

Predictors of Adherence to Anti-Hypertensive Medication among Hypertensive Adults in Jimma University Specialized Hospital, Jimma Zone, Southwest Ethiopia

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Abstract

Background: Uncontrolled hypertension can occur as a consequence of non-adherence to medication or dietary regimen. Different factors contribute to the non-adherence behaviour of the patients. Therefore, the aim of this study was to identify predictors of adherence to antihypertensive medication among hypertensive adults on follow up in Jimma University Specialized Hospital (JUSH), South West Ethiopia, 2016.

Methods: Institution based case control study was planned to be conducted in JUSH on 488 hypertensive adults from March-April, 2016. Cases were those patients who score Morisky Medication Adherence Scale (MMAS) less than 80% and controls were those patients who score MMAS 80% and above. Consecutive sampling method was used to select the participants. A structured and pretested questionnaire was used. Data was entered into Epidata version 3.1 then exported to Stata version 13 for analysis. Multivariable logistic regression analysis was used to identify predictors of adherence to anti-hypertensive medication.

Results: The number of cases and controls who participated in the study was 232 and 220 with response rate of 95% and 90% respectively. Factors significantly associated with non-adherence were being female patients (AOR=0.37, CI=0.17-0.80), educational status primary (AOR=0.27, CI=0.14-0.50), secondary (AOR=0.26, CI=0.10-0.69), and tertiary (AOR=0.17, CI=0.05-0.56) and knowledge about hypertension treatment (AOR=19.00, CI=6.50-55.60).

Conclusion and recommendation: In this study predictors of non-adherence to antihypertensive medication were female sex, lower educational status and poor knowledge about hypertension treatment. Therefore health care providers should advise the patients to boost the knowledge of patients related to hypertension treatment.

Keywords: Hypertension; Prevalence; Awareness; Treatment; Control; Ghana

Abbreviations: DALY: Disability Adjusted Life Years; DBP: Diastolic Blood Pressure; ICU: Intensive Care Unit; JUSH: Jimma University Specialized Hospital; MMAS: Morisky Medication Adherence Scale; SBP: Systolic Blood Pressure; US: United States; WHO: World Health Organization

Introduction

Hypertension is defined as systolic blood pressure (SBP) greater than or equal to 140 mmHg and diastolic blood pressure (DBP) greater than or equal to 90 mmHg over a sustained period, based on the average of two or more blood pressure measurements taken in two or more contacts with the health care provider after an initial screening [1]. The global burden analysis of hypertension indicate more than one fourth of the world's adult population nearly around one billion were hypertensive in 2000 and this number is projected to increase by 60% or to 1.56 billion in 2025 [2].

A study conducted in four different sub Saharan countries also indicated increment in the prevalence of hypertension and pre-hypertension with variations related to occupation and degree of urbanization [3]. Hypertension is one of the three leading risk factors that contribute to disease burden. Globally, in 2010 raising blood pressure is estimated to cause 9.4 million deaths and 7% of disability adjusted life years (DALYs) [4].

Even if there is high prevalence of hypertension the prevention and control of raised blood pressure has not received due attention in many developing countries including our country Ethiopia [5]. One of the factors that contribute to uncontrolled hypertension is non-adherence

to prescribed medication or dietary regimen [6]. Consistent control of blood pressure requires the patient to follow medication and dietary regimens prescribed by their health care provider [5].

Poor adherence or non-adherence to medical treatment is a major public health concern especially in patients with chronic conditions like hypertension which needs long term treatment. According to World Health Organization (WHO) definition adherence is "the extent to which a person's behaviour taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider" [7].

Non-adherence to anti-hypertensive medications may end with different complications like stroke, heart failure, kidney disease etc. The occurrence of those complications may end with admission to Intensive Care Unit (ICU) and increase the work load of nurses and doctors, cost of hospitalization and permanent disability or death to the patient and increase burden to the family, community and nation as a whole [8].

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In addition to this medication non-adherence in (United States) US increases the economic burden of health care system, resulting in an estimated 125,000 deaths annually, and costing \$100 billion per year including approximately \$47 billion for drug-related hospitalizations [9].

Estimates of the level to which patients adhere to drugs of hypertension vary between 50 and 70% and the variation may be related to duration of follow up, method of assessment of adherence and drug regimens used in different studies [7]. Different factors contribute to the non-adherence behaviour of the patient. Some of the factors that have effect on adherence behaviour are the age of the patient, educational status of the patient, number of drugs taken per day, knowledge about the disease or treatment and presence of side effects [10-12].

