ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE SCHOOL OF NURSING AND MIDWIFERY DEPARTMENT OF NURSING

HEALTH PRACTITIONERS' COMPLIANCE WITH HYPERTENSION MANAGEMENT GUIDELINE AND ITS ASSOCIATED FACTORS IN ILLUBABOR AND BUNO BEDELLE ZONES, SOUTH WEST ETHIOPIA, 2020

BY: G/MESKEL MULATU TESFAYE

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE SCHOOL NURSING AND MIDWIFERY DEPARTMENT OF NURSING IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF SCIENCE IN ADULT HEALTH NURSING

JUNE, 2020

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ACRONYMS AND ABBREVIATIONS

ACEI - Angiotensin Converting Enzyme Inhibitors

BP – Blood Pressure

CHD - Coronary Heart Disease

CPG- Clinical Practice Guideline

DALYs - Disability-Adjusted Life Years

DM – Diabetes Mellitus

FDREMOH - Federal Democratic Republic of Ethiopia Ministry of Health

GRC - Guidelines Review Committee

HC - Health Center

HDL-C - High Density Lipoprotein Cholesterol

HICs - High-Income Countries

HTN - Hypertension

IRB - Institution Review Board

LDL-C - Low Density Lipoprotein Cholesterol

LMICs - Low and Middle Income Countries

NCDs - Non-Communicable Diseases

OPDs - Outpatient Departments

PHC - Primary Health Care

PHCU - Primary Health Care Units

PHCWs - Primary Health care Workers

SBP - Systolic Blood Pressure

SDG - Sustainable Development Goal

WHO- World Health Organization

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ABSTRACTS

Background: To achieve sustainable development goal and to improve management of non-communicable diseases the federal democratic republic of Ethiopian ministry of health developed guidelines on clinical and programmatic management of major non communicable diseases in 2016. Compliance to hypertension guideline was very low in developing countries leading to compromised quality of life and premature deaths. The aim of this study was to assess compliance of health practitioners' with the 2016 federal democratic republic of Ethiopian ministry of health hypertension management guideline and health system, health practitioners', and patient factors associated their compliance in Illubabor and Buno Bedelle zones.

Objective: To assess health practitioners' compliance with hypertension management guideline and its associated factors in Illubabor and Buno Bedelle zones.

Method: A cross-sectional study design from patient medical record data was used to assess for compliance with hypertension management guideline. Medical records of adult Patients treated for hypertension from March 2019 to march 2020wasreviewed. Simple random sampling method was used to select the first study population then systematic sampling was used to select consecutive study populations. The collected data was checked for its completeness, consistency and accuracy before analysis. Data was coded, entered and cleaned using Epi- data 7 and export to SPSS version 25 for analysis. Multivariate analysis was used to obtain a final model describing the significant independent predictors of guidelines compliance.

Results: overall compliance of health practitioners' to hypertension guideline were found to be poor; only 75(19.5%) of patients were managed following the guideline. In multivariate analysis, availability of resource (adjusted odds ratio [AOR] =0.400, 95% CI: =0.203-0.788), supervision status (adjusted odds ratio [AOR] =0.497, 95% CI: =0.308-0.892), training status (adjusted odds ratio [AOR] =0.250, 95% CI: =0.107-0.584), and appointment status (adjusted odds ratio [AOR] =0.091, 95% CI: =0.024-0.352) had significant positive association with compliance to hypertension management guideline.

Conclusion: poor compliance is primarily due to a lack of recommending lifestyle modifications. The majority of health practitioners' complied with the pharmacological antihypertensive treatment protocols for 238 (62.0%)of the patients.

1. Introduction

1.1. Background

Hypertension (HTN) is among cardiovascular non-communicable diseases (NCDs)which are non-contagious diseases with long duration; which takes a high percentage of overall mortality, and known to push many people into poverty due to catastrophic spending on medical care (1). NCDs are embedded in sustainable development goal (SDG) target 3.4, that is, to reduce by one-third the premature mortality from non-communicable diseases by 2030(2). To achieve SDG and to improve management of NCDs the federal democratic republic of Ethiopian ministry of health (FDREMOH) developed guidelines on clinical and programmatic management of major non communicable diseases including HTN in 2016 (3). There is global consensus that using the primary health-care system, which provides a decentralized and integrated platform of care is important in addressing non-communicable diseases (4); which is the reason that FDREMOH have adapted the World health organization (WHO) package to the local context and developed the guideline for primary health care unit use. These guidelines deal in a comprehensive manner with all realms of NCDs interventions such as prevention, treatment and care. The major target audience comprise nurses, health officers and physicians in general practice (MD) working at the primary care level, especially health centers and primary hospitals (3). Primary health care (PHC) was defined as health facilities that served as the first point of contact for ill patients but excluded inpatient hospital settings(5).

A guideline is any document containing recommendations about health interventions, whether these are clinical, public health or policy recommendations. A recommendation provides information about what policy-makers, health-care providers or patients should do. It implies a choice between different interventions that have an impact on health and that have implications for the use of resources. Guidelines are recommendations intended to assist providers and recipients of health care and other stakeholders to make informed decisions so that there will be improvement of patient outcome. Guideline can be: 1) A rapid advice guideline which produced in response to a public health emergency (such as pandemic influenza) in which WHO is required to provide rapid global leadership and guidance, 2) A standard guideline that produced

in response to a request for guidance in relation to a change in practice or controversy in a single clinical or policy area. 3) A compilation of guidelines contains current recommendations from WHOs and other sources, but does not include any new recommendations. 4)Full guideline; full guideline is defined as one that provides complete coverage of a health topic or disease. It would be expected to include recommendations in relation to all aspects of the topic (e.g. surveillance, diagnosis, public health and clinical interventions) and to be fully based on systematic reviews of the evidence for each aspect(6).Guideline is a summary of Major study findings that can easily accessed by practitioners who are too busy to confirm the most recent information from major trials. Many practitioners are not aware of these guidelines and some are aware of them but are not compliant with them(7).

