661)****
Fair	115(40.3)	43(15.1)	**4.99(2.434, 0.239)***	**3.43(1.396, 8.448)****
Poor	15(5.2)	28(9.8)	1.00	1.00
Total	**185(64.7)**	**101(35.3)**		
Co-morbidity				
None	57(19.9)	18(6.3)	**3.37(1.418, 7.985)***	**3.36(1.161, 9.746)****
History of Stroke	1(.3)	1(.3)	1.06(.061, 18.454)	0.39(.015, 10.171)
Diabetes	47(16.5)	14(4.9)	**3.57(1.440, 8.833)***	**6.02(1.987, 18.223)****
Cancer	10(3.5)	5(1.7)	2.13(.595, 7.5830)	2.71(.589, 12.495)
High Cholesterol	10(3.5)	5(1.7)	2.13(.595, 7.583)	2.04(.422, 9.847)
Renal Disorders	30(10.5)	33(11.6)	0.97(.416, 2.244)	1.52(.546, 4.225)
More than one	14(4.9)	8(2.8)	1.86(.616, 5.613)	1.60(.426, 6.018)
Other	16(5.6)	17(5.9)	1.00	1.00
Total	**185(64.7)**	**101(35.3)**		
Perception of severity				
High	141(49.3)	53(18.5)	**2.90(1.731, 4.866)***	**2.48(1.323, 4.639)****
Low	44(15.4)	48(16.8)	1.00	1.00
Total	**185(64.7)**	**101(35.3)**		

(*COR, Statistically significant but lost in AOR) and (**AOR= statistically significant), p<0.05.

3. **Exercise Adherence:** Majority of the study participant 161(56.3%) were non-adherent to recommended physical exercise. After controlling possible confounding effects of other covariates, number of pills, read written information and co-morbidity were found to be significantly associated with exercise adherence. Respondents with cancer were negatively associated. Respondents who often read written information about their medication were significantly three times more likely to adhere to exercise recommendation compared to not read at all (AOR=2.50, 95% CI 1.166-5.354, P=0.018) **(Table 5).**

TABLE 5 ASSOCIATION OF EXERCISE ADHERENCE BY SELECTED CHARACTERISTICS, AMONG HYPERTENSIVE PATIENTS IN BLH CHRONIC FOLLOW UP UNIT, AA, ETHIOPIA 2012

Variables	Exercise adherence		COR (95%CI)	AOR (95%CI)
	Adherent: N (%)	Non-adherent N (%)		
Age				
20-39years	20(7)	31(10.8)	1.19(.586, 2.414)	0.69(.296, 1.605)
40-59years	73(25.5)	71(24.8)	**1.90(1.104, 3.254)***	1.30(.671, 2.516)
≥60 years	32(11.2)	59(20.7)	1.00	1.00
Total	**125(43.7)**	**161(56.3)**		
Income				
No regular income	23(8)	34(11.9)	0.84(.425, 1.660)	1.46(.625, 3.389)
< 999ETB	7(2.4)	23(8)	**0.38(.146, 0.979)***	0.54(.187, 1.538)
1000-1999ETB	13(4.5)	31(10.8)	0.52(.239, 1.136)	0.69(.290, 1.660)
2000-2999ETB	45(15.7)	27(9.4)	**2.07(1.088, 3.946)***	1.99(.979, 4.037)
≥ 3000ETB	37(12.9)	46(16.1)	1.00	1.00
Total	**125(43.7)**	**161(56.3)**		
Number of pills				
One to two	100(35)	96(33.6)	**3.65(1.159, 11.468)***	2.64(.769, 9.089)
Three to five	21(7.3)	51(17.8)	1.44(.425, 4.891)	1.34(.359, 5.019)
More than five	4(1.4)	14(4.9)	1.00	1.00
Total	**125(43.7)**	**161(56.3)**		
Co -morbidity				
Diabetes	32(11.2)	29(10.1)	0.97(.491, 1.900)	0.96(.446-2.057)
History of Stroke	2(.7)	0(.0)	0.00(0.00, -)	0.00(0.00,-)
Cancer	2(.7)	13(4.5)	**0.14(.028, 0.638)***	**0.16(.031,0.852)****

