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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

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Abstract

Objectives: Various explanations have been proffered to explain why a large percentage of patients have resistant hypertension, including secondary hypertension and endogenous resistance to treatment. However, the main reason for inadequate control of BP is poor compliance with the treatment regimen; both pharmacological and behavioral (e.g. weight reduction, sodium intake restriction, and exercise). Understanding the reasons for patient noncompliance with antihypertensive treatment is essential if BP is to be more effectively managed. The finding of this study will assist health care professionals to understand factors related to treatment compliance this enables them to manage hypertension appropriately both with medication and advising lifestyle interventions, also this study will be helpful to implement effective strategies that would lead to improved compliance, increased levels of controlled blood pressure and reduced occurrences of complications.

Background: Hypertension is defined as a systolic blood pressure greater than 140 mmHg and a diastolic blood pressure greater than 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. Uncontrolled high blood pressure increases the risk of ischemic heart disease 3- to 4-fold, and the overall risk of cardiovascular disease 2- to 3-fold. Treatment of hypertension is multifaceted, requiring long-term compliance with both medication regimens and behavior modifications. Multiple factors contribute to the poor level of compliance with long-term antihypertensive therapy.The aim of this study is to assess the factors affecting compliance with antihypertensive treatment among hypertension patients on follow-up in Jimma University Specialized Hospital, South West Ethiopia.

Methods: This study was conducted at the Jimma University Specialized Hospital (JUSH) from February 2013 – April 2013G.C. Simple random sampling techniques were employed to select 332 participants for this institution-based cross sectional study. A structured questionnaire was designed, translated, pre-tested, and utilized. Data were entered using Epidata3.1 and then exported to SPSS version 16 for analysis. Frequency distributions were used to organize the data and responses obtained. Multivariate logistic regression analysis was used to identify the factors, primarily affecting compliance with antihypertensive treatment.

Result: The mean age of participants was 53.8 + 12.8 years. 55.7% of patients were compliant with antihypertensive medications and 24.8% were compliant in making lifestyle modifications. Factors significantly associated with treatment compliance included: age of the patient (p=0.008), educational level (OR=6. 2 95% CI 1.8, 20.9), number of antihypertensive drugs prescribed (p=0.029), knowledge about hypertension treatment (OR=2.2 95% CI 1.1, 4.3), patient perception about disease severity (OR=3.1 95% CI 1.6, 5.8), and patient knowledge about the benefits of treatment compliance (OR=10.3 95% CI 3.8, 27.8).

Conclusion: In this study, compliance with antihypertensive medication was only reported by 55.7% of patients, and compliance with lifestyle modifications was only reported by 24.8% of patients. The findings from this study can be used to pinpoint the factors that are contributing to poor treatment compliance among patients at the Jimma University Specialized Hospital and to educate them about proper management of hypertension.

Keywords

Hypertension; Patient compliance; Blood pressure

Background

Hypertension is defined as systolic blood pressure greater than 140 mm Hg and a diastolic blood pressure greater than 90 mm Hg 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].

About 1 in 8 deaths worldwide are due to hypertension and 4 million people die annually, thus making it the third largest killer in the world. The seriousness of hypertension as a global public health

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problem is evident by its high prevalence and associated increase in cardiovascular complications in virtually all countries of the world [2]. In 2010, one of the three leading risk factors for global disease burden was arterial hypertension [3]. Hypertension contributes undeniably to both cardiovascular and cerebrovascular endpoints, including heart failure, myocardial infarction, and stroke [4]. Worldwide, 16.5% of all deaths can be attributed to high blood pressure. This includes 51% of deaths due to strokes and 45% of deaths due to coronary heart [3].

In sub-Saharan Africa, the prevalence of hypertension once thought to be low, has now assumed epidemic proportions. About 10 to 20 million people are affected with hypertension in the region. Effects of Westernization, urbanization, changes in dietary patterns and sedentary lifestyles are among the factors fuelling the epidemic of hypertension in sub-Saharan Africa [5].

The relationship between hypertension and heart disease is well established, and recent statements from American heart association and the JNC on detection, prevention, evaluation treatment of hypertension have emphasized the importance of maintaining low blood pressure for prevention of heart disease and stroke [1,6].

Despite improvements in the detection and treatment of hypertension since the 1970s, recent survey results illustrate that the condition continues to contribute, significantly, to mortality and morbidity in adults and that it is often poorly controlled in clinical practice [1]. Similarly, other studies suggest that the treatment's efficacy, in patients under care, is attenuated mainly by patient non-compliance with medication and lifestyle advice [7].