Globally, among all NCDs, HTN account for 0.7%, of the total disability-adjusted life years (DA LYs)(8). According to the WHO, hypertension is a major risk factor for cardiovascular disease (CVD), as well as renal impairment, peripheral vascular disease, and blindness. Hypertension is e stimated to cause 7.5 million deaths worldwide annually, about 12.8% of the total deaths (9). Ma ny factors have been identified as possible causes of the increased morbidity and mortality, inclu ding Demographic transition, increasing life expectancy, modern trends of living, and changing f amily dynamics in addition to poor patient understanding of the disease process and of appropria te medication use, noncompliance with prescribed medical regimens, and an inability to use medi cations properly (10).

Similarly, the magnitude of hypertension along with other diseases is increasing in Ethiopia (11). WHO, 2018 estimation shows that in Ethiopia national cardiovascular disease prevalence was 16 %(12). This WHO estimation shows a rise of 1% in cardiovascular prevalence, since 2011 estima tion(13).A study in Ethiopia showed the overall prevalence of hypertension among adult populati on to be 27.9%, with the proportion being 30.7% in urban and 25.3% in rural residents. In terms of sex proportion, 29.3% was for women and 26.3% for men (14). Prevalence of Hypertension (HTN) in Illubabor zone was shown to be 14.2%(15). Whereas in Bedelle town, reported use of a nti-hypertensive medication was 16.9%, only 44.8% of those with HTN were aware of their statu s, and the overall control rate of HTN was only 22.4%(16).

1.2. Statement of the problem

Compliance has been defined as the "the extent to which a person's behavior, corresponds with agreed recommendations and follows list of tasks given by some party." There is mounting evidence that non-compliance to the treatment guideline is prevalent across the world and is associated with adverse health outcomes, increased incidence of drug resistance, and higher costs of care (17). Lower risk of long-term morbidity and mortality, improved quality of life, and lower healthcare costs are some of the benefits shown in several studies from compliance to guidelines (18)Studies on the health practitioners' compliance to prescribing patterns of hypertension guidelines have shown that some physicians lack the tendency to follow the guideline and prescribe more expensive drugs without evidence of efficacy(19). A study conducted in Bangladesh revealed that, implementation to national guideline for HTN surveillance was weak(20). According to a systematic review of published population based studies on HTN in Sub-Saharan Africa, less than 40% of people with BP above the normal range are diagnosed as hypertensive; less than 30% of diagnosed cases are on treatment, and only less than 20% of them had BP within the defined normal range(21). Studies documented substantial gaps between the development and dissemination of guidelines and their implementation in practice; specifically there was no change in health personnel behavior to follow clinical practice guidelines (22)(23). Studies have concluded that health personnel compliance to HTN guidelines has been low (24). An estimated 40% of the 50 million persons in the United States with HTN remain untreated, and 66% of hypertensive patients have BP values that are not controlled to the recommended levels (25). Complying with guideline and translating into concrete medical practice is a complex process in which health practitioner-related, patient-related, guideline related, and educative factors all play a role(26).Some studies have been conducted to show the extent to which knowledge of guideline recommendations for diagnosis and treatment affects how health practitioners' manage their patients(27). The German follow-up of the Hypertension Evaluation Project clearly demonstrated inadequate knowledge of the diagnosis and treatment of arterial hypertension (28). Observational studies have shown that the health care practitioners' attitudes, behavior towards hypertension management and deviation from the clinical practice guidelines account for more than 66 % of the poor control of hypertension(29). There is also evidence of deficiencies in treatment quality that appear to be due, among other factors, to

inadequate implementation of existing treatment recommendations (30). Even though several studies are conducted across the globe, most of them are not recent, and only a few of this studies showed couples of factors affect compliance of health practitioners' with HTN guideline. Moreover, there is no study documented about health practitioners' compliance to the 2016 national NCD guideline in the management of hypertension and its associated factors in Ethiopia. The aim of this study was to assess the health practitioners' compliance with HTN management guideline and its associated factors in Illubabor and BunoBedelle zones.

1.3. Significance of the study

This study was conducted to provide baseline information about compliance of PHCWs/health practitioners' to national NCD guideline in the management of HTN. Its findings will be significant in preventing further spread of HTN and to promote wellbeing of the community. To provide an effective and efficient health care by minimizing medication, and therapeutic errors. Results of this study will help health care institutions; particularly the primary ones to recognize factors related to non-compliance and will help them take corrective measures in attempt to improve the compliance status of their employees as well as to improve efficiency and quality of care and so that SDG could be reached. The findings can also indicate the problem area, need of training and other aspects related to non-compliance for ministry of health. Moreover, for policy makers to draft a policy that involves improving compliance of health professionals and this study will also be used as important literature for future researchers who want to undertake similar study.

2. Literature Review

2.1. Introduction

This section presents the result and the idea taken from different studies that was reviewed from different literature including journals, articles and other literature related to this topic that deals with compliance of health practitioners to HTN management guidelines and its associated factors.

2.2. Compliance with hypertension management guidelines

The WHO concluded that, using guidelines according to protocols have the potential to improve quality of care, reduce the cost of treatment and reduce mortality. However, compliance of health practitioners to guidelines remains limited due to the expense of training, the lack of sufficient supportive supervision, the tendency for health workers to follow protocols less over time, and insufficient resource and support (31).

There were some studies conducted on compliance of health practitioners to hypertension management guidelines across the globe; for instance a study found health practitioners' noncompliance with guidelines for the treatment of HTN. Even though, the practitioners' must assess the absolute clinical manifestations and other risk factors before initiating antihypertensive medications, only 10% of them performed a complete clinical evaluation, including a full physical examination, and laboratory investigations(32).

