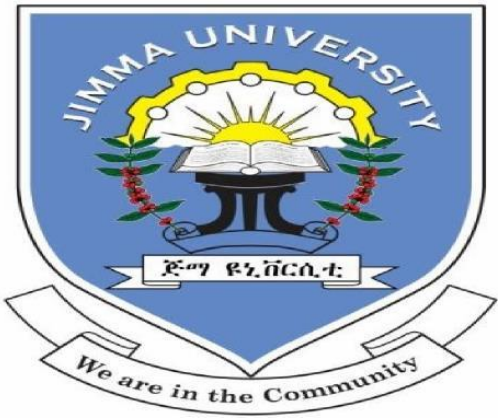

PREDICTORS OF ADHERENCE TO ANTIHYPERTENSIVE MEDICATION AMONG HYPERTENSIVE ADULTS IN JIMMA UNIVERSITY SPECIALIZED HOSPITAL, JIMMA ZONE, SOUTHWEST ETHIOPIA, 2016 : CASE CONTROL STUDY

A research thesis submitted to Jimma University, College of Health science, Department of Epidemiology as Partial Fulfillment of the Requirement for the Degree of Master in Epidemiology.

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Predictors of Adherence to Anti-Hypertensive Medication among Hypertensive Adults in Jimma University Specialized Hospital, Jimma Zone, Southwest Ethiopia, 2016: case control study

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Abstract

Background: Hypertension is an important public health challenge worldwide and defined as systolic blood pressure (SBP) greater than or equal to 140 mm Hg and a diastolic blood pressure (DBP) greater than or equal to 90 mm Hg. Uncontrolled hypertension can occur due to non-adherence to medication or dietary regimen. Different factors contribute to the non-adherence behavior of the patients. 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, South West Ethiopia, 2016

Methods: Institution based case control study was conducted in JUSH on 488 hypertensive adults from March- April, 2016. Cases and controls were selected by the Morisky Medication Adherence Scale (MMAS). Cases were those patients who score MMAS 80% and above and controls were those patients who score MMAS less than 80%. 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. Frequency distributions table was used to summarize the data. 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. Fifty percent (50.0%) of the cases and 28.6% of the controls were adherent to life style modification. Factors significantly associated with adherence were educational status primary (AOR=3.9, 95% CI: 2.2-6.8), secondary (AOR= 5.9, 95% CI: 2.2-16.3), higher (AOR=8.4, 95% CI: 2.8-25.6) and knowledge about hypertension treatment (AOR= 5.0 95% CI: 2.7-9.1).

Conclusion and recommendation: In this study predictors of adherence to antihypertensive medication were educational status and knowledge about hypertension treatment. Therefore health care providers should advise the patients on the importance of complying with hypertensive medications, the consequences of non-compliance with treatment and the disadvantage of skipping the dose.

Key words: Hypertension, Medication, adherence, JUSH

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Acronyms

AOR	Adjusted Odds Ratio
CI	Confidence Interval
DALYs	Disability Adjusted Life Years
DBP	Diastolic Blood Pressure
ETB	Ethiopian Birr
ICU	Intensive Care unit
JUSH	Jimma University Specialized Hospital
MOH	Ministry of Health
MMAS	Morisky Medication Adherence Scale
OR	Odds Ratio
SBP	Systolic Blood Pressure
SSA	Sub-Saharan Africa
WHO	World Health Organization

1. Introduction

1.1 Background

Hypertension is an important public health challenge worldwide because of its prevalence and its role as a risk factor for cardiovascular disease and defined as systolic blood pressure(SBP) greater than or equal to 140 mm Hg and diastolic blood pressure(DBP) greater than or equal to 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).

It is an overwhelming public health problems both in economically developed and developing countries and about two thirds of the total people with hypertension live in developing regions. According to the analysis of global burden of hypertension it is estimated that more than one fourth of the world's adult population nearly around one billion are hypertensive in 2000 and is projected to increase by 60% to a total of 1.56 billion in 2025 (2).

Even if the exact causes of Hypertension is not known there are different risk factors for the development of the disease like behavioral, socio economic risk factors like unemployment, sedentary behavior, tobacco use and harmful use of alcohol and also genetic factors can play a role (3). Despite improvements in the detection and treatment of hypertension since 1970's different survey results shows that it continues to contribute to mortality and morbidity in adults (1).

Even though measuring medication adherence is challenging there are different approaches used and some of them are: subjective measurements asking the medication taking behavior of the patient, or objective measures include pills count, using pharmacy refill records, or electronic event monitoring systems and biochemical measures blood or urine examination for presence of nontoxic marker added to drug. Currently, even though there is no golden standard a combination of them were used (4).

1.2 Problem statement

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. World

Health Organization(WHO) defines adherence as "the extent to which a person's behavior taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider" (5).

Globally, in 2010 raising blood pressure is one of the three leading risk factors that contribute to disease burden and is estimated to cause 9.4 million deaths and 7% of disability adjusted life years (DALYs). It also accounted for more than 20% of all health loss in adults aged 70 years and older in 2010 and around 15% in those aged 50-69 years (6).

A systematic review conducted in Sub-Saharan Africa (SSA) on Hypertension shows increase in the prevalence of hypertension in urban areas and poor control of hypertension in SSA(7). Effects of Westernizations, urbanization, changes in dietary patterns and sedentary lifestyles are among the factors fuelling the epidemic of hypertension in SSA(8).

The WHO crude estimate of raised blood pressure in Ethiopia for those whose age is above 18 were 24.0 for males and females with 95% CI [16.9–31.7] and [17.3–31.3] respectively(9). 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 (10).

Consistent control of blood pressure requires that the patient follow medication and dietary regimens prescribed by their health care provider (10). One of the factors that contribute to uncontrolled hypertension is non adherence to prescribed medication or dietary regimen (11).

Estimates of the level to which patients adhere to drugs of hypertension vary between 50 and 70% and the variation may related to duration of follow up, method of assessment of adherence and drug regimens used in different studies (5).

Different studies conducted in Ethiopia shows that adherence level of patients with anti-hypertensive medications were low (12, 13, 14). A study conducted in Jimma University Specialized Hospital shows that only 55.7% of patients were compliant to their anti-hypertensive medication and 28.8% were compliant to life style modification (12).

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 (15)**.**

Medication non-adherence increases the economic burden of the US 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 (16).

There are predictors of adherence to anti-hypertensive medication. Studies conducted in different areas shows that adherence to anti-hypertensive medications is affected by age of the patient, educational status of the patient, number of drugs taken per day, knowledge about the disease and treatment and presence of side effects (12,17, 18, 19).

Even though studies conducted in Ethiopia, particularly in the study area there are some factors that are not studied during that study and the study design used cannot helps to confirm the independent predictors of adherence to anti-hypertension medication. Therefore the aim of this study was to determine predictors of adherence to anti-hypertension medication and thereby provide information for action.

2. Literature review

2.1 Overview of adherence

Adherence is a multi-dimensional phenomena that is determined by the interplay of different factors. In 2003, the WHO described adherence to long term therapies as a behavior that is affected by multiple barriers. The WHO organize these barriers into five dimensions including health care team/health system, condition, therapy, patient and socioeconomic related barriers. There are different factors under the five individual dimensions (5).

A systematic review conducted using WHO multidimensional adherence model on barriers of adherence to anti-hypertensive medication showed patient related barrier is the most commonly studied barrier and other barriers like condition, therapy and socioeconomic were underrepresented(20).

Under this review predictors of adherence to anti-hypertensive medication is categorized into patient related factors, medication related factors, disease related factors and health system/health care team related factors.

2.2 Patient related factors

Age

Patient related factors are the most commonly studied predictors of adherence to anti-hypertensive medication in different countries. The factors included under this were socio-demographic and economic related factors and patient's knowledge and skills about the disease and treatment. Cross sectional studies conducted in different parts of Ethiopia shows age of the patients have strong association with adherence to anti-hypertensive medication (12, 13).

A study conducted in Jimma University Specialized Hospital shows that adherence or compliance was more likely among older patients between 41 to 60 years (AOR= 3.4, 95% CI 1.5 – 7.6) and above 60 years (AOR=2.8, 95% CI 1.6 - 6.9) than those who were between 18 to 40 age category(12). Similarly study conducted in Korea and China shows that older patients are more adherent to their medications than younger patients(17, 21).

Another study conducted in Adama referral hospital shows that respondents in the age group between 46 to 55 were 70% less likely to be adherent as compared to older groups in the age category greater than 55 (AOR=0.30, 95% CI 0.14 - 0.64)(13) .

Educational status

Educational status is the other predictors of adherence. Study conducted in Lusaka, Zambia shows that those patients who had attained primary education were 4.7 times more likely to be non-adherent than those who had no education (AOR 4.7 95% CI 1.1-21.4) (19). In addition, study done in JUSH (AOR=6.2 95% CI 1.8 - 20.9) showed patients who completed grade 9-12 were found to be more compliant with antihypertension medications than those who are illiterate.(12).

Sex

The sex of the respondents has relation with the adherence behavior of the respondents. Study conducted in University of Gondar (AOR = 0.48, 95% CI 0.28 - 0.82) shows that men were less adherent as compared to women and similar finding from study done in rural Bangladesh that male were 1.67 times more likely to be non-adherent than females (AOR = 1.67 95 % CI 1.42 - 1.97). But a study conducted in Tainan city shows different finding that males were 3 times more likely to be adherent than females (AOR = 2.58 CI 1.19-6.51)(14,22,23).

Occupation

Even though economic status is not the independent predictors there are some factors that determine adherence. A study conducted in Addis Ababa Tikur Anbessa Hospital shows that participants those who had private business were 72% less likely to be adherent to their medication as compared to governmental employed (AOR=0.28 95% CI 0.13-0.61) (24).

Income

Regarding income level patient who had high income level are more adherent. A study conducted on elderly hypertensive in Tainan city showed that patients whose monthly income were less than 10,000 new Taiwan dollars were 67% less likely to be adherent than those who earned more than 10,000 dollar(AOR= 0.33 95% CI 0.14 - 0.78)(23). Another study done in Kiambu district hospital, Nairobi showed similar finding that those who earned higher monthly income had higher chances

of complying with their medication compared to those who earned less(AOR=1.41 95% CI 1.00-1.81)(25).

The other socio-economic factors was having social support from the family or friends. A study done in Idikan community, Ibadan, a city in the southwestern Nigeria, shows that having friends who were concerned about the respondent's hypertension (X^2 = 62.203 P- value < 0.0001) or who were helpful in reminding the respondent about taking medication (X^2= 62.204 P-value <0.0001) was associated with high self-reported compliance (26).