Multiple factors contribute to poor compliance with long-term antihypertensive therapy. Many patients have negative attitudes towards taking medication, especially if they 'feel well' [8]. Some factors reported to have a significant effect on compliance are: poor socioeconomic status (poverty), low level of education, unemployment, lack of effective social support networks, unsTable living conditions, long distance from treatment centers, high cost of transport, cultural and lay beliefs about illness and treatment, and forgetfulness [9]. A lack of knowledge about the severity of the disease and the importance of adhering to the prescribed treatment, and a lack of motivation to make some lifestyle changes in terms of diet and physical exercise may constitute barriers to compliance behavior [10].

Thus, such factors must be understood; however there is no study done particularly in the study area. Therefore, this study assessed compliance with anti hypertension treatment and associated factors among hypertensive patients on follow up in JUSH.

Methods

Study area and period

This study was conducted at the Jimma University Specialized Hospital (JUSH) from February 2013 – April 2013G.C. JUSH which is found in Jimma town; is the only teaching and referral hospital in the southwestern part of the country. It runs an annual governmental budget of 25.06 million Birr with a bed capacity of 450 and a total of more than 750 staffs of both supportive and professional. It provides services for approximately 9000 inpatient and 80,000 outpatient attendances a year. The hospital gives both inpatient and outpatient services. As one of the outpatient services, the hospital has specialty clinics where patients with specific chronic disease are referred for follow-up. Hypertension clinic is one of those clinics which give service for patients with hypertension disorder. The clinic currently gives service for about 2237 hypertension patients.

Study design

This study used institution based Cross sectional quantitative study design.

Study participants

The study population was hypertensive patients on follow up in the hypertension clinic of JUSH who were placed in treatment for more than three months and those who were above 18 years of age.

Sampling procedure

The sample size was determined by using sample size determination for estimation of a single population proportion formula. The following assumptions were considered; estimate of % of hypertensive patient who are compliant with antihypertension treatment was taken 65% [11]. The margin of sampling error tolerated 5% (0.05), and 95% confidence level. After applying finite population correction and adding 10% non response rate the final sample size became 332. The patient's card number was used as a sampling frame and individual patients was selected by using simple random sampling from a total of 2237 patients on follow up in chronic illness clinic.

Data collection

The data were collected from hypertensive patients using pre tested structured questionnaires and by reviewing patient chart. Questions were developed for this study to assess social demography, clinical characteristics, knowledge about hypertension treatment, compliance with lifestyle instructions, perceptions of the patients, locus of control, and service related factors.

Compliance to medication regimen was assessed by using the revised morisky 8 item medication adherence scale which has a high reliability (Alpha Reliability=0.83) [12]. The data were collected by 5 trained nurses working in JUSH other than chronic illness department who can speak both Amharic and Affan Oromo through face to face interview and record review. Patients were interviewed after they get the service they required from hypertension clinic using pretested questionnaire. Also patient chart was reviewed by using structured check list. The items were formulated in a manner that elicits the required data from the chart.

Data analysis

Data were entered by using Epidata3.1 and then exported to SPSS version 16 for analysis. Frequency distributions were used to organize the data and present the responses obtained. Measures of central tendency were calculated and utilized for appropriate variables to describe the data. Bivariate and multivariate logistic regression were done using Compliant vs. non-compliant status as the outcome variable, while various study variables were used as independent variables. A p-value of less than 0.05 was considered to be statistically significant in multivariate analysis.

Data quality management

A questionnaire was prepared in English and translated to Amharic & Affan Oromo and retranslated back into English. One day training was given for five Bsc nurse data collectors ahead of the actual data collection period. The training was focused on familiarizing interviewers with the questionnaire and giving them the opportunity to practice using it. The training also includes holding a discussion about different sections of the questionnaire, using a question by question description. Data collectors practiced interviewing to identify any possible future problems and to take remedial measures.

A questionnaire was pre-tested on 5% of the sample a week before the actual data collection period in Limmu hospital; after pre-test necessary modification was done. At the time of data collection, filled questionnaires were checked for completeness and consistency of information by the supervisor on a daily basis and typographic errors were manually edited. Any ambiguity and other problems of data collectors were addressed by communicating with the data collectors before the following week.

Ethical considerations

The ethical clearance letter was obtained from an ethical review committee of the JU College of public health and medical sciences. The respondents were informed about the purpose of the study, and their oral consent was obtained before the data collection. The respondents' right to refuse or withdraw from participating in the interview was fully maintained and the information provided by each respondent kept strictly confidential.

Operational definitions

Knowledge: One point was given for the correct answers and zero for the incorrect answers. The knowledge scores were divided into two levels which are good knowledge and poor knowledge using the mean knowledge score as the cutoff point.