In another study from Malaysia, a fair-to-good level of compliance to medication recommendations of Clinical practice guideline was observed. The study revised medical record of patients and observed 67.1% of them received guidelines compliant treatment. In the study,67.9%ofdiabeticand69%ofrenaldisease patients were receiving guideline compliant anti-hypertensive therapy(33).

From studyconductedat11primaryhealthcare clinics in Melaka, state of Malaysia, only 18.3% of diabetic hypertensive patients received guidelines recommended ACE inhibitors (34).

Another study found that compliance of health practitioners' to Malaysian clinical practice guideline (CPG) was fair. The finding from the study indicated that more than two third (73.5 %) of the total prescriptions written were in compliance with the hypertension Clinical practice guideline. Significantly better hypertension control was seen in patients who were on guideline-compliant therapy, majority of patients (59.2 %) were at goal BP. In the study, CPG adherence when treating co morbid hypertension was found to have negative association with diabetes mellitus and left ventricular hypertrophy; 53.8 % patients with left ventricular hypertrophy were receiving unguided medications as compared to 33.3% patients who were receiving guideline recommended medications (35).

Good Adherence to hypertension guidelines in other study were reported by a cross-sectional study conducted at a family medicine clinic in Edmonton, where 64% of diabetic or renal disease patients were receiving Canadian Hypertension Education Program (CHEP) recommended therapy (36)

Compliance of health practitioners' to hypertension management guideline was also found to low; in which they tend to treat according to their experience and patients preference rather than following the recommended protocols(37).

As study conducted in two primary clinics has reported, the guideline discouraged beta blockers were prescribed for patients with uncomplicated hypertension (38).

Regarding studies in African continent, a study from South Africa showed that primary health care physicians did not follow guideline when treating hypertensive patients. The result of this study revealed that 65.4% of the respondents correctly diagnosed BP >140/>90 mmHg as hypertension, and only 16.8% of them, SBP (systolic blood pressure) >140 mmHg as isolated systolic hypertension (ISH). On the initial choice of anti-hypertensive drug in a post-myocardial infarction (MI) patient with HTN and Atrial fibrillation, 62.5% of the physicians choose according to the guideline, 81.9% correct initial drug choice in patients with HTN and diabetic nephropathy, 70.4% correct drug of choice in patients with HTN complicated by congestive cardiac failure (CCF), Only 27.3% of the right choice when treating a hypertensive patient with angina, compliance to oral drug choice when treating a pregnant female with newly diagnosed

HTN was 68.4% and Most participants (60.2%) were correct when treating isolated systolic hypertension(39).

Another study from Bojanala district in South Africa, overall compliance was found to be 51.9%. Compliance to screening for major cardiovascular risk factors was high for diabetes mellitus (99.2%), moderate for smoking (53.5%), low for obesity (6.1%), dyslipidemias (36.9%) and abdominal obesity (6.2%). Adherence to measurement aspects of the guidelines was high for BP (99.8%), whilst adherence to staging of the severity in accordance with the guideline was low (19.0%). Adherence to lifestyle modification/non-drug treatment recommendations was low for physical activity (31.2%), dietary modification (46.5%), and advice on stopping/reduction of alcohol intake (34.5%) and stopping smoking (47.2%). Adherence to the ongoing care aspect was high for referral (78.6%), whilst adherence to discussion of review date was low (5.3%)(40).

According to a study from Zimbabwe, about 65% of the anti-hypertensive medications given to patients were not in line with the Zimbabwean 2015 hypertension guideline (41).

A study from Sudan revealed that, many health practitioners' reported that they were using hypertension guidelines in their daily practice, but their compliance to hypertension clinical guidelines was found to be very low (38%), which implies that their clinical practices were not in line with the new guideline recommendations(42).

2.3. Factors associated with health practitioners compliance to guidelines

Several factors have been mentioned as limit for compliance of health practitioners hypertension management guidelines' these includes: lack of skill and expertise to implement recommended action, lack of the mandatory equipment or staff to implement a guideline recommendation, not being aware of the existence of the guidelines, unfamiliarity or disagreement with the recommendations of the guidelines, lack of confidence in ability to implement the guideline, inability to overcome the inertia of previous practice, the presence of external barriers to following recommendations, a lack of expectancy that adherence to guidelines will lead to the desired process of health care, or simply forgetting to use it(43).

2.3.1. Attitude towards guideline

Health practitioners' attitudes towards guidelines play a significant role in their implementation in clinical practice. Their intentions to use guidelines can be predicted from their attitudes towards guidelines, which are influenced by many factors, such as their knowledge, past clinical experience, beliefs about guidelines, outcome expectations, peers' opinions, and guidelines characteristics (44).

Health practitioners' are found to remain more positive when they are asked about a specific guideline as compared to guidelines in general (42).

On a study from Malaysia, All health practitioners' in the study had welcoming attitudes towards guidelines. They showed trust in both, the guideline and its developers. They believed that the guideline is useful for them and adherence to it would produce best patients' outcomes. Doctors were positive towards guidelines with mean attitude score of 23.15 ± 1.34 points on a 30-point scale(33).

2.3.2. Knowledge of guideline

A study which assessed guideline knowledge of primary care physicians and their compliance stated that, 40% of the physicians knew the guidelines adequately; while the rest of them knew about certain disease better than the others. Physicians answered questions about chronic Coronary Heart Disease(CHD) in accordance with the guidelines more often than they did questions about HTN (74% versus 11%). The analysis of guideline compliance revealed that physicians who knew the guidelines adequately performed no differently than physicians who did not with respect to 12 of the 16 compliance indicators. As for the remaining 4 compliance indicators, it turned out, surprisingly, that physicians who did not know the guidelines adequately performed significantly better than those who did(45).