Even though studies conducted in Ethiopia, the factors addressed are little and non-comprehensive. Therefore the aim of this study was to identify predictors of adherence to anti-hypertension medication and thereby provide information for action.

Methods

Study area and study period

The study was conducted in Jimma University Specialized Hospital (JUSH) which is found in Jimma town. It is the only teaching and referral hospital in the Southwestern part of the country. It provides both inpatient and outpatient services. Chronic care clinic is one of the clinics which give outpatient service for patients with hypertension. The clinic currently gives service for more than 2077 hypertensive adults. The study was conducted from March-April, 2016 G.C.

Study design

Institution based case control study was conducted.

Study populations

All hypertensive patients who come to Jimma University Specialized Hospital for follow up during the data collection period whose age is greater than 18 years and who are on anti-hypertensive medication at least for the last six months was included.

Cases were hypertensive patients who score Morisky Medication Adherence Scale (MMAS) less than 80% and controls were patients who score MMAS greater than or equal to 80%.

Sample size determination and sampling techniques

The sample size was determined by Epi info version 7 using formula for estimation of two population proportion with assumption of 95% CI, 80% power, 1:1 case to controls ratio, Odds Ratio (OR) and proportion of different predictor variables of adherence to anti-hypertension from different studies conducted in Ethiopia is considered [12-14]. During the calculation and the largest sample size is taken and the sample size becomes 444. After adding 10% non-response rate the total sample size becomes 488 with 244 cases and 244 controls. Consecutive sampling method was employed until the required sample size achieved.

Data collection methods

Adherence to medication was assessed by MMAS which consists of eight items [15] with a scoring scheme of “yes”=0 and “no”=1 for the first seven items and a 5 point Likert response for the last item. The items are summed to give a score that categorize the patient as adherent/controls who score 80% and above and non-adherent/cases who score below 80%.

After developing of the questionnaire finalized, the questionnaire was translated to local language Amharic and Afan Oromo and back translated to English by independent persons to ensure consistency. Interviewer administered pretested structured questionnaire was used for data collection. Data was collected by six diploma nurses and two BSc supervisors.

Data analysis

Data was entered into Epidata version 3.1 and exported to Stata version 13 for analysis. After cleaning and organizing the data descriptive statistics such as mean, standard deviation (SD), frequency and percentage was calculated. Bivariate analysis was done in binary logistic regression and all independent variables which have p value of less than 0.25 were selected as candidate for multivariable binary logistic regression analysis. Then multivariable logistic regression using back ward selection method was done to identify predictors of adherence to anti-hypertension medication at P value <0.05. OR and 95% CI was used to identify presence and strength of association.

Data quality management

To assure the quality of data, the data collectors and supervisors who are fluent in local language and working in JUSH other than chronic care clinics was recruited and two day training was given on the purpose of the study, importance of privacy and confidentiality of the respondents and the content of the questionnaire as a whole. Pre-test was done on 5% of the total sample size and during data collection completeness and consistency was checked by the supervisors every time after each questionnaire filled.

Ethical consideration

Clearance was obtained from the Institutional Review Board of Jimma University College of Public Health and permission to undertake the study was obtained from the hospital. Informed verbal consent was obtained from each study participants after clear explanation about the purpose of the study. All the interviews were conducted with strict privacy and to keep confidentiality of the collected information the name of the respondents was not written on the questionnaire. The right of the respondents to refuse answer for few or all of the questions was also be respected.

Results

Socio demographic characteristics

Among 244 controls and 244 cases planned to be included in the study 232 controls and 220 were participated in the study. Among the respondents 132(56.9 %) of controls and 112(50.9%) of cases were male. The mean age of the participants was 55.1 ± 10.6 years for cases and 54.8 ± 12.0 years for controls. Majority of both cases 130(59.1%) of and controls 162(69.8%) current residence were urban. The dominant ethnic group among controls 132(56.7%) and cases 135(61.4%) were Oromo. Regarding their educational status around half (51.8%) of the cases are illiterate. But, only one fourth (25.9%) of the case are illiterate (Table 1).

Regarding knowledge about hypertension treatment almost all 225(97.0%) of the controls and 156(70.9%) of the cases have good knowledge about the treatment.

Related to lifestyle modification adherence half 116(50.0%) of the controls and only 63(28.6%) of the cases were adherent to lifestyle modification.