Knowledge about hypertension treatment

Cross sectional study conducted on patients of poor adherence to antihypertensive treatment in Congo-Brazzaville shows that knowledge about the treatment was one predictors of adherence to hypertension medication. Those patients who are not knowledgeable about the treatment were 64% less likely to be adherent than their counterparts (AOR= 0.36 95% CI 0.15 – 0.83) (27).

2.3 Health system/ health care team related factors

There are limited number of studies conducted on health system related factors. But there are different factors that can affect the adherence level of the patients. A study conducted in Lusaka, Zambia shows that patients who were counseled for more than 5 minutes were 60% less likely to be non-adherent than those patients who were counseled for 5 minutes or less. (AOR = 0.4 95% CI 0.2-0.9) (19).

The other factors that influence adherence is patient-provider communication. An article review conducted on factors affecting anti-hypertensive treatment adherence on Saudi Arabian perspective shows that a good patient provider relationship have a positive impact on patient's health outcome and medication taking behavior (28).

Unavailability of drugs

A study conducted in Kinshasa democratic republic of Congo showed that unavailability of antihypertensive medication in healthcare facilities is one factor that contribute to non-adherence.

Patients who reported the availability of antihypertensive medication in healthcare facilities were about three times more likely to be adherent than their counterparts (AOR=2.8 95% CI 1.4–5.5) (29).

2.4 Medication related factors

Medication related predictors of adherence to anti-hypertension medication include treatment duration, presence of side effects and complexity of the regimen.

A study conducted in Chinese population shows that patients who used anti-hypertensive agents for more than ten years were 1.6 times more likely to be adherent than those with shorter duration (5 years or less) (AOR= 1.6 95% CI 1.11 – 2.29) (21). A similar finding was observed in Addis Ababa Tikur Anbessa Hospital where patients with longer duration of treatment to anti-hypertensive medication were more adherent than patients with shorter duration (AOR=3.81 95% CI 1.26 -11.51) (24).

Cross-sectional study conducted in Kinshasa Primary Health-care network facilities shows patients who experienced side effect of the medication were 2.2 times more likely to be non-adherent to their medication than their counterparts(AOR = 2.2 95 % CI 1.4–3.3) (29).

Concerning complexity of the regimen, a cross sectional study conducted to establish determinants of adherence to hypertension medication in Aga Khan University Hospital (AKUH) and National Institute of Cardiovascular Diseases in Pakistan, showed that Patients on mono therapy were less adherent than those on three drugs or more (COR = 0.3 95% CI 0.1–0.6) (18).

2.5 Disease related factors

Regarding disease related predictors of adherence to anti- hypertensive medication duration of the diagnosis of the disease and absence of co morbidities are predictors.

A study conducted in Addis Ababa Tikur Anbessa Hospital shows respondents with five or more duration of diagnosis years were 89% less likely to adhere to treatment when compared to those with diagnosis of hypertension for less than two years (AOR= 0.11 95% CI 0.01-0.96) (24).

Related to co-morbidities in Adama Referral Hospital respondents with co-morbidities were 50% less likely to be adherent compared to clients without co-morbidity (AOR=0.50 95%CI 0. 29 - 0.89) (13). But another study done in rural Bangladesh shows that patients with cardiovascular comorbidity like angina, heart attack or stroke were 22% less likely to be non-adherent to their medication than their counterparts (AOR = 0.78 95% CI 0.64 – 0.97) (22)

As shown in different literatures even if all of the dimensions are not studied in single studies the age of the patient, sex, educational status, complexity of the regimen, treatment duration and presence of co-morbidities are some of the predictors of adherence to anti-hypertensive medication. Therefore this study tried to assess all the dimensions: the patient related, health system related, medication related and disease related factors all in one study.

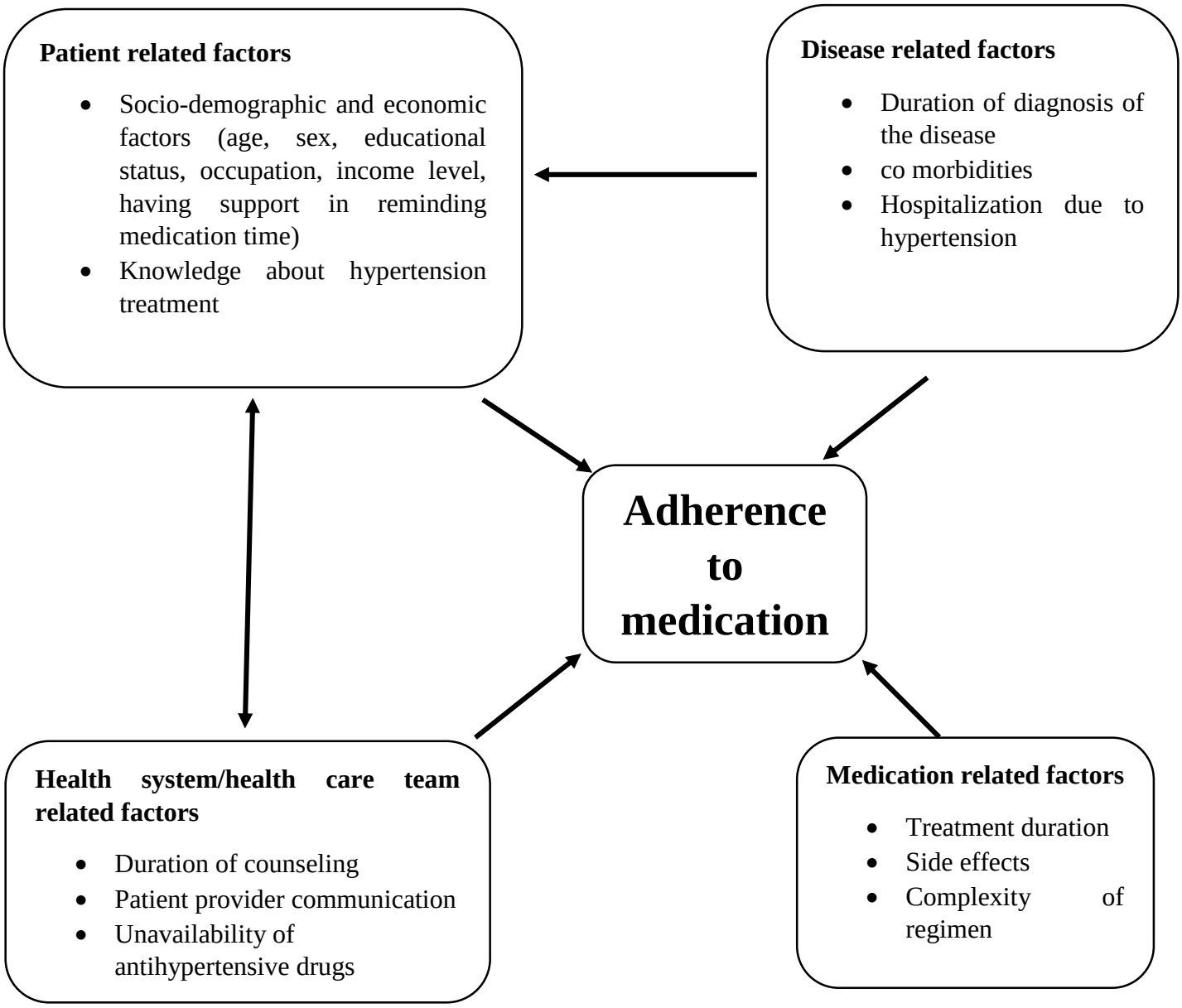

Figure 1: conceptual framework developed after review of different literature regarding predictors of adherence to anti-hypertensive management adherence, 2016

2.6 Significance of the study

In our country Ethiopia Hypertension becomes a public health problem and our country also faces double burden of non-communicable diseases and non-adherence to prescribed medications is common. Therefore the finding of this study provide information for policy makers to develop factor specific and relevant policies for improving patient adherence to antihypertensive medication. It also helps to develop programs and plan interventions that improve adherence to hypertension medication, increased levels of controlled hypertension and reduce the complications occur due to uncontrolled hypertension.

3. Objectives

3.1 General objectives

To identify predictors of adherence to antihypertensive medication among hypertensive adults on follow up in JUSH, South West Ethiopia, 2016.

3.2 Specific objectives

To identify predictors of adherence to antihypertensive medication among hypertensive adults on follow up in JUSH, South West Ethiopia, 2016.

4. Methods and Materials

4.1 Study area and study period

The study was conducted in Jimma University Specialized Hospital (JUSH) which is the only teaching and referral hospital found in Jimma town, southwestern part of Ethiopia, 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. As one of the outpatient services, the hospital has specialty clinics where patients with specific chronic diseases are referred for follow-up. Hypertension clinic is one of those clinics which give 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

4.2 Study design

Institution based case control study was conducted

4.3 Source population

The source population of the study were all hypertensive patients on follow up in Jimma University Specialized Hospital.

4.4 Study population

All hypertensive patients who come for follow up to Jimma University Specialized Hospital during the data collection period and those who are fulfilling the inclusion criteria was included.

4.4.1 Case definition

Hypertensive patients who score Morisky Medication Adherence Scale (MMAS) greater than or equal to 80%.

4.4.2 Control definition

Hypertensive patients who score MMAS less than 80%

4.5 Inclusion and exclusion criteria

4.5.1 Inclusion criteria

All hypertensive patients whose age is greater than 18 years and who are on anti-hypertensive medication at least for the last six months was included

4.5.2 Exclusion criteria

Hypertensive patients who were mentally unstable, critically sick patients who cannot able to respond and hypertensive patient secondary to pregnancy was planned to be excluded. But only

during data collection we got only critically sick patients who cannot able to respond and excluded from the study.

4.6 Sample size determination and sampling techniques

4.6.1 Sample size determination

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 during the calculation and the largest sample size is taken. Distance from house to hospital gave the maximum sample size of 444. After adding 10% non-response rate the total sample size becomes 488 with 244 cases and 244 controls.