A survey, carried out in Italy, indicate that, adequate knowledge of guidelines decreases dramatically with increasing age and duration of practice; surprisingly high prevalence of BP control reported by many doctors, probably reflecting a diffuse overrating of their own skills, is inversely related with guidelines knowledge. The mean score of correct answers was 5.3 points

and only 20.1% of the study population correctly answered at least six of the questions including that on the definition of hypertension in the elderly. Guidelines awareness was negatively related to increase in physicians' age and duration of clinical practice and by the male gender. Finally, the physicians reported a high rate of achieved BP control, and those who were considered to have achieved highest rates (47.5%) of control in their patients had a lower rate of adequate knowledge than those who reported less-successful therapeutic results (18 vs 25%), suggesting that they ignored the goal BP recommended by the guidelines. This large regional survey shows that a sufficient degree of guidelines awareness is present in a minority of primary-care physicians (46).

A study conducted to evaluate doctors' knowledge, attitude, and practices and predictors of adherence to Malaysian hypertension guidelines, identified that, the gap between guidelines recommendations and practice was seen in the pharmacotherapy of uncomplicated hypertension and hypertension with left ventricular hypertrophy, renal disease, and diabetes mellitus. According to the study, 73.07% of study populations had adequate knowledge of guidelines. Specialistsandconsultantshadsignificantlybetterknowledgeaboutguidelines'recommendations.
The median number of guidelines compliant prescriptions was 13 (range 5–20). Statistically significant correlation was observed between doctors' knowledge and practice scores. A total of 349 (67.1%) prescriptions written were guidelines compliant(33).

A case-control study conducted to assess effect of using different strategies found no difference of health practitioners' awareness towards hypertension treatment guideline. The interventions were guideline in print, interactive guideline, and expert seminars. Even though, the interventions didn't bring different level of awareness, but overall knowledge of guideline contents was increased from 23.7%- 37.1% over five years (47).

The knowledge, attitude and practice of physicians in the detection and management of hypertension were modest according to a research finding from north-central Nigeria. A cross-sectional study of 100 of the 250 physicians was conducted using a pre-validated self-administered questionnaire. The mean age of the physicians was 41.05 ± 8.71 years and 59 (73.8%) were males. Forty- one (51.2%) of them have practiced for more than 10 years. Arterial hypertension was considered an important health problem by 93.8% of the physicians, 30% of them believed that it should not be referred to a specialist. Majority of the physicians request for

urinalysis (96.2%), electrocardiogram (95.0%), fasting blood glucose (88.8%), blood urea nitrogen (98.8%) and fasting lipid profile (97.5%) to either assess target organ damage or associated co-morbid conditions. Fifty-seven (71.2%) of the physicians prescribe diuretics as the initial drug. However, the knowledge of the other drugs on initiation of therapy of mild uncomplicated hypertension was poor(48).

2.3.3. Other factors

A study that assessed physicians' compliance to guideline showed degree of compliance to guideline can be affected by their specialty and coo work. Compliance rates for cardiologists, internists, and a combination of these two significantly differed. Compliance with the guideline was higher (84%) when internists alone cared for patients than when cardiologists alone (58%) or internists with cardiologists cared for the patient (53%) (49).

A study showed hypertension management was found to be significantly associated with patient total co morbidities, coronary artery disease, and history of myocardial infarction. According to the study, patients with concurrent co morbidities of overlapping path physiological pathways and management like hypertension and cardiovascular disease are more likely to receive guidelines adherent management(31).

According to study conducted in Hong Kong, health practitioners' with higher qualifications and longer duration of practice performed better as compared to health practitioners' with lower qualifications(50).

In general different studies have been done worldwide on compliance of health practitioners' to hypertension management guidelines and associated factors. Over all poor to good compliance was found on these studies and factors such as knowledge, attitude, experience, lack of training and resources are factors that found to be associated with compliance of health practitioners to HTN guideline along with some other factors; but there is no study conducted to assess compliance to the 2016 national NCD guideline in the management of hypertension and associated factors in Ethiopia. Hence, this study is aimed at assessing degree of compliance of health practitioners' with national guideline in the management of hypertension (HTN) and its associated factors in Illubabor and Buno-Bedelle public health care units (PHCU).