Compliance: with the medication regimen: Respondents who score 80% and above on the revised Morisky 8-Item Medication Adherence Scale were considered as compliant and respondents with a score < 80% were considered as non compliant [13].

Perception: of the severity of hypertension: Respondents with an average score of 3 and above were regarded as having a high perception of severity of hypertension and those with an average score of below 3 as having a low perception of severity of hypertension.

Perception: of the benefits of compliance to hypertension treatment: Respondents with an average score of 3 and above were regarded as having a positive perception of benefits and those with scores of below 3 as negative perception of benefits.

Khat: The fresh leaves and twigs of a shrub that have a stimulating and euphoric effect when chewed or brewed as tea.

Result

Socio demographic characteristics

Out of 332 hypertensive patient planned to be included in the study, 314 were interviewed, 12 were not present during the data collection period, 4 refused to participate and 2 were too sick to be interviewed, which gives a response rate of 94.5%.Among the study participants, 161 (51.3%) and 153 (48.7%) were females and males respectively. The mean age of the participant was 53.8 years with a standard deviation of 12.8 years. The majority of participants, namely 214 (68.2%) were married, 10 (3.2%) were single, 64 (20.4%) were widowed and 26 (8.3%) were divorced (Table 1).

Clinical characteristics

Evidence of Co morbidity, like DM, heart failure or renal disease was not noted among the 213 (67.8%) of the study participants, but 92 (29.3%) had one and 9 (2.9%) had two or more Co morbidities. This study showed that blood pressure was controlled in 174 (55.4%) and uncontrolled in 140 (44.6%) of patients. Regarding medication, nearly half (47.5%) of the participants took 2 drugs and those participants who took their medication once daily were 167 (53.2%) (Table2).

Knowledge and perceptions of the study participants

Regarding participant's knowledge about hypertension treatment only 138 (43.9%) was knowledgeable. Two hundred fifty (79.6%) study participants were found to have a high perception of the benefits of compliance to anti-hypertensive treatment. The majority of participants, namely 251 (79.9%) had higher perceptions of susceptibility to hypertension related complications while 63 (20.1%) had low perceptions. In this study, more than half (61.8%) of the participants perceived their disease as severe. Also, this study showed that 63.7% of the participants had a good perception of service related factors (Table 3).

Compliance to antihypertension medication

According to 80% cutoff level using MMAS, 175 (55.5%) of the study participants complied with antihypertension medication regimen while the rest 139 (44.3%) were non compliant with antihypertensive medication regimen. Of the total 314 study participants 66 (21%) skipped taking medication once or more in the past three days, of them 34 (51.5%), 17 (25.8%), 9 (13.6%) and 5 (7.6%) mentioned forgetting to take medication, feeling better, unable to buy, and due to side effects respectively for the reason to skip doses.

Compliance with lifestyle interventions

Out of 314 hypertensive patients participated in the study only 4.5% of them were smokers, 172 (54.8%) were not having salt restriction, 59.2% adapted DASH plan, 63.7% maintained their normal weight and 36.3% use to do regular physical exercise. Two hundred eighty (89.2%) participants were compliant with instructions about alcohol consumption. In this study, the overall compliance to lifestyle instructions was noted only on one fourth (24.8%) of the participants, the others 236 (75.2%) are non compliant with lifestyle instructions.

Factors associated with compliance with anti hypertensive medications

All variables were considered in the bivariate analysis and those variables with a p value < 0.2 in bivariate analysis were included in the multivariate analysis. The association between compliance to antihypertension medication and certain explanatory variables was further investigated using multivariate logistic regression. Those variables with P-value < 0.05 were considered as predictors of compliance to anti hypertension medication.

Multivariate logistic regression revealed that compliance was more likely among patients in the age group between 41 to 60 years (OR=3.4 95% CI 1.5, 7.6) and above 60 years (OR=2.8 95% CI 1.6, 6.9) than those who are between age 18 to 40 years. Participants who completed their education from grade 9 -12 were more than 6 (OR=6. 2 95% CI 1.8, 20.9) times compliant with anti hypertensive medication compared to those who were illiterate. The odds of compliance to antihypertension medication was higher among hypertensive patients who took only one, two and three drugs in relation to those who took four and above drugs (OR=10.1 95% CI 1.9, 51.7) (OR=8. 4 95% CI 1.9, 38.3) (OR=10. 9 95% CI 2.2,53.4) respectively. Compliance to anti hypertensive medication was also higher (OR=2.2 95% CI 1.1, 4.3) among study participants who were knowledgeable about hypertension treatment compared to those who had less knowledge about the treatment. In this study patient perception about the disease severity and benefits of compliance to the treatment had a positive association with compliance with antihypertensive medication. The odds of compliance to antihypertension medication was higher among hypertensive patients