Table 1: Predictor variables used for determination of sample size using Epi info version 7 software with the parameters used and the total sample size, January 2016

S.N	Predictor variable	Percent of controls exposed	OR	Sample size of cases	Sample size of controls	Total sample size
1.	Distance from house to hospital (22)	74.2	2.02	222	222	444
2.	Knowledge about hypertension (13)	69.6	2.2	161	161	322
3.	Co-morbidities (19)	65.9	0.5	148	148	296
4.	Sex (22)	61.3	0.48	130	130	260
5.	Educational status (13)	81.2	6.2	79	79	158
6.	Age (13)	53.6	2.8	77	77	154

4.6.2 Sampling technique

All hypertensive patients attending the hypertension clinic during the working time of the clinic and fulfilling the inclusion criteria was included. Consecutive sampling method was employed until the required sample size of one of the groups, the case or the controls achieved. After one of

the groups whether cases or controls fulfilled first, only the groups that the size is not filled interviewed. Study participants was interviewed after they visited their clinicians and to avoid multiple enrollment the patient's card number was filled on the questionnaire from their appointment card.

4.7 Measurement and variables

4.7.1 Dependent variables

- Adherence to hypertension medication

4.7.2 Independent variables

- **Patient related factors:** These include Socio-demographic and economic factors(age, sex, marital status, educational status, occupation, income level and support from family or friends) and Knowledge about the treatment
- **Health system related factors:** Including duration of counseling, patient provider communication, unavailability of antihypertensive drugs
- **Disease related factors:** These include duration of the disease, co-morbidity, disease related hospitalizations.
- **Medication related factors:** treatment duration, side effects and complexity of regimen

4.7.3 Measurements

Adherence to medication was assessed by MMAS which consists of eight items (30) 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 who score 80% and above and non-adherent who score below 80%.

Adherence to life style modification was measured by using 9 item Likert scale measuring different behavior like smoking drinking alcohol, diet, physical activity and others. After collection of the data the negative behavior was reverse coded for analysis.

Knowledge about treatment of study participants was measured by using 10 items developed after review of different literature. One point was given for the correct answers and zero for the incorrect answers. The items are summed up and percentage was calculated. The patients who score 50% and above were categorized as good knowledge and below 50% poor knowledge.

Patient provider communication will be measured by using 4 items Likert scale derived from a study assessing the effect of physicians' initial and follow-up communication styles on the beliefs and behaviors of patients with depression (31).

4.8 Data collection procedure

The questionnaire was developed after critical review of different literatures which were done for similar purposes by different investigators. The questionnaire was translated to local language Amharic and Afan Oromo and back translated to English by independent persons to ensure consistency. The questionnaire was pretested in Shenen Gibe Hospital on 5% of the total sample size to check whether the questionnaire needs modification or not. Interviewer administered pretested structured questionnaire was used for data collection. Data was collected by six diploma nurses and two BSc supervisors

4.9 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. Pretest 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.

4.10 Data processing and 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), percent and frequency was calculated. Bivariate analysis was done in binary logistic regression and all independent variables which have p value of less than 0.25 was 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 antihypertension medication at P value < 0.05. OR and 95% CI was used to identify the presence and strength of association.

Goodness and fitness of the model was checked by likelihood ratio and multicollinearity by standard error.

4.11 Operational definition and definition of terms

Adherence: the extent to which a person's behavior taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider.

Adherent or cases: Hypertensive patients who were adherent to the medication (score MMAS greater than or equal to 80%) prescribed by their health provider.

Non adherent or controls: Hypertensive patients who were non adherent to the medication (score MMAS less than 80%) prescribed by their health provider.

Co-morbidities: a known hypertensive patient with other chronic disease like heart disease, diabetes mellitus and other disease/s.

Adherence to lifestyle: those patients who score equal to and above mean.

Non adherent to lifestyle: those patients who score below mean.

Good knowledge: One point was given for the correct answers and zero for the incorrect answers. Those patients who answered 5 or more questions correctly were considered to have good knowledge.

Poor knowledge: those patients who answered less than 5 questions correctly.

Side effects: any symptoms that occur after the patient takes the drug.

Good patient provider communication: those patients who score equal to the mean and above mean.

Poor patient provider communication: those patients who score below mean.

Duration of counseling: the time the provider take to discuss about the treatment with the patient.

Complexity of regimen: The type of the medication that was prescribed for the patient, its number.

4.12 Ethical consideration

Clearance was obtained from the Institutional Review Board of Jimma University College of Health Sciences 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 was 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.

4.13 Dissemination plan

The result of this study will be presented to Jimma University College of Health Sciences, Department of Epidemiology, and also communicate with Ministry of health and the Hospital. The findings may also be presented in different seminars, meetings, workshops and attempts will be made to publish in peer-reviewed scientific journal.

5. Results

Patient related characteristics (Socio demographic and economic characteristics, knowledge about hypertension treatment

Among 244 cases and 244 controls planned to be included in the study 232 cases and 220 controls participated with response rate of 95% and 90% for controls and cases respectively. Among the respondents 132 (56.9 %) of cases and 108(49.1%) of controls were male. The median age of the respondents was 55.0 years (SD=10.6) and 55.0 years (SD=12.0) for controls and cases respectively. One hundred sixty two (69.8%) cases and 130(59.1%) controls were urban residents. The dominant ethnic group 132(56.7%) cases and 135(61.4%) controls was Oromo.

Half of the respondents, 116(50.2%) cases and 112(50.9%) controls were Muslim. Majority of the respondents 193(83.2%) cases and 166 (75.5%) controls were married. Only one fourth 60(25.9%) of the cases but, half 114(51.8%) of the controls were illiterate and around one fourth 59(25.4%) cases and 62(28.2%) controls occupation were farmer. One hundred forty one (60.8%) of the cases and 123(55.9%) of the controls monthly income were below 500 Ethiopian birr (ETB). (Table 2).

In both the control and case groups most of the respondents have a person who reminds them their medication taking time. Among the participants who have a person who remind their medication time 82(47.7%) cases and 74(62.7%) controls were reminded by their son/daughter. Regarding knowledge about hypertension treatment 203(87.5%) of the cases and 124(56.4%) of the controls have good knowledge about hypertension treatment. Related to life style modification adherence half 116(50.0%) of the cases and 63(28.6%) of the controls were adherent to lifestyle modification (Table 2).

Table 2: patient related characteristics of the respondents in Jimma University Specialized Hospital, SW Ethiopia, 2016

Variables		Cases		Controls	
		Frequency	%	Frequency	%
Sex	Male	100	43.1	112	50.9
	Female	132	56.9	108	49.1
	Total	232	100	220	100
Age of the respondents	18-40	35	15.1	16	7.3
	41-60	131	56.5	150	68.2
	>/=61	66	28.4	54	24.5
	Total	232	100	220	100
Residence	Rural	70	30.2	90	40.9
	Urban	162	69.8	130	59.1
	Total	232	100	220	100
Ethnicity	Oromo	132	56.9	135	61.4
	Amhara	36	15.5	31	14.1
	Kefa	16	6.9	22	10
	Dawuro	20	8.6	11	5
	Yem	15	6.5	11	5
	Others[1]	13	5.6	10	4.5
	Total	232	100	220	100
Religion	Orthodox	91	39.2	91	41.4
	Muslim	117	50.4	112	50.9
	Protestant	20	8.6	16	7.3
	Others[2]	4	1.7	1	0.5
	Total	232	100	220	100
Marital status	Married	193	83.2	166	75.5
	Single	4	1.7	4	1.8
	Divorced	8	3.4	15	6.8
	Widowed	27	11.6	35	15.9
	Total	232	100	220	100
Educational status	Illiterate	60	25.9	114	51.8
	Primary	91	39.2	74	33.6
	Secondary	42	18.1	21	9.5
	Higher	39	16.8	11	5
	Total	232	100	220	100
Occupation	Government employee	44	19	19	8.6
	Merchant	26	11.2	47	21.4
	House wife	60	25.9	65	29.5
	Farmer	59	25.4	62	28.2
	Retired	32	13.8	22	10

	Others[3]	11	4.7	5	2.3
	Total	232	100	220	100
Income level	< /=500 ETB	141	60.8	123	55.9
	501-1000 ETB	50	21.6	52	23.6
	> 1000 ETB	41	17.7	45	20.5
	Total	232	100	220	100
Support in reminding medication time	No	60	25.9	102	46.4
	Yes	172	74.1	118	53.6
	Total	232	100	220	100
Who remind your medication time	Husband	30	17.4	10	8.5
	Wife	57	33.1	29	24.6
	Friends	3	1.7	3	2.5
	Daughter/Son	82	47.7	74	62.7
	Total	172	100	118	100
Knowledge about hypertension treatment	Poor	29	12.5	96	43.5
	Good	203	87.5	124	56.4
	Total	232	100	220	100

[1:] Gurage, Silte, Hadiya 2[:] Catholic, Jova, Wakeffatta, 3[:] Unemployed, Private organization

Disease related characteristics

Ninety nine (42.7%) of the cases and 81(36.8%) of the controls were between one to three years since they diagnosed of hypertension. Among those whose diagnosis is between one to three years 89(38.4%) of the cases and 76(34.5%) of the controls were between one to three years since they started hypertension treatment (Table 3).

From the 232 cases and 220 controls who participated, 80(34.5%) and 72(32.7%) of them respectively reported that they have comorbid disease like diabetes mellitus, heart disease, renal disease and others in addition to hypertension. Among cases the commonly 27(33.8%) reported comorbidity was kidney disease but in the control group the commonest one 24(33.3%) is heart disease. More than three fourth (85.8%) of the cases and 197(89.5%) of the controls had no hospital admission during the last one year (Table 3).

Treatment related characteristics

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

developed side effects. The commonly reported side effects in both groups were headache (Table 3).