2.4. Conceptual framework

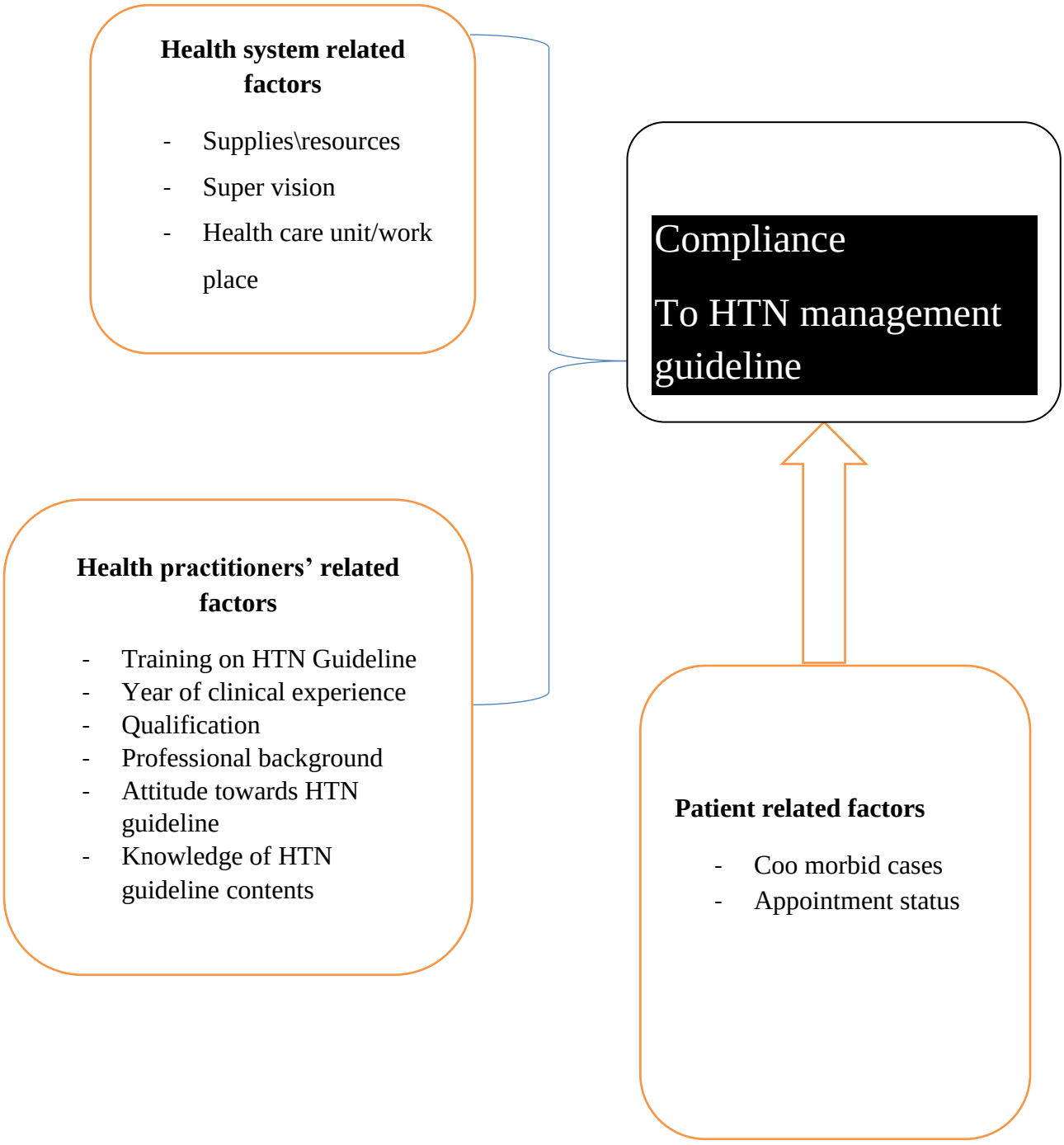

Figure 1: Conceptual frame work on factors influencing compliance with HTN Management guideline developed by principal investigator after literature review (33, 42, 43, and 48)

3. OBJECTIVES

3.1. General objective

- To assess health practitioners' compliance with hypertension management guideline and its associated factors in Illubabor and Buno Bedelle zones, 2020.

3.2. Specific objectives

- To assess health practitioners' compliance with HTN management guideline; and
- To describe associated factors to health practitioners' compliance with HTN management guideline.

4. Methodology

4.1 study area

The study was conducted at four governmental health care units found in Illubabor and Buno Bedelle zones. One health center from Metu (also Mettu) which is an administrative town of Ilu-Ababor Zone in South West Ethiopia, Oromia region which is located 600km from the capital city of Ethiopia, Addis Ababa. Mettu, located in the Illubabor Zone of the Oromia Region along the Sor River, this town has a latitude and longitude of 8°18′N 35°35′E and an altitude of 1605m and another one health center from Gore town which located 18 Kms from Mettu was included in the study. In addition two governmental health care units from Bedelle town was part of the study. Bedelle town is located in the south west of Ethiopia, 480Km from capital Addis Ababa. The town has one general hospital, one health center and few private medium clinics. In all selected health care units, mostly nurses and health officers and rarely general practitioners have been trained on the HTN guideline and working at Outpatient Departments (15, 16).

4.2. Study period

The study was conducted from March to April/2020 in Illubabor and BunoBedelle zones, Oromia regional state, south west Ethiopia.

4.3. Study design

A retrospective cross sectional study design was employed.

4.4. Source and study population

4.4.1. Source population

All medical records of hypertension patients treated from March, 2019 to March 2020.

4.4.2 Study population

All sampled medical records of HTN patients who are treated in the health care units.

4.5. Inclusion and exclusion criteria

4.5.1. Inclusion criteria

Medical records of adult Patients (>18 years old) treated for hypertension between March 1st, 2019 and March 1st, 2020

4.5.2. Exclusion criteria

Criteria for exclusion included medical records with missing information at first or consecutive follow up, and those for which inadequate information was available to establish whether appropriate treatment was received.

4.6.Sample size determination

The sample size for this study was calculated using a single population proportion formula based on the following assumptions:

$$\mathbf{n= \frac{(Z_{\alpha/2})^2 \ P\ (1-P)}{(d)^2}}$$

Where: **n**-minimum sample size required for the study

d- Margin of error=0.05

$\mathbf{Z_{\alpha/2}}$- Value of standard normal distribution (Z=1.96) with confidence interval of 95% and α is 0.05

$$n= \frac{(Z_{\alpha/2})^2 P (1-P)}{(d)^2} = \frac{(1.96)^2 0.519 (1-0.519)}{(0.05)^2} = 383.605 \approx 384$$

For the sample size calculation, the prevalence of compliance to hypertension management guideline was obtained from a previous study conducted in South Africa that found51.9%to be overall compliance to HTN guideline(40).

4.7. Sampling procedures

First, total sample size (384) was estimated based on the total number of HTN patients visited the governmental primary care units in 2019. Next the determined sample was proportionally allocated to each health units as follows Bedelle hospital1=120, BedelleHC=84, Gore HC=60, Mettu HC=120. Finally, simple random sampling method was used to select the first study population then systematic sampling was used to select consecutive study population.