Variables	Category	Frequency	percentage
Age in years	18 -40	62	19.7
	41-60	168	53.5
	>=60	84	26.8
Ethnicity	Oromo	158	50.3
	Amhara	78	24.8
	Dawero	30	9.6
	Yeme	25	8
	Other	23	7.3
Religion	Orthodox	128	40.8
	Muslim	151	48.1
	Protestant	33	10.5
	Others[1]	2	0.6
Occupation	Gov't employed	46	14.6
	Merchant	27	8.6
	Farmer	109	34.7
	Housewife	64	20.4
	Day laborer	17	5.4
	Have no work	33	10.5
	Others[2]	18	5.7
Educational status	Illiterate	150	47.8
	Grade 1- 8	103	32.8
	Grade 9- 12	32	10.2
	12 and above	29	9.2
Family income	< 500 birr	155	49.4
	500 -1000 birr	94	29.9
	>1000 birr	65	20.7
Time to reach the hospital (single trip)	Up to one hour	174	55.4
	Greater than one hour	140	44.6
Cost covered	Self	173	55.1
	Family	67	21.3
	Free	72	22.9
	Employer organization	2	0.6

[1]: Includes Tigrie, Gurage, kaffa
[2]: Includes students and retired individuals
Table 1: Socio demographic characteristics of hypertension patients on follow (n = 314), JUSH, 2013.

who highly perceived their disease, severe (OR=3.1 95% CI 1.6, 5.8) and benefits of compliance to antihypertensive treatment (OR=10.3 95% CI 3.8, 27.8) than those who have lower perceptions (Table 4).

Discussion

Compliance with antihypertensive medications among study participants as measured in this study was 55.7% when defined by the 80% cutoff. It is comparable to a study done in Pakistan (57%) [14] and Nigeria (50.5%) [15], but level of compliance with antihypertensive medications was lower compared to other studies done in Gondar, Ethiopia (64.6%), Tikur Anbesa Ethiopia (69.2%) and Egypt (74.1%) [8,11,16]. The difference can be because of the large variation in the knowledge level of the study group and the inability of the study participants to afford for a medication fee since most (55.1%) of the study participants were expected to pay for their medication expenses.

Inadequate compliance with antihypertensive medications likely contributes to a failure to contribute to attain BP goal, as poor compliance is associated with sub optimal clinical outcomes [17]. A study done in Australia shows that elderly patients with no prior history of CVD who adhere with their antihypertensive medication regimen were less likely to experience CV morbidity and death than those who were non adherent [18].

Age was found to be significantly and independently associated with compliance with antihypertension medication in this study, with better adherence observed in older people. This finding is consistent with a number of other studies [8,19]. Poor compliance in younger patients may be due to ignorance of the true nature of hypertension, denial of the existence of the disease or becoming busy with activities outside the home that makes them forget taking medications.

Education may lead to better understanding of the risks involved in non-compliant behavior. Literate persons and those who are motivated to know more about their illness are more susceptible to health education than illiterate persons. Patients who completed grade

Variables	Category	Frequency	percentage
Duration on treatment	1 year or less	79	25.2
	1 – 3years	134	42.7
	3 – 5 years	57	18.2
	5 – 7 years	27	8.6
	> 7 years	17	5.4
Presence of health compliant	None	189	60.2
	One	79	25.2
	Two and above	46	14.6
Number of drugs	One	51	16.2
	Two	149	47.5
	Three	97	30.9
	Four and above	17	5.4
Dosage	Once	167	53.2
	BID	142	45.2
	TID and above	5	1.6
Type of hypertension	Primary	297	94.6
	Secondary	17	5.4
History of hospital admission (n=314)	Yes	90	28.7
	No	224	71.3
Hypertension related complication	Yes	116	36.9
	No	198	63.1

Table 2: Clinical characteristics of hypertension patients on follow up (n = 314), JUSH, 2013.