Table 3: Disease and treatment related characteristics of the respondents in Jimma University Specialized Hospital, SW Ethiopia, 2016

Variables		Cases		Controls	
		Frequency	%	Frequency	%
Duration of diagnosis	Less than 1 Year	21	9.1	21	9.5
	1-3 Years	99	42.7	81	36.8
	3(1/12) -5 Years	63	27.2	38	17.3
	>5 Years	49	21.1	80	36.4
	Total	232	100	220	100
Presence of comorbidity	No	152	65.5	148	67.3
	Yes	80	34.5	72	32.7
	Total	232	100	220	100
Type of comorbidity	Diabetic Mellitus	21	26.3	19	26.4
	Heart disease	25	31.3	24	33.3
	Kidney disease	27	33.8	20	27.8
	Others	7	8.8	9	12.5
	Total	80	100	72	100
History of last year hospital admission	No	199	85.8	197	89.5
	Yes	33	14.2	23	10.5
	Total	232	100	220	100
Duration of treatment	Less than 1 Year	27	11.6	24	10.9
	1-3 Years	89	38.4	76	34.5
	3(1/12) -5 Years	67	28.9	40	18.2
	>5 Years	49	21.1	80	36.4
	Total	232	100	220	100
Type of drugs	One	57	24.6	36	16.4
	Two	103	44.4	130	59.1
	Three	47	20.3	39	17.7
	More than three	25	10.8	15	6.8
	Total	232	100	220	100
Presence of side effects	No	174	75.0	182	82.7
	Yes	58	25.0	38	17.3
	Total	232	100	220	100

Organization related characteristics

Regarding average distance travelled to reach the hospital 144(62.1%) of the cases and 115(52.3%) of the controls travel less than 5 km. The mean medication cost paid by controls and cases per month was 110.6 birr (SD=104.4) and 109.9 birr (SD=96.2) respectively. Sixty five percent of both controls and cases reported unavailability of the medication in the hospital pharmacy after prescription by service providers. Almost equal proportion (80.2%) of cases and controls were advised about the treatment and 115(61.8%) of the cases and half of the controls (53.0%) were counseled for less than or equal to five minutes. Regarding communication between the patient and service provider two third of the cases (67.7%) and 139(63.2%) of the controls have good communication (Table 4).

Table 4: Health system related characteristics of the participants in Jimma University Specialized Hospital, SW Ethiopia, 2016

Variables		Cases		Controls	
		Frequency	%	Frequency	%
Distance	>/= 5 Km	88	37.9	105	47.7
	<5 Km	144	62.1	115	52.3
	Total	232	100	220	100
Availability of drugs in the pharmacy	No	151	65.1	141	64.1
	Yes	81	34.9	79	35.9
	Total	232	100	220	100
Advice about treatment	Yes	186	80.2	181	82.3
	No	46	19.8	39	17.7
	Total	232	100	220	100
Duration of counseling	>5 mint	71	38.2	85	47.0
	</=5mint	115	61.8	96	53.0
	Total	186	100	181	100
Patient provider communication	Poor	75	32.3	81	36.8
	Good	157	67.7	139	63.2
	Total	232	100	220	100

Bivariate analysis

Bivariate logistic regression was employed for each individual variables to select candidate variables for multivariable logistic regression. From variables under socio demographic and economic which include age, sex, residence, ethnicity, religion, marital status, educational status,

occupation, monthly income and have support in reminding medication time five variables such as respondents within the age group of 41-60, urban residence, having educational status of primary and above, those whose occupation were merchant, farmer and housewife and have support in reminding medication time were significant in bivariate logistic regression and selected as candidate for multivariable logistic regression (Table 5)

Knowledge about hypertension treatment of the respondents is another variable which is selected as candidate for multivariable logistic regression. In addition to this adherence to lifestyle modification is also candidate and selected for multivariable logistic regression (Table 5).

Table 5: Bivariate logistic regression of patient related predictors of adherence to anti-hypertension medication in Jimma University Specialized Hospital, SW Ethiopia, 2016

Variables		Cases		Controls		COR	p-value
		Freq.		Freq.	%		
Sex	Male	100	43.1	112	50.9	0.7(0.5-1.1)	0.097
	Female	132	56.9	108	49.1	1	
Age of the respondents	18-40	35	15.1	16	7.3	1	
	41-60	131	56.5	150	68.2	0.4 (0.2-0.8)*	0.005
	>/=61	66	28.4	54	24.5	0.6 (0.3-1.1)	0.099
Residence	Rural	70	30.2	90	40.9	0.6 (0.4- 0.9)*	0.017
	Urban	162	69.8	130	59.1	1	
Ethnicity	Oromo	132	56.9	135	61.4	1	
	Amhara	36	15.5	31	14.1	1.2 (0.7-2.0)	0.530
	Kefa	16	6.9	22	10	0.7 (0.4-1.7)	0.399
	Dawuro	20	8.6	11	5	1.9 (0.9-4.0)	0.116
	Yem	15	6.5	11	5	1.4 (0.6-3.1)	0.423
	Others	13	5.6	10	4.5	1.3 (0.6-3.1)	0.516
Religion	Orthodox	91	39.2	91	41.4	1	
	Muslim	117	50.4	112	50.9	1.0 (0.7-1.5)	0.826
	Protestant	20	8.6	16	7.3	1.3 (0.6-2.6)	0.543
	Others	4	1.7	1	0.5	4.0 (0.4-36.5)	0.219
Marital status	Married	193	83.2	166	75.5	1	
	Single	4	1.7	4	1.8	0.9 (0.2-3.5)	0.833
	Divorced	8	3.4	15	6.8	0.5 (0.2-1.1)	0.084
	Widowed	27	11.6	35	15.9	0.7 (0.4-1.1)	0.139
Educational status	Illiterate	60	25.9	114	51.8	1	
	Primary	91	39.2	74	33.6	2.3 (1.5-3.6)*	< 0.001
	Secondary	42	18.1	21	9.5	3.8 (2.1-7.0)*	< 0.001
	Higher	39	16.8	11	5	6.7 (3.2-14.1)*	< 0.001

Occupation	Government employee	44	19	19	8.6	1	
	Merchant	26	11.2	47	21.4	0.2 (0.1-0.5)*	< 0.001
	House Wife	60	25.9	65	29.5	0.4 (0.2-0.8)*	0.005
	Farmer	59	25.4	62	28.2	0.4 (0.2-0.8)*	0.007
	Retired	32	13.8	22	10	0.6 (0.2-1.3)	0.233
	Others	11	4.7	5	2.3	1.0 (0.3-3.1)	0.932
Income level	< /=500	141	60.8	123	55.9	1	
	501-1000	50	21.6	52	23.6	0.8 (0.5-1.3)	0.356
	> 1000	41	17.7	45	20.5	0.8 (0.5-1.3)	0.268
Support in reminding medication time	No	60	25.9	102	46.4	1	
	Yes	172	74.1	118	53.6	2.5 (1.7-3.7)*	< 0.001
Knowledge about hypertension treatment	Poor	29	12.5	96	43.5	1	
	Good	203	87.5	124	56.4	5.4(3.4-8.7) *	<0.001
Adherence to lifestyle	Adherent	116	50.0	63	28.6	2.5(1.7-3.7)	<0.001
	Non-adherent	116	50.0	157	71.4	1	

* Significant at p-value < 0.25

Disease related variables

Among disease related factors, there are three variables which include duration of diagnosis, presence of comorbidity and hospitalization during the last one year. Among these variables only those with duration of diagnosis between one to three years were significant and candidate (Table 6).

Treatment related variables

There are also three variables under this category including duration of treatment, type of antihypertensive drugs taken and encountering side effect. Respondents who were between one to three years, three and one month to five years since they started treatment, those who took two type of anti-hypertensive drugs and those who encounter side effect were significant and hence candidate to be included into the final model (Table 6).

Table 6: Bivariate logistic regression result of disease and medication related predictors of adherence to anti-hypertension medication in Jimma University Specialized Hospital, SW Ethiopia, 2016

Variables		Cases		Controls		COR	p-value
		Freq.	%	Freq.	%		
Duration of diagnosis	Less Than 1 Year	21	9.1	21	9.5	1.6 (0.8-3.3)	0.171
	1-3 Years	99	42.7	81	36.8	2.0 (1.3-3.2)*	0.003
	3(1/12) -5 Years	63	27.2	38	17.3	2.7 (1.6-4.6)*	< 0.001
	>5 Years	49	21.1	80	36.4	1	
Presence of comorbidity	No	152	65.5	148	67.3	1	
	Yes	80	34.5	72	32.7	1.1 (0.7-1.6)	0.693
History of last year hospital admission	No	199	85.8	197	89.5	1	
	Yes	33	14.2	23	10.5	1.4 (0.8-2.5)	0.226
Duration of treatment	Less Than 1 Year	27	11.6	24	10.9	1.8 (1.0-3.5)	0.069
	1-3 Years	89	38.4	76	34.5	1.9 (1.2-3.1)*	0.007
	3(1/12) -5 Years	67	28.9	40	18.2	2.7 (1.6-4.6)*	< 0.001
	>5 Years	49	21.1	80	36.4	1	
Type of drugs	One	57	24.6	36	16.4	1.0 (0.4-2.0)	0.895
	Two	103	44.4	130	59.1	0.5 (0.2-0.9)*	0.035
	Three	47	20.3	39	17.7	0.7 (0.3-1.6)	0.408
	More Than Three	25	10.8	15	6.8	1	
Presence of side effects	No	174	75	182	82.7	1	
	Yes	58	25	38	17.3	1.5 (1.0-2.5)*	0.046

* Significant at p-value < 0.25

Organizational related variables

There are different factors included under this category like distance they travel to reach the hospital, cost they monthly pay for their medication, availability of the medications prescribed for them in the hospital pharmacy, whether advice regarding the medications were given for them, duration of advice and the patient provider communication. Among all these variables only those who move less than 5 km were significant and selected as candidate for multivariable logistic regression (Table 7)

Table 7: Bivariate logistic regression result of health system related predictors of adherence to anti-hypertension medication Jimma University Specialized Hospital, SW Ethiopia, 2016

Variables		Cases		Controls			
		Freq.	%	Freq.	%	COR	p-value
Distance	>/= 5 Km	88	37.9	105	47.7	1	
	<5 Km	144	62.1	115	52.3	1.5 (1.0-2.2)*	0.036
Availability of drugs in the pharmacy	No	151	65.1	141	64.1	1	
	Yes	81	34.9	79	35.9	1.0 (0.7-1.4)	0.825
Advice about treatment	Yes	186	80.2	181	82.3	1	
	No	46	19.8	39	17.7	1.1 (0.7-1.8)	0.568
Duration of counseling	>5 mint	71	38.2	85	47	1	
	</=5mint	115	61.8	96	53	1.4 (0.9-2.2)	0.089
Patient provider communication	Poor	75	32.3	81	36.8	0.8 (0.6-1.2)	0.316
	Good	157	67.7	139	63.2	1	

* Significant at p-value < 0.25

Multivariable logistic regression (predictors of adherence to anti-hypertensive medication)

From each dimension different variables were significant and candidate for multivariable logistic regression. All the Eleven variables significant from each dimension were entered into multivariable logistic regression to control for confounding. Among these educational status and knowledge about hypertension treatment were independent predictor of adherence to anti-hypertension medication (Table 8).