Sampling procedure

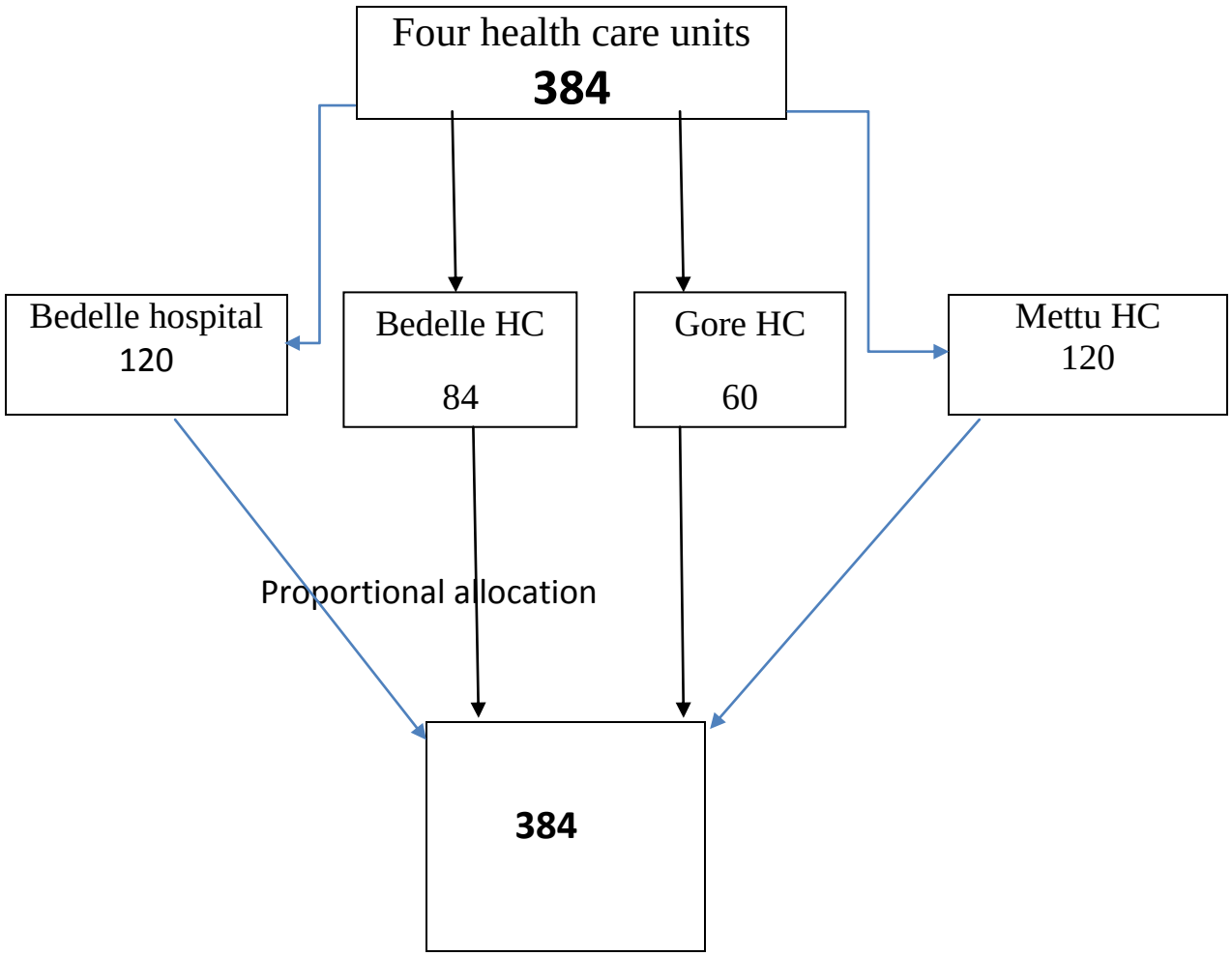

Figure 2: Schematic presentation of sampling procedure

4.8. Data collection procedures and instruments

A checklist was created using the National HTN guideline consensus points to assess for compliance with the recommendations and questionnaire was adopted from previous similar studies to assess factors associated with primary care practitioners 'compliance with guidelines on the basis of the existing published recommendations for the diagnosis, treatment, and other activities of HTN(3)(33). Data was collected by principal investigator; since associated factors cannot be assessed from medical records, first primary data was collected from health practitioners' so that the specific time period they were in the NCD/HTN OPD and specific patients treated could be known and traced on medical record of patients. The questioner includes Health personnel biographic data(age, sex, specialization, experience, training on HTN guideline, availability of resource, health care unit, qualification and others); in order to avoid recall bias they was requested to check the health units 12 months schedule, and they were also requested to fill the questioners' on spot (Appendix III).The medical record of each patient was traced on the hospital/health centers Health management information system (HMIS) registration book following the specific time period allocated by the health practitioners'. Information from medical records include: patients General information, date at which the pharmacological treatment was initiated by the specific health practitioners', appointment status, date of consecutive follow-up, Data on blood pressure from the first and second appointments, presence of co morbidities, classification of disease given by the health practitioners', prescribed antihypertensive medication, and if any recommendation of lifestyle modification was made (Appendix II). Once the medical records were identified, the medical record number (MRN) was collected and a study identification number (Study_ID) was assigned to each clinical chart so that similar patient's card will be excluded if appeared on another health practitioner' review (even if a patient is seen by more than one health practitioners', it was reviewed only for one health practitioner). The study identification number went from 001 to 384. This code was stored in electronic format, encrypted using the encryption software Mac OS X version 10.9.8, and password-protected on the principal investigator's personal computer. Only the principal investigator has access to this file and to the personal computer where it is stored. No other identifier was collected, such as name, participant's home address.

4.9. Data quality management

To assure high quality of the data, emphasis was given in designing data collection instrument. In order to test reliability and assure the quality of the data, pre test of approximately 15% (maximum number was thought to yield a more accurate result) of the sample was performed. The following variables were tested: age, systolic and diastolic blood pressures during the first and second appointments, classification by health practitioners', lifestyle modification recommendations during first appointment, medications prescribed in the first appointment and existing co morbidities.

A lecturer from Mettu University College of health science department of psycatric nursing did the pretest and these data were compared with the data collected by the principal investigator using the same clinical charts. To assess the level of agreement between the two abstractors, a kappa statistic was used for categorical variables and the intra class correlation coefficient for continuous variables. The kappa coefficient ranged from 0.854 to 1.000 and the intra class correlation coefficient ranged from 0.940 to 0.996, showing very good to excellent agreement between pretesters

4.10. Operational definitions and definition of terms

Compliance to HTN guideline-is an application of the strategy or the guideline according to the recommended manner. The level of compliance can be categorized as high level, and low level(40)

Health practitioners'- are those whose professional backgrounds are nurses, health officers, and general practitioners' involved on HTN management.