Variables		Cases		Controls	
		Frequency	%	Frequency	%
Sex	Male	112	50.9	100	43.1
	Female	108	49.1	132	56.9
	Total	220	100	232	100
Age of the respondents	18-40	16	7.3	35	15.1
	41-60	150	68.2	131	56.5
	>/=61	54	24.5	66	28.4
	Total	220	100	232	100
Residence	Rural	90	40.9	70	30.2
	Urban	130	59.1	162	69.8
	Total	220	100	232	100
Ethnicity	Oromo	135	61.4	132	56.9
	Amhara	31	14.1	36	15.5
	Kefa	22	10	16	6.9
	Dawuro	11	5	20	8.6
	Yem	11	5	15	6.5
	Others ¹	10	4.5	13	5.6
	Total	220	100	232	100
Religion	Orthodox	91	41.4	91	39.2
	Muslim	112	50.9	117	50.4
	Protestant	16	7.3	20	8.6
	Others ²	1	0.5	4	1.7
	Total	220	100	232	100
Marital status	Married	166	75.5	193	83.2
	Single	4	1.8	4	1.7
	Divorced	15	6.8	8	3.4
	Widowed	35	15.9	27	11.6
	Total	220	100	232	100
Educational status	Illiterate	114	51.8	60	25.9
	Primary	74	33.6	91	39.2
	Secondary	21	9.5	42	18.1
	Higher	11	5	39	16.8
	Total	220	100	232	100
Occupation	Government Employee	19	8.6	44	19
	Merchant	47	21.4	26	11.2
	House Wife	65	29.5	60	25.9
	Farmer	62	28.2	59	25.4
	Retired	22	10	32	13.8
	Others ³	5	2.3	11	4.7
	Total	220	100	232	100
Income level	≤500	123	55.9	141	60.8
	501-1000	52	23.6	50	21.6
	> 1000	45	20.5	41	17.7
	Total	220	100	232	100
Support in reminding medication time	No	102	46.4	60	25.9
	Yes	118	53.6	172	74.1
	Total	220	100	232	100
Who remind your medication time	Husband	10	8.5	30	17.4
	Wife	29	24.6	57	33.1
	Friends	3	2.5	3	1.7
	Daughter/Son	74	62.7	82	47.7
	Total	118	100	172	100

¹Gurage, Silte, Hadiya; ²Catholic, Jova, Wakeffatta; ³Unemployed, Private organization.

Table 1: Socio-demographic and economic characteristics of the respondents in Jimma University Specialized Hospital, SW Ethiopia, 2016.

Clinical characteristics

About 49 (21.1%) of controls and 80 (36.4%) of cases duration since hypertension was diagnosed were more than five years. Evidence about the co morbid status of the cases and controls show that 80 (34.5%)

controls and 72 (32.7%) cases reported that they have co morbid disease like diabetes mellitus, heart disease, renal disease and others in addition to hypertension. Among controls the commonly reported co morbid was kidney disease 27 (33.8%) but in case group the commonest one is heart disease 24 (33.3%). More than three fourth of the controls 199

(85.8%) and cases 197 (89.5%) have no hospital admission during the last one year.

Regarding number of medication they are taking currently 103 (44.4%) of the controls and 130 (59.1%) of the cases took two type of drugs. When we come to encountering drug related side effects only one fourth (25.0%) of the controls and 38 (17.3%) of the cases develop side effect (Table 2).

Facility related characteristics

Regarding the average distance the patients travel to reach their service providing facility, 144 (62.1%) of controls and 115 (52.3%) of cases travel more than 5 km. Every month the patient is expected to pay certain amount of money for medication. The mean medication costs paid are 110.6 ± 104.4 for controls and 109.9 ± 96.2 for cases. Around 65% of both controls and cases reported unavailability of the medication in hospital pharmacy after prescription by service provider. Almost equal proportion (80.2%) of cases and controls were advised about the treatment and 115 (61.8%) of the controls and half of the cases were counseled for five or more than five minutes. Regarding the relationship between the patient and service provider two third (67.7%) of the controls and 139 (63.2%) of the cases have good relationship.

Predictors of anti-hypertensive medication non adherence

All variables were considered in the bivariate analysis and those variables with a p-value <0.25 in bivariate analysis were included in the multivariable analysis. The association between adherence to anti-hypertensive medication and certain predictor variables was further investigated using multivariable logistic regression. Those variables with p-value <0.05 were considered as predictors of adherence to anti hypertension medication.

As shown on Table 2, multivariable logistic regression revealed that being female, having formal educational status and poor knowledge about hypertension treatment was significantly associated with non-adherence. Accordingly female patients were (AOR=0.37, CI=0.17-0.80) 63% times less likely non adherent than male patients. Also, those patients who attended primary (AOR=0.27, CI=0.14-0.50, p<0.001), secondary (AOR=0.26, CI=0.10-0.69), and tertiary (AOR=0.17, CI=0.05-0.56) are 73%, 74% and 83% respectively less likely to be non-

adherent when compared with patients who are illiterate. Additionally, those patients who have poor knowledge about hypertension treatment were (AOR=19.00, CI=6.50-55.60) 19 times more likely to be non-adherent as compared to those who have good knowledge.