Those hypertensive patients who attended primary education were 3.9 times (AOR=3.9; 95% CI: 2.2-6.8) more likely to be adherent as compared to illiterate. Those patients who attended secondary education were 5.9 times (AOR= 5.9; 95% CI: 2.2-16.3) more likely to be adherent to anti-hypertensive medication as compared to illiterate. Patients with higher educational level were 8.4 times (AOR=8.4; 95% CI: 2.8-25.6) more likely to adhere to their medication than illiterate **OR** Those who were adherent (cases) are 3.9 times, 5.9 times, and 8.4 times more likely to have primary, secondary and higher educational level than those who were non adherent (controls) (Table 8).

In addition to educational status, knowledge about the hypertension treatment is one of the predictor of adherence to anti-hypertensive medication. Patients who had good knowledge about

hypertension treatment were 5.0 times (AOR=5.0; 95% CI: 2.7-9.1) more likely to be adherent than their counterparts **OR**

Those who were adherent (cases) are 5.0 times more likely to have good knowledge about hypertension treatment than those who were non adherent (controls) (Table 8).

Table 8: Multi-variable logistic regression on predictors of adherence to antihypertensive medication among adults in Jimma University Specialized Hospital, SW Ethiopia, 2016

Variables		Cases		Controls			
		Freq.	%	Freq.	%	COR	AOR
Age of the respondents	18-40	35	15.1	16	7.3	1	1
	41-60	131	56.5	150	68.2	0.4 (0.2-0.8)*	0.6 (0.3-1.3)
	>/=61	66	28.4	54	24.5	0.6 (0.3-1.1)	0.7 (0.3-1.7)
Residence	Rural	70	30.2	90	40.9	0.6 (0.4- 0.9)*	1.2 (0.4-3.4)
	Urban	162	69.8	130	59.1	1	1
Educational status	Illiterate	60	25.9	114	51.8	1	1
	Primary	91	39.2	74	33.6	2.3 (1.5-3.6)*	3.9 (2.2-6.8)**
	Secondary	42	18.1	21	9.5	3.8 (2.1-7.0)*	5.9 (2.2-16.3)**
	Higher	39	16.8	11	5	6.7 (3.2-14.1)*	8.4 (2.8-25.6)**
Occupation	Government employee	44	19	19	8.6	1	1
	Merchant	26	11.2	47	21.4	0.2 (0.1-0.5)*	1.1 (0.3-3.5)
	House wife	60	25.9	65	29.5	0.4 (0.2-0.8)*	1.0 (0.3-2.8)
	Farmer	59	25.4	62	28.2	0.4 (0.2-0.8)*	1.3 (0.4-4.0)
	Retired	32	13.8	22	10	0.6 (0.2-1.3)	2.3 (0.5-10.0)
	Others	11	4.7	5	2.3	1.0 (0.3-3.1)	1.0 (0.3-2.7)
Support in reminding medication time	No	60	25.9	102	46.4	1	1
	Yes	172	74.1	118	53.6	2.5 (1.7-3.7)	1.7 (1.0-2.7)
Knowledge about hypertension treatment	Poor	29	12.5	96	43.5	1	1
	Good	203	87.5	124	56.4	5.4(3.4-8.7)*	5.0 (2.7-9.1)**
Duration of diagnosis	Less Than 1 year	21	9.1	21	9.5	1.6 (0.8-3.3)	0.6 (0.1- 4.2)
	1-3 Years	99	42.7	81	36.8	2.0 (1.3-3.2)*	1.5 (0.2-11.1)
	3(1/12) -5 Years	63	27.2	38	17.3	2.7 (1.6-4.6)*	1.6 (0.2-11.2)
	>5 Years	49	21.1	80	36.4	1	1
Duration of treatment	Less Than 1 year	27	11.6	24	10.9	1.8 (1.0-3.5)	2.0 (0.3-13.1)
	1-3 Years	89	38.4	76	34.5	1.9 (1.2-3.1)*	0.8 (0.1-6.0)
	3(1/12) -5 Years	67	28.9	40	18.2	2.7 (1.6-4.6)*	1.2 (0.2-7.5)

	>5 Years	49	21.1	80	36.4	1	1
	One	57	24.6	36	16.4	1.0 (0.4-2.0)	1.0 (0.4-2.5)
	Two	103	44.4	130	59.1	0.5 (0.2-0.9)*	0.7 (0.3-1.7)
	Three	47	20.3	39	17.7	0.7 (0.3-1.6)	0.9 (0.3-2.2)
Type of drugs	More than three	25	10.8	15	6.8	1	1
Presence of side effects	No	174	75	182	82.7	1	1
	Yes	58	25	38	17.3	1.5 (1.0-2.5)*	1.3 (0.7-2.2)
Distance	>/= 5 Km	88	37.9	105	47.7	1	1
	<5 Km	144	62.1	115	52.3	1.5 (1.0-2.2)*	1.7(0.9-3.0)

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

6. Discussion

Adherence is one of the most important reasons for uncontrolled hypertension, serious complications and wastage of health care resources (2). Several factors, which may be patient, condition, therapy and health system related, continue to affect adherence behavior (5)

Different findings are forwarded regarding age of the patients. The finding of this study shows that age has no significant association with adherence. The finding is in agreement with a study conducted in University of Gondar Hospital and Black Lion Specialized Hospital, Addis Ababa (14, 24). But, the finding is in contrast with research done in Jimma University Specialized Hospital, Pakistan and China which shows older patients were more adherent than younger (12, 18, 21).

Better education may be related to better understanding of the disease and comparing the risks and benefit of adherence and non-adherence. The result of this study shows Those who were adherent (cases) are 3.9 times, 5.9 times, and 8.4 times more likely to have primary, secondary and higher educational level than those who were non adherent (controls) This finding is in line with previously conducted cross sectional study in Jimma University Specialized Hospital (12).

This could be due to the fact that educated persons have exposure to different source of information like internet, written materials and they grasp different information from it. They might have also high level of understanding. They can also read and understand written materials related to their medication. But, this finding is inconsistent with other study done in university of Gondar which showed no significant association between adherence and educational status (14).

In this study there is no association between occupation and adherence. This finding is similar to research done in Adama Referral Hospital and Jimma University Specialized Hospital (12). But the finding is inconsistent with the study done in Black Lion Specialized Hospital, Addis Ababa that showed who had private business were 72% less likely to be adherent than government employee (24).

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 Jimma University Specialized Hospital, University of Gondar Hospital and Pakistan (12, 14, 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. Therefore they choice to be adherent rather than missing or skipping their drugs.

In this study duration of diagnosis has no significant association with adherence to treatment. This finding is incomparable with study done in Black Lion Specialized Hospital, Addis Ababa that showed those with greater than or equal to five years since they diagnosized for hypertension were less adherent to their medication than those with less than two years (24).

Presence of comorbidity in addition to hypertension might exacerbate the disease condition and lead to complex drug regimen and reduces adherence status. This study revealed that there is no significant association between presence of comorbidity and adherence. This finding is inconsistent with research conducted in rural Bangladesh and Adama referal hospital which showed those with cardiovascular comorbidity were less adherent and those with any of the comorbid were less adherent respectively (22, 13).

Number of drugs were not associated with adherence in this study. This finding is consistent with a study conducted in Adama referral hospital (13). But incontrast to the finding from Jimma university Specialized Hospital and Kiambu District Hospital were respondents who took three or less drugs were more adherent than those who took four or more and those who took one or two antihypertensive drugs were more adherent than those who took three or more drugs respectively (12, 25). This could be due to difference in the variables studied. The variables studied in the previous Jimma study adds perception related variables. But, there is no perception related variables assessed in this study.

Side effects might compromise adherence because the patients who experience side effects may feel uncomfortable and partially or totally stop the medication. The finding of this research shows there is no association between experience of side effect and adherence. This finding is inconsistent with the finding of study conducted in Zambia and Tainan city which showed that experiencing of side effect negatively affect adherence (19, 23).

Distance may be one of the factors that hinder adherence because lack of transportation or unavailability of health facilities near by may lead to missing of appointment day. But, this study shows there is no significant association between distance and adherence to medication. This finding is inconsistent with the research done in university of Gondar and Lusaka, Zambia that showed those who travel more than half an hour and above 10 km respectively were less adherent as compared to their counterparts (14, 19). This could be due to the fact that majority of the respondents of this study were urban residents and access to health facilities is below five kilometers and they have no access problem.

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 (29). 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.

Strength of the study

- The study uses strong design and can be sure of the independent predictors of adherence to anti hypertension mediction.
- The study uses validated tool to identify cases and controls.

Limitation of the study

- This study was conducted only on JUSH. Therefore the results cannot be generalized to hypertensive patients who took drugs from other health facilities.
- Self-reporting of treatment adherence could introduce misclassification bias by either categorizing cases as controls and controls as cases.

7. Conclusion and Recommendations

7.1 Conclusion

Different factors were studied to identify the predictors of adherence to anti-hypertensive medication. Among the predictors considered educational status of the patient and good knowledge about hypertension treatment which were under patient related predictors were statistically significant and independent predictors of adherence to anti-hypertension medication.

7.2 Recommendations

Depending on the finding of the following recommendations were forwarded:

Ministry of Health (MOH)

- They should prepare special days for the patients to provide information about the treatment.

Hospital

- The hospital should arrange educational program on hypertension treatment and follow its implementation.

Health service provider

- They should counsel the patients every time whenever they visit physician to improve the compliance to anti hypertensive drugs, salt restriction and to do exercise daily in order to be able to understand the importance of using drugs as prescribed.
- The health care provider should educate hypertensive patients about their disease on the importance of complying with hypertensive medications, the consequences of non-compliance with treatment and the disadvantage of skipping the dose.
- Health providers should stress the importance of compliance with their hypertension treatment despite the absence of symptoms including complying with follow-up visits and attending clinic appointments.

Patient

- Patients should have to attend the health information dissemination program of the hospital.

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Annex

English version questionnaire

Predictors of adherence to anti-hypertension medication in Jimma University Specialized Hospital

My name is---------- I am one of the data collectors of study that is conducted on predictors of adherence to anti-hypertension management. I would like to ask few questions which take around--------minutes. The information collected from you will only be used for this study and your name will not be written on the questionnaire. You do not have to answer any question that you do not want to answer and you may end this interview at any time you want to. However, your honest answers to these questions will help the researchers to achieve the objective of the study.

I would appreciate your cooperation in responding to this survey questions.

Are you willing to participate in this study?

Yes_ (say thank you and continue interviewing) No_ (say thank you and go to the next respondent)

Patient card number----------

Name of data collector----------Sign--------- Date----------

Name of Supervisor ----------Sign ---------Date ----------

Morisky Medication Adherence Scale template.