Supplies\resources- are equipment's used in the management of hypertension including the printed guideline, presence of separate NCD/HTN outpatient department, laboratory, medications, BP cuff etc.

Super vision – frequent follow up and correction on non-complying activities by the institutions supervisor or any trained body on HTN guideline

Health care unit/work place– whether the health practitioners' work in health center or hospital.

Level of qualification- if the health practitioners have minimum of degree from known educational institution.

Compliance- ability of health practitioners to follow NCD guideline of HTN assessment, diagnosis, treatment process and all activities listed on the guide line by FDREMOH.

High level compliance:

- Correct implementation of recommended strategy for above 50% of patients

Low level compliance:

- Below 50% correct implementation

The assessment procedure of compliance to HTN guideline is presented on Appendix II

The knowledge evaluating portion of the questionnaire consisted of 12 multiple-choice questions. A score of "1" point will be credited to each correct answer and "0" to each wrong answer and unanswered question.

Level of knowledge will be indicated as:

- 0-4 correct answer is Poor knowledge
- 5-8 correct answer is reasonable
- 9 and more correct answer is good

Attitude evaluation portion, consisting of 6 items, will be developed on the basis of extensive literature review(38). These items will be based on a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree" and scored as:

Strongly disagree=1,

Disagree=2,

Undecided=3,

Agree=4, and

Strongly agree=5.

Negative items were scored reversely, so that the high score reflects more positive attitude.

4.11. Variables

4.11.1. Dependent variable

- Compliance to HTN management guideline

4.11.2. Independent variables

- Supervision
- Health Care unit level
- Resources/supplies
- Year of service
- professional background
- Qualification
- Training
- Attitude of the health practitioners' towards HTN guideline
- Knowledge of the guideline
- coo morbid cases

4.12. Data analysis procedures

Data were coded, entered and cleaned using Epi- data 7 and export to SPSS version 25 for analysis. In the univariate analysis, for continuous variables Q-Q plots were used to assess if the variable was normally distributed. For those variables which were normally distributed, the mean and standard deviation were used as descriptive statistics; and for those that were not normally distributed the median and interquartile range (IQR) were used. For categorical variables, the results were presented as frequencies and proportions.

A bivariate analysis was conducted to compare independent variables with dependent variable. An independent sample t test was used for continuous normally distributed variables, Wilcoxon Sum-Rank test for continuous non-normally distributed variables, and Fisher's exact test or chi-squared test for categorical variables, depending if the observed frequencies in any cell was less than five or not.

Multivariate analysis was used to obtain a final model describing the significant independent predictors of guidelines compliance. All those variables which had statistically significant association with HTN guideline compliance in Bivariate analysis was included in multivariate

model. P-value and 95%CI for OR was used in judging the significance associations. P-value less than 0.05 were taken as significant association. The finding was presented by using, graphs and tables.

4.13. Dissemination of the findings

The finding of this study will be presented and submitted to Addis Ababa University College of health science school of nursing and midwifery. A summary of the results will also be sent to the study area health institutions. The result of this research will also be disseminated or communicated to federal democratic republic of Ethiopia ministry of health, policy makers and other concerned bodies through Conferences, reports as well as publication on world class journal.

4.14. Ethical considerations

Institution review board (IRB) of Addis Ababa University, college of health science school of nursing and midwifery reviewed the protocol to insure full protection of the right of study subjects. Following the approval by IRB, official letter of co-operation was written to respected study area from department of nursing. The study was conducted after permission from concerned management bodies was taken. Written Informed consent was taken from health practitioners' and data was collected after permission. The study also used patient record data. Ideally, it was preferable to have informed consent from the subjects of the study, even if there is no direct contact with them, but it was difficult to get them. However, all the necessary measures have been taken to maintain and assure the privacy, confidentiality and all benefits of the patients. Charts were reviewed at separate room, no mention has made about the names of the patients and care providers or anything related to the study. Moreover, Data have been treated confidentially and identify subject by number only.

5. Results

5.1. Univariate Analysis- patients' clinical characteristics

Table 1 shows patients' clinical characteristics. Among the patients, 97(25.3%) of them were diagnosed as having hypertension for the very first time, whereas287(74.7%) were on follow up treatment. For hypertension classification, 68(17.7%) of participants were classified as Stage II, 12(3.1%) classified as Stage I,29(7.6%) were classified as having hypertensive crisis and 275(71.6%) were classified using other classifications like mild-moderate and controlled-uncontrolled. During the first appointment, the mean systolic blood pressure (SBP) was153.8mmHg (± 23.5), while the mean diastolic blood pressure (DBP) was 97.1mmHg (± 33.8). In the consecutive appointment, the mean SBP was 142.5mmHg (± 17.0) and the mean DBP was 89.9mmHg (± 9.9). For the number of co morbidities, 347(90.4%) had noco morbidities, 24(6.3%) had diabetes mellitus, while 13(3.4%)had stroke. For blood pressure status on the consecutive follow up; 142(37.0%),185(48.2%), 57(14.8%) of them had uncontrolled, controlled and below target level which is 140/90 of the guideline consecutively. On the other hand, table 2 presents the treatment characteristics of the patients. Regarding the number of antihypertensive medication, 274(71.4%) of cases were prescribed with one medication, 78(20.3%) of cases were prescribed two antihypertensive medications and 10(2.6%) was prescribed with three medications while 22(5.7%) of them referred to higher facilities. Lifestyle modification recommendations were given to 79(20.6%) of participants, while they weren't given to 305(79.4%). The majority of health practitioners' complied with the pharmacological Antihypertensive treatment protocols for 238(62.0%) patients, while for146(38.0%) of the patients the guideline were not followed. Combining the lifestyle modification recommendations and pharmacological antihypertensive treatment to assess compliance with the hypertension management guideline, only 75(19.5%)patients were managed following the guideline, while 309(80.5%) did not.