Variables	Category	Frequency	%
Knowledge status (n=314)	Knowledgeable	138	43.9
	Less knowledgeable	176	56.1
Perceived severity of hypertension (n=314)	High	194	61.8
	Low	120	38.2
Perceived susceptibility to hypertension complication (n=314)	High	251	79.9
	Low	63	20.1
Perceived benefits of compliance to hypertension treatment (n=314)	High	250	79.6
	Low	64	20.4
Perceived barriers for compliance to hypertension treatment (n=314)	High	54	17.2
	Low	260	82.8
Perception on Service related factors (n=314)	Good	200	63.7
	Poor	114	36.3
Internal locus of control (n=314)	High	237	75.5
	Low	77	24.5

Table 3: Distribution of hypertension patients on follow up based on knowledge and perceptions (n=314), JUSH, 2013

Variables	Category	Compliant to antihypertension medications	COR (95% CI)	AOR (95% CI)
Age	18 -40	29(46.8)	1	1
	41-60	101(60.1)	1.7(0.9,3.1)	3.4(1.5,7.6)**
	>=60	45(53.6)	1.3(0.7,2.5)	2.8(1.6,6.9)**
Educational level	Illiterate	70(46.7)	1	1
	Grade 1- 8	65(63.1)	1.9(1.2,3.3)*	1.4(0.7,2.8)
	Grade 9- 12	26(81.2)	4.9(1.9,12.7)*	6.2(1.8,20.9)**
	12 and above	14(48.3)	1.1(0.5,2.4)	0.6(0.2,1.7)
Number of drug	One	31(60.8)	7.2(1.8,28.4)*	10.1(1.9,51.7)**
	Two	81(54.4)	5.6(1.5,20.2)*	8.4(1.9,38.3)**
	Three	60(61.9)	7.6(2.0,28.1)*	10.9(2.2,53.4)**
	Four and above	3(17.6)	1	1
Knowledge status	Knowledgeable	96(69.6)	2.8(1.8,4.5)*	2.2(1.1,4.3)**
	Less knowledgeable	79(44.9)	1	1
Perceived severity	High	144(74.2)	8.3(4.9,13.9)*	3.1(1.6,5.8)**
	Low	31(25.8)	1	1
Perceived benefits	High	167(66.8)	14.1(6.4 ,30.9)*	10.3(3.8,27.8)**
	Low	8(12.5)	1	1

Note * Significant in bivariate analysis ** in multivariate analysis

Table 4: Multivariate logistic regression model showing predictors of compliance to antihypertension medication, JUSH, 2013 G.C

9 -12 were found to become more compliant with antihypertension medications than those who are illiterate. The finding is in line with research done in Nigeria [20] but the finding of this study is inconsistent with many studies showing no significant associations between the variables [11,19,21,22].

The complexity of the regimen is one of treatment-related factors that have been identified as a possible cause of noncompliance. Number of drugs was found to have strong associated with compliance to antihypertension medication. Patients who took three or less drugs daily were more likely to be compliant than those who took four or more drugs daily. This is in contrast with study in Pakistan [8] and Nigeria [20] that demonstrates patients who took multiple drugs were more likely to be compliant. The good compliance in patients who took fewer drugs may perhaps be that when patients have to take fewer drugs, they may not feel the pill burden and gets compliance easy.

Good knowledge about hypertension and its management is an essential part of successful treatment. The finding of this study revealed that there is a positive association between knowledge about

hypertension treatment and compliance with anti hypertensive medications. The finding is in line with other studies done in Gondar, Ethiopia and Pakistan [8,11].

The finding of this study is concordant with the health belief model [23] showing perceived severity and perceived benefits to have a positive association with compliance to antihypertension medication. In this study, patients who highly perceive hypertension as Savior and those who have high perceptions of the benefits of compliance to hypertension treatment were more likely to be compliant with antihypertension medication. Also the strong positive association between perceived benefit and compliance to antihypertension medication is in line with other study done in Seychelles [19] and also supported by a study in England that revealed compliant respondents reported the perceived benefits they derived from taking medication as one of the reasons for their compliance [24].

Strength of the study

This study used reviewing patient charts and self reporting as a method of data collection which increased the reliability of the result. The use of validated tool (MMAS) in this study further strengthens the reliability of our results.

Limitations

Since it is difficult to assess the characteristics of non responders, this study assumed that responders and non-responders are similar in distribution of the recorded variables. Cause and effect cannot be ascertained since it was a cross sectional study.

Conclusions

It is concluded that the compliance with hypertension treatment, both for anti hypertension medications and lifestyle modification is still suboptimal among hypertension patient to follow up. Compliance to antihypertension medication is only reported by 55.7% of patients and compliance to lifestyle instructions was found to be only 24.8% among the patients in the study area. In the study area patients know little about hypertension and its management. Even though more than half of patients maintained their blood pressure normal, it is not at a satisfactory level.

Authors' contribution

FG wrote the proposal, participated in data collection, analyzed the data and drafted the paper. FA and AM participated by revising and approving the proposal, data analysis and revised subsequent drafts of the paper. SE has been involved in drafting the manuscript. All authors read and approved the final manuscript.

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