S.N	Questions	Response
1.	Do you sometimes forget to take your High Blood Pressure (HBP) pills?	0. Yes 1. No
2.	People sometimes miss taking their medication for reasons other than forgetting. Thinking over the past three months, was there any days when you did not take your HBP medication?	0. Yes 1. No
3.	Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it?	0. Yes 1. No
4.	When you travel or leave home, do you sometimes forget to bring along your HBP medication?	0. Yes 1. No
5.	Did you take your HBP medication yesterday?	0. No 1. Yes
6.	When you feel like your HBP is under control, do you sometimes stop taking your medication?	0. Yes 1. No
7.	Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your HBP treatment plan?	0. Yes 1. No
8.	How often do you have difficulty remembering to take your medication?	0. Never/rarely 1. Once in a while 2. Sometimes 3. Usually 4. All the time

Part one: socio-demographic and economic related factors

Q.N	Question	Response	skip
101.	Respondents age(in completed years)	----------	
102.	Gender	1. Male 2. Female	
103.	Where do you currently live?	1. Urban 2. Rural	
104.	What is your ethnic group?	1. Oromo 2. Amhara 3. Tigre 4. Dawuro 5. Others(specify)----------	
105.	Religion	1.orthodox 2. muslim 3. pirotestant 4. catholic 5. others (specify)----------	
106.	What is your current marital status?	1. Single 2. Married 3. Divorced 4. Widowed	
107.	What is your educational status	1.no education (illiterate) 2.primary education (1-8) 3.secondary education (9-12 4.higher education (12+)	
108	What is your employment status?	1. Government 2. Merchant 3. Student 4. Housewife 5. Farmer 6. Retired 7. others(specify)	
109	What is your total monthly income?	----------Birr---	
110	Is there anyone who supports you in reminding the time you take the medication?	1. Yes 2. No	
111	If yes to Q"109" who is it?	1. Husband 2. Wife 3. Daughters/son 4. Friends 5. Others(specify)	

Part two: knowledge about hypertension treatment

Q.N	Questions	Response	Skip
201	High diastolic or systolic blood pressure indicates increased blood pressure.	1. Yes 2. No 3. Don't know	
202	Patients with hypertension cannot drink alcoholic beverages	1. Yes 2. No 3. Don't know	
203	Individuals with increased blood pressure must not smoke	1. Yes 2. No 3. Don't know	
204	Individuals with increased blood pressure must eat fruits and vegetables frequently	1. Yes 2. No 3. Don't know	
205	The best type of meat for individuals with increased blood pressure is red meat.	1. Yes 2. No 3. Don't know	
206	If the medication for increased blood pressure can control blood pressure, there is no need to change lifestyles.	1. Yes 2. No 3. Don't know	
207	Increased blood pressure is the result of aging, so treatment is unnecessary	1. Yes 2. No 3. Don't know	
208	Increased blood pressure can cause heart diseases, such as heart attack, if left untreated.	1. Yes 2. No 3. Don't know	
209	Increased blood pressure can cause strokes, if left untreated.	1. Yes 2. No 3. Don't know	
210	Increased blood pressure can cause kidney failure, if left untreated.	1. Yes 2. No 3. Don't know	

Part three: lifestyle related questions

S.N	Questions				
	How often do you	Daily (4)	Frequently (3)	Rarely (2)	Never (1)
301	Smoke?				
302	Drink alcohol?				
303	Eat meal high in animal fat?				
304	Eat vegetables?				
305	Eat fruits?				
306	Sprinkle salt on Your food?				
307	Engage in physical exercise?				
308	Try to lose some weight?				
309	Get enough sleep?				

Part four: disease related factors

Q.N	Questions	Response	Skip
401.	For how long (in years) have you been on diagnosed for hypertension?	1. Less than 1 year 2. 1-3 years 3. 3-5 years 4. >5 years	
402.	Do you suffer from any other chronic disease?	1. Yes 2. No	If "NO" skip to Q 404
403.	If yes to Q "302" which chronic disease?	1. DM 2. Heart disease 3. others(specify)	
404.	Have you been hospitalized due to complications from hypertension in the last one year?	1. Yes 2. No	

Part five: drug related factors

Q.N	Questions	Response	Skip
501.	For how long have you been on the treatment of hypertension?	5. Less than 1 year 6. 1-3 years 7. 3-5 years 8. >5 years	

502..	How many type of antihypertensive drugs are you taking now?	1. One 2. Two 3. Three 4. More than three	
503.	Have you ever noted any side effects of the drugs you are taking?	1. Yes 2. No	If "NO" skip to Q "601"
504.	If yes to Q"402" which ones do you noticed?	1. Headache 2. Dizziness 3. others(specify)	

Part six: organizational related factors

Q.N	Questions	Response	Skip
601.	What is the average distance of your home from the hospital in meters?	----------	
602.	What is the average number of hours it takes you to reach the hospital in minutes?	----------	
603	What is the average cost of your hypertension medication per month in birr?	----------	
504.	Are those drugs prescribed for you readily available in the hospital pharmacy every time?	**1. Yes** **2. No**	
605.	Have you ever been told by your Doctor the importance of taking your hypertension medication?	**1. Yes** **2. No**	
606.	For how long on average do you discuss about the importance of taking your medication in minutes?	----------	

Part seven: patient-provider communication

Q.N	Questions	Response				
	Your physician	1.strongly disagree	2.disagree	3.neither	4.agree	5.strongly agree
701.	Encourages expression of problems					
702.	Asks about concerns					
703.	Listens to your concerns					
704.	Helped solve problems					

Amharic version questionnaire

በጅማ ዩኒቨርሲቲ ስፔሻላይዝድ ሆስፒታል የደም ብዛት ታካሚ ህሙማን ላይ በመድሃኒቶቹ አወሳደድ ላይ ተያይዞው ስላለ ችግሮች በተመለከተ ለሚደረግ ጥናተ የቀረበ መጠየቅ

ስሜ _____ይባላል፡፡ እኔ የደም ብዛት መድሃኒት አወሳሰድ ላይ ተያይዞ ስላለ ችግሮች ላይ በምሰራ ጥናት አንዱ/አንድዋ መረጃ ሰብሳቢ ነኝ፡፡ እኔ 20 ደቂቃ የሚፈጅ ጥቃት ጥያቄዎችን አቀርብልሃለሁ፡፡ ከአንተ /አንቺ የምሰበስብ መረጃ ለዚህ ጥናት ብቻ ነው የምንጠቀምበት፤፤ በመጠየቁ ላይ ስም አይጻፍም፤፤ በመጠየቁ ወቅት መመለስ የማትፈልገውን ማንኛውንም አይነት ጥያቄ ወይም በማንኛውም ሰዓት ውይይቱ ማቋረጥ ይችላለ፡፡ ሆኖም ግን ያንተ /ያንቺ ትክክለኛ ምላሽ የጥናቱን አላማ ለማሳካት ጥናቱን የማያካሂድ ሰው ይጠቅማል፡፡ የዚህ ጥናት መጠይቅ የመመለስ ትብብርህን አደንቃለሁ፡፡

ስለዚህ በዚህ ጥናት ላይ መሳተፍ ይችላለ?

መልሶ አዎ ከሆነ ወደሚቀጥለው ገፅ እለፊ/ፍ አልፈልግም ከሆነ አመስግነው መጠይቁን ያቋርጡ፡፡

የታካሚው ካርድ ቁጥር _____

የመረጃው ሰብሳቢ ስም _____ ፊርማ_____ ቀን _____

የተቆጣጣሪው ስም _____ ፊርማ_____ ቀን _____

ሞርስክ መድከሽን አደራንስ እስከል

ተ.ቁ	ጥያቄ	መልስ
1	አንዳንዴ የደምብዛት መድሃኒትን መዋጥ ትረሳለህ ?	0. አዎ 1. አይ
2.	አንዳንዴ ሰዎች ከመርሳት ውጪ በሌላ ምክኒያት መድሃኒታቸዉን አይውጡም። ያለፉትን ሁለት ሳምንታትን በማሰብ መድሃኒትህን ሳትወስድ ያሳለፍከው ቀን አለ ?	0. አዎ 1. አይ
3.	ለሃኪም ሳትናገር መድሃኒቱን ስትወስድ የህመም ስሜት ስለተሰማ መድሃኒትህን መዋጥ አቁመህ ወይም ቀንሰህ ታውቃለህ ?	0. አዎ 1. .አይ
4.	ቤትህን ጥለህ ስትሄድ ወይም ወደ ሌላ ቦታ ስትጓዝ አንዳንዴ መድሃኒትህን ይዘህ መሄድ ረስተህ ታውቃለህ/ሽ?	0. አዎ 1. አይ
5.	የደም ብዛት መዳኒትህን ትናንትና ወስደሃል?	0. አይ 1. አዎ
6.	አንዳንዴ ደም ብዛት ተቆጣጥሮዋልህ ብለህ ስታስብ መድሃኒትህን ታቆማለህ?	0. አዎ 1. .አይ
7.	ሁሌ በቀን በቀን መድሃኒትህን መውሰድ ለአንዳንድ ሰዎች አመቺ አይደለም። አንተ የደም ብዛት መድሃኒትህን እቅድ ለመከታተል ተሰላችተህ ታውቃለህ?	0. አዎ 1. አይ
8.	የደም ብዛት መድሃኒትን ለማስታወስ ምንያህል ትቸገራለህ?	1.ፈፅሞ 2.አንዳዴ /በአጋጣሚ 3.አልፎ አልፎ 4.አብዛኛውን ጊዜ 5.ሁልጊዜ