High Cholesterol	8(2.8)	7(2.4)	1.00(.329, 3.038)	0.57(.167, 1.971)
Renal Disorders	25(8.7)	38(13.4)	0.58(.292, 1.135)	0.57(.267, 1.220)
More than one	4(1.4)	18(6.3)	**0.19(.060, 0.629)***	**0.23(.060, 0.878)****
Others*	12(4.2)	21(7.3)	0.50(.215, 1.160)	0.39(.151, 1.024)
None	40(14)	35(12.3)	1.00	1.00
Total	**125(43.7)**	**161(56.3)**		
Read written information				
Sometimes	52(18.2)	53(18.5)	**2.06(1.205, 3.524)***	1.59(.848, 2.991)
Often	33(11.5)	24(8.4)	**2.89(1.512, 5.513)***	**2.50(1.166, 5.354)****
Not at all	40(14)	84(29.4)	1.00	1.00
Total	**125(43.7)**	**161(56.3)**		

(*COR, Statistically significant but lost in AOR) and (**AOR= statistically significant), p<0.05, others*=gastritis, asthma, arthritis (joint pain).

DISCUSSION: Hypertension is one of the mostly prevalent chronic diseases in the world [5, 11, 12]. In study conducted in Brazil showed that Adherence to treatment is the most important factor to an effective blood pressure control. Non-adherence to medication is a major factor to non- control of blood pressure in more than two-thirds of hypertensive individuals [13]. To examine this problem, a lot of studies have been performed. A common feature of these studies was that the emphasis was laid on only the medicine, and therefore, other modalities of the treatment, such as lifestyle modifications, are often neglected.

Since success of therapies is dependent upon the level of medication and lifestyle modifications adherence carried out by patients, this study tried to assess the adherence level of hypertensive patients on medication and lifestyle changes. It was identified 69.2%, 64.7% and 43.7% of respondents in this study were adherent to medication, diet and exercise recommendations respectively.

The finding of medication adherence was significantly lower compared to expected index of 80% medication adherence [5, 10, 13, 14]. It is also lower than previous studies done in Kuwait 88.6%, Nigeria 75%, India 73%, and Turkey 72% were adherent [15, 16, 17, 18.]. This might be due to better access and care to patients in these countries. This could also be related to low level of education and low level of awareness related to risk of hypertension complications. Failure to adhere by hypertensive patients to medications can lead them to poor blood pressure control and increased risk of complications.

The relation between age and medication adherence was found in studies conducted in New Orleans USA and Iran [19, 20.] In this study there was no association between age of respondents and medication adherence. In this study, even though there was no significant association between sex and adherence level, females were more adherent than males (40.9% Vs 28.3%). This finding is in line with a study done in Gonder University Hospital (65% Vs35%) [1].This can be explained by the fact that; men are burdened by the outdoor activities which make them busy and make them forget their medications. Alcohol consumption, a commonly practice by males, could also be a barrier for their treatment adherence.

In this study awareness of the negative consequence of non- adherence to antihypertensive drug therapy(17.8% Vs 48%), patients attending private hospital(3.1% Vs34.1%) had low level of adherence and adherence to medication in motivated patient(36.7% Vs 65.7%) were low compared to study conducted in southwestern Nigeria [16]. This can be explained by the findings of the respondents related to perception of risk was very low (17.8%) in this study groups. Low Perception of negative consequence and lack of reminders could lead to non- adherence.

Patients with hypertension for five or more years were 88% less likely to adherent to treatment which is lower than studies conducted in India showed 1.71 times more adherent compare to these who were not adherent [17].This could be related to symptom free nature of the disease, lack of knowledge and continuous reminders.

'It is important to provide continuous awareness and motivations (reinforcement) to those groups of patients in this study groups to improve their adherence status.