Discussion

Adherence to anti-hypertensive medication is very important for control of hypertension and good prognosis. But, there are different factors which contribute to non-adherence. In this study being female, lower educational status attainment and poor knowledge about hypertension treatment were predictors of non-adherence to anti-hypertensive medications.

This study demonstrated that female patients are less non adherent when compared with male patients. This finding is consistent with other studies conducted in rural Bangladesh and Gondar, Ethiopia [13,16] which indicates as male population is less adherent compared with female. This finding can be explained by the fact that male spend most of their time outside home by performing different activities which can precipitate the probability that they forgot their medication. Additionally male are more alcohol and other drug user than females which can hinder their ability to remember the time of their medication and precipitate non adherence.

Educational status of the patient can also influence the adherence behaviour of patients. In this study irrespective of the level of their educational status those patients who attended formal education are less likely to be non-adherent when compared with those illiterate patients. Other studies conducted in Zambia and Jimma University Specialized Hospital also goes in line with this finding [10,12]. The possible reasons which can explain this finding can be educated persons have exposure to different source of information which can enable them to grasp different information from it. The other possible reason is their level of understanding and their consciousness about their health status might be different.

Good knowledge about hypertension treatment is important to achieve maximum adherence level. The finding of this study shows knowledge and adherence have positive association. This finding is similar with the other studies done in Pakistan, Congo Brazzaville,

Variables		Cases				Controls	
		Frequency	%	Frequency	%	COR	AOR
Sex of the respondent	Female	108	49.1	132	56.9	0.73(0.50-1.05)*	0.40(0.20-0.80)*
	Male	112	50.9	100	43.1	1	1
Age of the respondents	18-40	16	7.3	35	15.1	1	1
	41-60	150	68.2	131	56.5	2.50(1.32-4.73)*	1.74(0.80-3.80)
	≥61	54	24.5	66	28.4	1.78(0.89-3.57)*	1.27(0.53-3.06)
Support in reminding medication time	Yes	118	53.6	172	74.1	0.40 (0.27-0.60)	0.76(0.46-1.27)
	No	102	46.4	60	25.9	1	1
Educational status	Illiterate	114	51.8	60	25.9	1	1
	Primary	74	33.6	91	39.2	0.42 (0.27-0.66)*	0.27(0.16-0.46)**
	Secondary	21	9.5	42	18.1	0.26(0.14-0.48)*	0.24(0.09-0.59)**
	Higher	11	5	39	16.8	0.14(0.07-0.31)*	0.17(0.06-0.49)**
Hospitalization	Yes	23	10.5	33	14.2	0.70(0.40-1.24)*	0.69(0.35-1.35)
	No	197	89.5	199	85.8	1	1
Knowledge about hypertension treatment	Poor	64	29.1	7	3.0	13.18(5.88-29.54)*	14.46(5.55-37.64)**
	Good	156	70.9	225	97.0	1	1

*Significant at p-value <0.25; ** Significant at p-value <0.05

Table 2: Multi-variable logistic regression on predictors of adherence to antihypertensive medication among adults in Jimma University Specialized Hospital, SW Ethiopia, 2016.

and tertiary hospital in Nigeria [11,17,18]. This could be due to the fact that knowledgeable person have high level of understanding about the pros and cons of adherence and the benefit of obtaining normal blood pressure.

Unavailability of the drugs in the hospital pharmacy may lead to finding of the drugs outside the hospital pharmacy like private pharmacy and may affect adherence. The finding of this study shows that there is no significant association between unavailability of anti-hypertensive drugs and adherence. This finding is inconsistent with study done in Kinshasa, democratic republic of Congo [19]. This could be due to study area difference that the Kinshasa study was conducted in primary health care facilities and this study conducted on specialized hospital that the availability of drugs might not be a problem. Additionally, due to increment in cost of medication from at private pharmacy if medications are unavailable in the hospital pharmacy the probability that they bought the drug from private pharmacy may be low. Therefore this reason may also have association with the level of hypertension care providing facility. If the care providing facility level is high the probability that they lack important medication is low and vice versa.

Limitation of the Study

Self-reporting of treatment adherence could introduce misclassification bias by either categorizing cases as controls and controls as cases.