ክፍል አንድ፡ አጠቃላይ የግለሰቡ መረጃ

ተ.ቁ	መጠይቅ	መልስ
101	የመላሽ ዕድሜ (በሙሉ አመት)	_____
102	ፆታ	1.ወንድ 2.ሴት
103	በአሁኑ ጊዜ የት ነዉ የምትኖረዉ ?	1.ከተማ 2.ገጠር
104	ብሄር ምንድ ነዉ?	1. ኦሮሞ 2. አማራ 3. ትግሬ 4. ዳዉሮ 5.ሌላ (ግለጽ)----------
105	ሀይማኖት ?	1. ኦርቶዶክስ 2. ሙስሊም 3.ፕሮቴስታንት 4.ካቶሊክ 2. ሌላ (ግለጽ)----------
106	የአሁን ጊዜ የትዳር ሁኔታ?	1.ያገባ/ች 2. ያላገባ/ች 3. የፈታ/ች 4. የሞተባት
107	የትምርት ደረጃ?	1. ያልተማረ 2. አንደኛ ደረጃ (1-8) 3. ሁለተኛ ደረጃ (9-12) 4. ከፍተኛ ትምርት(ከ12 በላይ)
108	የስራ ሁኔታ ?	1. የመንግስት ሰራተኛ 2. ነጋዴ 3. ተማሪ 4. የቤት እመቤት 5. አርሶ አደር 6. ጡረተኛ 7. ሌላ (ግለጽ)----------
109	ጠቅላላ የወር ገቢ	_____ብር
110	መዳኒትህን የምትወስድበት ሰአት በማስታወስ የሚደግፍ ሰዉ አለ?	1. አለ 2. የለም
111	ለጥያቄ ቁጥር 110 አለ ካልክ ማነዉ?	1. ባል 2. ሚስት 3. ጓደኛ 4. ልጆች 5. ሌላ (ግለጽ)----------

ክፍል ሁለት ፡የግለሰቡን እዉቀት መለኪያ መጠይቅ

ተ.ቁ	መጠይቅ	መልስ
201	የታችኛዉ ና የላኛዉ የደም ልከት መጨመር የደም ብዛት መጨርን ያሳያል	1.አዎ ያሳየል 2.አይ 3. አላዉቅም
202	ደም ብዛት ያለባቸዉ ሰዎች አልኮል መጠጦችን መጠጣት አይችላለ?	1.አዎ አይችላለ 2.አይ ይችላለ 3. አላዉቅም
203	ደም ብዛት ያለባቸዉ ሰዎች ማጨስ የለባቸዉም ?	1.አዎ የለባቸዉም 2.አይደለም 3.አላዉቅም
204	ደም ብዛት ያለባቸዉ ሰዎች ብዙ ጊዜ ፍራፍሬ እና አታክልት መብላት አለባቸዉ	1.አዎ 2.አይደለም 3.አላዉቅም
205	ደም ብዛት ያለባቸዉ ሰዎች ጥሩ የስጋ አይነት ቀይ ስጋ ነዉ?	1.አዎ 2.አይደለም 3.አላዉቅም
206	ለደም ብዛት የሚወስዱት መድሀኒት ደም ብዛቱን ከተቆጣጠረዉ የኑሮ ዘይቤን መቀየር አያስፈልግም	1..አዎ 2.አይደለም 3.አላዉቅም
207	ደም ብዛት በማርጀት የሚመጣ ስለሆነ ህክምና አያስፈልግም ?	1.አዎ 2.አይደለም 3.አላዉቅም
208	ደምብዛት ሳይታከሙ ሲቀር የልብ በሽታን ሊያመጣ ይችላል	1.አዎ 2.አይደለም 3.አላዉቅም
209	ደምብዛት ሳይታከሙ ሲቀር እራስን መሳት ሊያመጣ ይችላል?	1.አዎ 2.አይደለም 3.አላዉቅም
210	ደም ብዛት ሳይታከሙ ሲቀር የኩላሊት በሽታ ልያመጣ ይቻላል	1.አዎ 2.አይደለም 3.አላዉቅም

ክፍል ሶስት፡ የኑሮን ዘይቤ በተመለከተ

ተ.ቁ	መጠይቅ	መልስ
301	ታጨሳለ	1. ፈጽሞ 2. በጣም አልፎ አልፎ 3. ዘወትር 4. በቀን በቀን
302	አልኮል ትጠጣለህ	1. ፈጽሞ 2.በጣም አልፎ አልፎ 3.ዘወትር 4.በቀን በቀን
303	በሬሳ የበለጸገ ምግብ ትመገባለህ	1. ፈጽሞ 2.በጣም አልፎ አልፎ 3.ዘወትር 4.በቀን በቀን
304	አታክልት ትመገባለህ	1. ፈጽሞ 2.በጣም አልፎ አልፎ 3.ዘወትር 4.በቀን በቀን
305	ፍራፍሬ ትበላለህ	1. ፈጽሞ 2.በጣም አልፎ አልፎ 3.ዘወትር 4.በቀን በቀን
306	ምግብህ ላይ ጨዉ ታደርግበታለህ	1. ፈጽሞ 2.በጣም አልፎ አልፎ 3.ዘወትር 4.በቀን በቀን
307	እንቅስቃሴ ተሰራለህ	1. ፈጽሞ 2.በጣም አልፎ አልፎ 3.ዘወትር 4.በቀን በቀን
308	ክብደት ለመቀነስ ትሞክራለህ	1. ፈጽሞ 2.በጣም አልፎ አልፎ 3.ዘወትር 4.በቀን በቀን
309	በቂ እንቅልፍ ታገኛለህ	1. ፈጽሞ 2.በጣም አልፎ አልፎ 3.ዘወትር 4.በቀን በቀን

ክፍል አራት፡ በሽታዉን (ደም ብዛትን) በተመለከት መጠይቅ

ተ.ቁ	መጠይቅ	መልስ	እለፍ
401	ደም ብዛት እንዳለብህ ከታወቀ ምን ያህል ጊዜ ሆነክ;	1.ከ 1 አመት በታች 2. ከ 1 - 3 አመት 3. ከ 3 - 5 አመት 4.ከ 5 አመት በላይ	
402	ከደም ብዛት ዉጭ በሌላ በማይተላለፍ በሽታ ትታመማለህ;	1. አዎ 2. አይ	ለ ጥያቄ 402 መልስ 2 ከ ሆነ ወደ 404 እለፍ
403	ለጥያቄ 402 አዎ ከሆነ በምን በሽታ	1. ስኳር 2. የልብ በሽታ 3. ሌላ (ግለጽ)----------	
4 404	ባ ባለፈዉ አንድ አመት ዉስጥ ከደም ብዛት ጋር በተያያዘ ሆስፒታል ተኝተህ ታዉቃለህ	1.አዎ 2.አይ	

ክፍል አምስት፡ መዳኒትን በተመለከተ መጠይቅ

ተ.ቁ	መጠይቅ	መልስ	እለፍ
501	የደም ብዛት መዳኒትን መዉሰድ ከጀመርክ በአመት ለምን ያህል ጊዜ ነዉ	1. ከ 1 አመት በታች 2. ከ 1 - 3 አመት 3. ከ 3 - 5 አመት 4. ከ 5 አመት በላይ	
502	በአሁን ግዜ ስንት አይነት የደም ብዛት መዳኒት ትወስዳለህ	1.አንድ 2. ሁለት 3. ሶስት 4. ከ 3 በላይ	

503	መዳኒቱና በመዉሰድ ጋር በተያያዘ ያጋጠመህ ችግር አለ	1. አዎ 2. አይ	ለ ጥያቄ 502 መልስ 2 ከ ሆነ ወደ 601 እለፍ
504	ለጥያቄ 503 አዎ ከሆነ ምን አይነት ችግር	1. ራስ ምታት 2. ማዞር 3. ሌላ (ግለጽ)----------	

ክፍል ስድስት፡ የጤና አገልግሎት ሰጪ/ሆስፒታሉን የተመለከተ መጠይቅ

ተ.ቁ	መጠይቅ	መልስ	እለፍ
601	በአማካይ ከቤት እስከ ሆስፒታል ስንት ሜትር ይሆናል	----------ሜትር	
602	በአማካይ ሆስፒታል ለመድረስ ስንት ደቂቃ ይፈጅብሀል/ሻል	----------ደቅቃ	
603	በአማካይ በወር ለደም ብዛትህ መዳኒት ስንት ብር ታወጣለህ	----------ብር	
604	ሀኪምህ የሚያዝልህን መዳኒት ሁሌ በሆስፒታሉ መድሀኒት መደብረ/መሸጫ ታገኛለህ	1. አዎ 2. አይ	
605	ሀኪምህ የደም ብዛት መዳኒት የመዉሰድ ጥቅሙን ነግሮክ ያዉቃል	1. አዎ 2. አይ	
606	በአማካይ ከሀኪምህ ጋር ስለ መዳኒቱ ጥቅም ለመወያየት ስንት ደቂቃ ትጠቀማላችዉ	----------ደቅቃ	

ክፍል ሰባት፤ በታካሚዉ ና በአገልግሎት ሰጪዉ ባለሙያዎች መካከል ስላለዉ ግንኙነት የተመለከተ መጠየቅ

ተ.ቁ	መጠየቅ	መልስ
	ያንተ ሀክም	
701.	ችግርን ለመግለጽ ያበረታታሀል	1.በጣም አልደግፍም 2. አልደግፍም 3. መካከለኛ 4. እደግፋለዉ 5. በጣም አደግፋለዋ
702	ሀሳብህን ይቴይቅሀል	1.በጣም አልደግፍም 2. አልደግፍም 3. መካከለኛ 4. እደግፋለዉ 5. በጣም አደግፋለዋ
703	ሀሳብህን ያዳምጥሀል	1.በጣም አልደግፍም 2. አልደግፍም 3. መካከለኛ 4. እደግፋለዉ 5. በጣም አደግፋለዋ
704	ችግርህን ለመፍታት ያግዝሀል	1.በጣም አልደግፍም 2. አልደግፍም 3. መካከለኛ 4. እደግፋለዉ 5. በጣም አደግፋለዋ

Afan Oromo version questionnaire

Maqaan koo _____. Ani namota raga waa'ee akkataa itti fayyadaama qoricha dhibbaa dhiiga funanan kessaa ishee/isaa tokko dha. Gaaffilee murasaa naannoo daqiiqaa 20 fudhatuun sii gaafadha. Odeffannoo/ ragaan sirra funanamuu qorannoo kana qofaf ittii fayyadamaama. Maqaan kee asirratti hin barreeffamu. Gaaffii deebisuu hin barbannee kamiyyuu deebisuu dhisuu dandeessaa, yeroo barbade kamittiyyuu addaan kutuu ni dandeessa. Haata'uu malee obsaa fi xiyyeffannadhaan akkasumas amanamummadhaan yoo gaaffilee kana naa deebistaan kayyoo qo'annaa kana jechunis sababoota/wantoota namootni tokko tokko qoricha isaanii sirriitti hordoffanii/fudhaatani namootni tokko tokkomoo sirritti hin hordofnee godhaan beekuuf naa gargaraa. Deggersaa naaf gootaniif baayeen isiin galateffadha

Gaaffanoo kana keessatti hirmachuuf fedha qabduu?