Even though the findings of diet and exercise adherence become difficult to be compared since there were few studies, this study significantly showed the gap and can be a good input for health care systems in the management of hypertension. Regarding diet, general diet adherence was 64.7% which is lower than study conducted in Finland (88%) [21]. It could be related to culture difference. Moreover, as indicated in American study [22], Substantial body of evidence strongly supports the concept that multiple dietary factors affect blood pressure.

Well established dietary modifications that lower BP are reduced salt intake, weight loss, and moderation of alcohol consumption (among users). The possible explanation of lower adherence level in this study participant is facing difficulty to adapt recommended diet management and problems of preparing two types of diet in the family. This could be also the current challenge to healthcare providers in developing and implementing effective clinical strategies that lead to sustained dietary changes among individuals and more broadly among whole populations and most patients may not consider diet management as treatment.

Co-morbidities can worsen the conditions of the patient and make them unable to adhere to diet changes. This study revealed that respondents with no co morbidities had significant associations with adherence to diet. Patients with no morbidities were more likely to adhere to diet change than those with co-morbidities (also supported by different literatures). Patients with co morbidities could suffer from serious complications and complex treatment regimens and diet changes which were favorable conditions not to adhere to their medication, diet and exercise recommendations.

In this study, the exercise adherence (43.7%) is lower study in Finland (84%) [21]. The possible explanation could be related to cultural difference and lack of organized setup in living areas. But higher than study in Turkey[18] (31%). This could be related to methodological difference (30 minute three times per week Vs regular exercise).

Another aspect of patients care revolves around the health belief model. In this model perceived risk and severity played a vital role in achieving therapeutic success. This could be another reason for non-adherence to medication and lifestyle modifications. Those who had high perception of severity of hypertension significantly adhere to diet changes (5times more likely adherent than those who had low perception). This could be explained by improved perception of severity of hypertension could improve adherence status of patients.

The health care team, especially nurses should emphasis on the awareness creation related to hypertensive complications. There by increase adherence behavior of their patients. In general, lack of organized continuous health education concerning hypertension management might be the cause for non-adherence among these patients.

Strength of the Study: The study considered both medication and lifestyle modification management of hypertensive patients which was not adequately done in Ethiopia. It will be helpful to give insight on the issue for further studies.

Limitations of the Study: The main limitation in the study was absence of adequate similar studies in our country. Therefore, comparisons were difficult in lifestyle changes. In addition it did not consider HTN patients who did not visit the hospital during the time of the study. Therefore, the extent of generalizability is limited only to those similar patients who were on chronic illness follow up units.

CONCLUSION: The rates of adherence to medicine and life-style changes were generally low in these hypertensive patients. It was indicated in this study that patients had low perception of risk of complication of hypertension which was reflected by low level of adherence. The causes of non-adherence may differ according to the category of adherence. Factors such as marital status, work status, Health care facilities, duration of HTN and its treatment were associated with medication adherence; marital status, understanding information given, health status and

perception of severity of HTN were associated with diet adherence; read written information and co-morbidity were associated with exercise recommendation on multivariate analysis. The medication and diet-related adherence were found to be better in patients who had been informed about their medicine. The present study will provide base line information that will enable to explore the problem at wide range by conducting further more research in different segment of populations, to investigate the problem in better way and design interventional activities accordingly.

ACKNOWLEDGEMENTS: Above all, we thank the Almighty God, the architect of our life who has made this to happen.

We are very grateful to Addis Ababa University for the approval of the ethical clearance and for their technical support of this study. Finally, we would like to thank the study participants and data collectors for their fully participation and responsible data collection.

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How to cite this article:
Hareri HA, Abebe M and Asefaw T: Assessments of adherence to Hypertension managements and its influencing factors among Hypertensive patients attending Black Lion Hospital chronic follow up unit, Addis Ababa, Ethiopia-a cross-sectional study. *Int J Pharm Sci Res* 2013; 4(3); 1086-1095.