Conclusion

Poor knowledge about hypertension treatment is factors negatively associated with adherence. But, being female and higher level educational attainment is factors positively associated with adherence. Therefore, improving the knowledge of hypertensive patients regarding the treatment and the need for adherence to medication/s by giving more emphasis to male patients is very crucial for increasing patient adherence to antihypertensive therapy.

Conflict of Interest

There is no conflict of interest between the authors.

Acknowledgement

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Authors' Contributions

AK participated in the design and analysis of the research. The other two authors participate in critically revising the paper and agree to be accountable for all aspects of the work.

References

1. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, et al. (2003) The Seventh Report of the Joint National Committee on Prevention, Detection Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. *JAMA* 289: 2560-2572.
2. Kearney P, Whelton M, Reynolds K M, Muntner P, Whelton PK, et al. (2005) Global burden of hypertension: analysis of worldwide data. *Lancet* 365: 217-223.
3. Cho SJ, Kim J (2014) Factors associated with non-adherence to antihypertensive medication. *Nurs Health Sci* 16: 461-467.
4. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, et al. (2012) A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 380: 2224-2260.
5. Osterberg L, Blaschke T (2005) Adherence to Medication. *N Engl J Med* 353: 487-497.
6. Ahmed N, Abdul Khaliq M, Shah SH, Anwar W (2008) Compliance to antihypertensive drugs, Salt restriction, Exercise and Control of systemic hypertension in hypertensive patients at Abbottabad. *J Ayub Med Coll Abbottabad* 20: 66-69.
7. World Health Organization. Adherence to Long-Term Therapies: Evidence for Action. WHO, Geneva. 2003.
8. Mahrous FM (2015) Factors Affecting Compliance of Hypertensive Patients toward Therapeutic Regimen. *Life Sci J* 12: 62-69.
9. Vermeire E, Hearnshaw H, Van Royen P, Denekens J (2001) Patient adherence to treatment: three decades of research. A comprehensive review. *J Clin Pharm Ther* 26: 331-342.
10. Girma F, Emishaw S, Alemseged F, Mekonnen A (2014) Compliance with Anti-Hypertensive Treatment and Associated Factors among Hypertensive Patients on Follow-Up in Jimma University Specialized Hospital, Jimma, South West Ethiopia: A Quantitative Cross- Sectional Study. *J Hypertens* 3: 174.
11. Hashmi SK, Afridi M, Abbas K, Sajwani RA, Saleheen D, et al. (2007) Factors Associated with Adherence to Anti-Hypertensive Treatment in Pakistan. *PLoS One* 2: e280.
12. Mweene MD, Banda J, Andrews B (2010) Factors Associated With Poor Medication Adherence in Hypertensive Patients in Lusaka, Zambia. *Med J Zambia* 37: 252-261.
13. Khanam MA, Lindeboom W, Perez TL, Alam DS, Niessen L, et al. (2014) Hypertension: adherence to treatment in rural Bangladesh findings from a population-based study. *Glob Health Action* 1: 1-9.
14. Hareri HA, Gedefaw M, Simeng B (2014) Original Research Article Assessment of prevalence and associated factors of adherence to anti- hypertensive agents among adults on follow up in Adama Referral Hospital, East Shoa, Ethiopia, cross sectional study. *Int J Curr Microbial App Sci* 3: 760-770.
15. Morisky DE, Ang A, Krousel-Wood M, Ward HJ (2008) Predictive Validity of Medication Adherence Measures in an Outpatient Setting. *J Clin Hypertens (Greenwich)* 10: 348-354.
16. Ambaw AD, Alemie GA, W/Yohannes SM, Mengesha ZB (2012) Adherence to antihypertensive treatment and associated factors among patients on follow up at University of Gondar Hospital, Northwest, Ethiopia. *BMC Public Health* 12: 282.
17. Nsitou BM, Ikama MS, Drame B, Kaboru BB (2013) Patients-related predictors of poor adherence to antihypertensive treatment in Congo-Brazzaville : a cross-sectional study. *Glob J Med Public Health* 2: 1-9.
18. Ajayi EA, Adeoti AO, Ajayi IA, Ajayi AO, Adeyeye VO (2013) Adherence to antihypertensive medications and some of its clinical implications in patients seen at a tertiary hospital in Nigeria. *J Dent Med Sci* 8: 36-40.
19. Lulebo AM, Mutombo PB, Mapatano MA, Mafuta EM, Kayembe PK, et al. (2015) Predictors of non-adherence to antihypertensive medication in Kinshasa, Democratic Republic of Congo: a cross-sectional study. *BMC Res Notes* 8: 526.