Eeyyee (gafachuu itti fufii) lakkii (galatoomii jedhii garaa tajaajilamaa itti aanutti darbi)

Lakk. Kaardii----------

Maqaa nama raga funaanu/tu ----------Mallattoo --------- Guyyaa --------

Maqaa to'ataa/tu ----------Mallattoo --------- Guyyaa ----------

Safaartu/madalii haalan itti fayyaadama dawwaa dhibee dhibbaa dhiiga

(Morisky Medication Adherence Scale template)

T.L.	Gaaffillee	Deebii
1	Yeroo tokko tokko dawwaa dhibbaa dhiiga kee fudhachu/liqimsu ni dagataa?	0. Eyyee 1. Lakkii
2	Namootni yeroo tokko tokko irranfachun qofa osoo hin tahin sababoota biroon dawwaa liqimsu dhiisu danda'u. torban lamaa darban keessatti guyyaa itti dawwaa dhibbaa dhiiga kee hin liqimsiin hafte jira?	0. Eyyee 1. Lakkii
3	Sabaabi dhukkubin yeroo fudhaatu sitti dhagahameef osoo haakimaa kee hin marisisen dawwa fudhachu addaan kutee/gutumman liqimsu dhaabde beekta ?	0. Eyyee 1. Lakkii
4	Yeroo tokko tokko yeroo mana batuu yookiin bakka bira yeroo adeemtu dawwaa dhibbaa dhiiga kee fudhatee deemu dagatee beekta?	0. Eyyee 1. Lakkii
5	Guyyaa kalessa dawwaa dhiibba dhiiga kee liqimsitee jirta?	0. Lakkii 1. Eyyee
6	Yeroo tokko tokko daabalin dhiibba dhiiga keetii waan gadii bu'e yoo sittii fakkaatu dawwaa kee liqimsu ni dhiifta?	0. Eyyee 1. Lakkii
7	Guyyaa guyyaan dawwaa liqimsun namoota tokko tokkof mijaa'u dhiisu danda'a. ati sagantaa dawaa dhiibba dhiiga kee itti fudhattu nuffittee beekta?	0. Eyyee 1. Lakkii
8	Dedeebiin yeroo hagamiif dawaa dhiibba dhiiga kee yaadachuun sitti ulfata?	0.Tasaayyuu 1.Akka tasaa yeroo tokko 2.Darbee darbee 3.Yeroo baay'ee 4.Yeroo hundaa

Kutaa 1ffaa odeeffannoo/raagaa dhunfaa hirmatoota

Lakk	Gaaffii	deebii	Irraa darbii
101	Umuriin kee meeqa?(wagga guutuu dha)	_____	
102	Saala	1. Dhiira 2. Dhaala	
103	Bakka jireenyaa	1.Magaalaa 2.Baadiyyaa	
104	Saba/qoomoo	1.Oromoo 2.Amharaa 3. Tigiree 4.Dawaroo 5.kan biroo (haa ibsamuu)----------	
105	Amantaa	1. orthodoksii 2. musiilima 3. pirotestantii 4. katolikii 5. kan biro(haa ibsamu)----------	
106	Halaa fudhaa fi herumaa	1.Hin herumnee/ hin funnee 2. Kan herumtee/ kan fuudhee 3.Adda baanee/wal hikan 4.Abban/Haadhaa mana kan irraa du'ee 5. kan biroo (haa ibsamuu)___	
107	Sadarkaa barumsaa	1.Hin barrannee 2.Sadarkaa 1ffaa (1-8) 3. Sadarkaa 2ffaa(9-12) 4.Sadarkaa ol'aanaa (12+)	

108	Hojiinkee maalii?	1.Hojetaa/tu motummaa 2.Daldala/tu 3.Barataa/tu 4. Haadhaa warraa 5. Qote Bula 6. Soorumma kan bahe 7. kan biroo (haa ibsamuu)___	
109	Galiin ji'atti argattan tilmaman qarshiidhaan hagami?	_____ birrii	
110	Namni yeroo ati itti qorichaa kee fudhatu si yaadachisun sii gargaru jira?	1. eeyyyee 2. lakkii	
111	Deebiin gaafii 109 eyyee yoo tahe, eenyuu?	1.Abbaa maana 2.Hadhaa mana 3. Ijoolle 4. Hiriyyaa 5. Kan biroo (haa ibsamuu)___	

Kutaa 2ffaa Gaaffannoo beekumsii waa'ee yaala dhibbaa dhiigaa

Lakk	gaaffii	deebii	Irraa darbii
201	Olkaainsi safartuu dhiiga kan iirraa ykn kan jala dabaala/ dhiiba dhiiga muliisa.	1. Eyyee 2. Lakkii 3. Hin beeku	
202	Dhukkubsatotni dhiibaa dhiiga dhugaati alkooli dhuguu hin danda'ani.	1. Eyyee 2. Lakkii 3. Hin beeku	
203	Namootni dhiibaa dhiiga qaban tamboo xuuxuu hin qaban	1. Eyyee 2. Lakkii 3. Hin beeku	
204	Namootni dhiibba dhiiga qaban yeroo baayee fuduraalee fi muduralee nyaachu qabuu.	1.Eyyee 2. Lakkii 3. Hin beeku	
205	Namoota dhiibba dhiiga qabaniif gosti foonii filatamaan foon diimaa dha.	1.Eyyee 2. Lakkii	

		3. Hin beeku	
206	Yoo daawaan dhiibaa dhiiga dabala dhiiga to'aate haala jireenyaa ofii jijjirun barbachisa miti	1.Eyyee 2. Lakkii 3. Hin beeku	
207	Dabaalin dhiibaa dhiiga bu'a dulloma waan tahef yaalamuun barbachisaa miti	1.Eyyee 2. Lakkii 3. Hin beeku	
208	Dabaaliin dhiibaa dhiiga yoo yaali argachuudha baate dhibee oonnee namatti fida.	1.Eyyee 2. Lakkii 3. Hin beeku	
209	Dabaaliin dhiibaa dhiiga yoo yaali argachuudha baate dhibee of waalalu namatti fida.	1.Eyyee 2. Lakkii 3. Hin beeku	
210	Dabaaliin dhiibaa dhiiga yoo yaali argachuudha baate dhibee Kalee namatti fida.	1.Eyyee 2. Lakkii 3. Hin beeku	

Kutaa 3ffaa Gaaffannoo Haala jireenya waliin wal qabatu.

Lakk.	Gaaffii				
	Yeroo haagamiif	Guyyaa guyyaan (4)	Yeroo baayee (3)	Darbe darbe(2)	tasayyuu(1)
301	Taamboo xuuxaa?				
302	Dhugaatti alkoolii dhugdaa?				
303	Nyaata cooma horiin badhaadhe soorataa?				
304	Muuduralee soorataa?				
305	Fuduraalee soorataa?				
306	Soogidaa soorata kee irratti firfirsitaa?				
307	Sochii qaama keessatti hirmataa?				
308	Ulfaatina qaama hirisuf yaali goote?				
309	Hirriba gaha argataa?				

Kutaa 4ffaa Gaaffannoo waa'ee rakkoo dhiibaa dhiiga wajjin walqabatu

Lakk	gaaffii	deebii	Irraa darbii
401	dhiibaa dhiiga akka qabduu ergaa beekitee yeroo hagami?	1. Wagga tokko gadi 2. Wagga 1-3	

		3. Wagga 3-5 4. wagga 5 olii	
402	Dhukkubni nama namatti hin darbine kan biran si dhukkubaa?	1. Eyyee 2. Lakkii	Lakkii yoo tahe gaafii 404 tti darbi
403	Deebiin gaaffii 402 eyyee yoo tahe dhukkubaa isaa kami?	1.dhukkubaa sukkaraa 2. dhukkubaa onnee 3.Kan biroo (haa ibsamuu)___	
404	Waaggaa darbe keessatti Sababii rakkoo haama /daanqaa dhukkuba dhiibaa dhiigaatiif mana yaala ciiftee wallanamtee beekta?	1.Eyyee 2. Lakkii	

Kutaa 5 ffaa : rakkoollee dawaan walii qabatan

Lakk.	Gaaffii	Deebii	Darbii
501	Dawaa dhiibbba dhiiga fudhachuu ergaa eegalte yeroo hagami?	1.Wagga tokko gadi 2.Wagga 1-3 3.Wagga 3-5 4.wagga 5 olii	
502.	Yeroo amma kana dawwa dhibba dhiiga gosaa meeqa fudhata?	1. Tokko 2. Lamaa 3. Sadii 4. Sadii olii	
503.	Dawaa dhiibba dhiigan walii qabatee rakkon/mallatton sii mudate beeku jiraa?	1. Eeyyee 2. Lakkii	Deebiin “lakkii” yoo ta’e 601 darbii
504.	Gaaffii “503” eeyyee yoo ta’e mallattoo akkami?	1. Mataa bowwu 2. Maramartoo 3. Kan biroo (haa ibsamuu)	

Kutaa 6ffaa: rakkoollee dhabbiilee fayyan walii qabatan

Lakk.	Gaaffii	Deebii	Darbii
601.	Giddu galeessan manni jireenya kee Hosipitalaa irra meetira meeqa fagaata?	----------	
602.	Giddu galeesan hosipitalaa kanaa gahuuf sa’aatii hagam sitti fudhata?	----------	
603.	Giddu galeessan ji’aatti dawaa dhiibba dhiiga keef qarshii hagam baastaa?	----------birrii	

604.	Yeroo mara dawaa siif ajejame dukkana qoricha hosipitalichatti ni argataa?	1. Eeyyee 2. Lakkii	
605.	Dookitarii kee waa'ee faayidaa dawaa dhiibba dhiiga kee fudhachuu sitti himee beeka?	1. Eeyyee 2. Lakkii	
606.	Giddu galeessan dookitarii kee waliin waa'ee faayidaa dawaa dhiibba dhiiga kee daqiiqa hagamiif mari'atu?	-------- daqiiqa	

Kutaa 7ffaa: walitti dhufeenyaa dokitarii fi dhukkubsata giddu jiruu

Lakk.	Gaaffii	Deebii
	Dookitarii kee	1. Baay'ee walii hin galuu 2. Walii hin galuu 3. yaada hin qabuu 4. waliin gala 5. baay'een walii galaa
701.	Rakkoo kee ibsachuuf sii jajjabeessa.	
702.	Yaada kee sii gaafata.	
703.	Yaada kee sii dhaggeffata.	
704.	Rakkoo kee hiikuuf sii gargaraa.	