Table 1: Patients' clinical characteristics

Characteristic	
First visit SBP, mmHg; Mean (SD)	153.8(± 23.5)
First visit DBP, mmHg; Mean (SD)	97.1(± 33.8)
Follow-up SBP, mmHg; Mean (SD)	142.5(± 17.0)
Follow-up DBP, mmHg; Mean (SD)	89.9(± 9.9)
Appointment status; n (%)	
Initial	97(25.3)
Follow up	287(74.7)
Total	384(100)
Disease stage on record; n (%)	
Pre hypertension	0
Stage I HTN	12(3.1)
Stage II HTN	68(17.7)
Hypertensive crisis	29(7.6)
Other staging	275(71.6)
Total	384(100)
Co morbidities; n (%)	
None	347(90.4)
DM	24(6.3)
Stroke	13(3.4)
total	384(100)
BP Status; n (%)	
Uncontrolled	142(37.0)
Controlled	185(48.2)
Below target	57(14.8)
Total	384(100)

Note. SD = standard deviation; n = number of subjects; SBP, systolic blood pressure; DBP, diastolic blood pressure; HTN, hypertension; DM, diabetes mellitus. For continuous and normally distributed variables the mean was used as central tendency measure.

Table 2: Treatment characteristics of study participants

Characteristics	
Number of Antihypertensive medication(s) prescribed; n (%)	
1 medication prescribed	274(71.4)
2 medications prescribed	78(20.3)
3 medications prescribed	10(2.6)
Referred to higher facilities	22(5.7)
Total	384(100)
Lifestyle Modifications recommended; n (%)	
YES	79(20.6)
NO	305(79.4)
Total	384(100)
Antihypertensive medication(s) following the guideline; n (%)	
YES	238(62.0)
NO	146(38.0)
Total	384(100)
Management compliance with HTN guideline; n (%)	
YES	75(19.5)
NO	309(80.5)
Total	384(100)

Note. n = number of subjects; HTN= hypertension; the result of management compliance with HTN guideline was yielded by combining lifestyle recommendations and anti-hypertensive medications as explained on appendix II; YES= for whom guideline recommendation was followed; NO=for whom guideline recommendations not followed.

5.1.1. Biographic characteristics of Health practitioners'

As shown on table 3, there were more males 68.4% (n=13) than females 31.6% (n=6); and the mean age of the health practitioners' were 33.9 years (± 7.8). Regarding professional background; 31.6% (n=6) were general practitioners' (GPs), 47.9% (n=9) were health officers (HOs) and 21.1% (n=4) of them were nurses. Qualification of health practitioners' were a first degree for all of them which named as: 68.4% (n=13) had BSc degree and 31.6% (n=6) of them were medical doctors and their mean year of clinical experience were 5.3years (± 3.3). From the health practitioners', most of; 13(68.4%) were enrolled in health centers whereas 6(31.6%) were in hospital; 12(63.2%) of them responded as having resources for management of hypertension and 7(36.8%) didn't. Among the study participants 7(36.8%) have received training on Hypertension guideline where 12(63.2%) were not trained. 5(26.3%) responded as having close supervision and 14(73.7%) had no supervision.

Table 3: Demographic characteristics of the health practitioners'

Age (years) Mean; (±SD)	**33.9(± 7.8)**
Sex; n (%)	
Male	13 (68.4)
Female	6 (31.6)
Total	19 (100)
Designation; n (%)	
General practitioner	6 (31.6)
Health officer	9 (47.9)
Nurse	4 (21.1)
Total	19 (100)
Qualification; n (%)	
Medical doctors	6 (31.6)
BSc	13 (68.4)
Total	19 (100)
Year of experience; Mean (±SD)	5.3(± 3.3)
Training status; n (%)	
Trained	7 (36.8)
Not trained	12 (63.2)
Total	19 (100)
Work place; n (%)	
Health center	13 (68.4)
Hospital	6 (31.6)
Total	19 (100)
Resource available; n (%)	
Yes	12 (63.2)
No	7 (36.8)
total	19 (100)
Have supervision; n (%)	
Yes	5 (26.3)
No	14 (73.7)
Total	19 (100)

Note. SD = standard deviation; n = number of subjects; for continuous and normally distributed variables the mean was used as central tendency measure.

5.1.2. Health practitioners' knowledge, attitude, and compliance to HTN guideline (2016)

Table 4: Percentage of answers confirming to HTN guideline (2016) for knowledge assessing questions

Question number	n	%
(1) Which of the following blood pressure (BP) values defines hypertension in an adult subject without coo morbidities?	17	89.5
(2) The absolute risk of cardiovascular events over 10 years in high risk patients is?	2	10.5
(3) In newly diagnosed, uncomplicated hypertension and no compelling indications, all of the following antihypertensive drug classes are agents of choice of first line mono therapy except**,**	12	63.2
(4) Which are the BP values, that after repeated measurements, define elderly subjects (>75 years) as hypertensive?	7	36.8
(5) Which one of the following antihypertensive drug classes you would like to prescribe as first choice for hypertensive patient with angina?	11	57.9
(6) Which one of the following antihypertensive drug classes you would like to prescribe as first choice for hypertensive patients with protein uric CKD?	10	52.6
(7) Which one of the following antihypertensive drug classes you would like to prescribe as first choice for hypertensive patients with systolic heart failure? Choose that apply	15	78.9
(8) Which are the appropriate examinations to be prescribed for the minimum diagnostic work-up of hypertensive patients?	6	31.6
(9) Which is the definition of Stage 1 hypertension?	16	84.2
(10) Which of the following actions are wrong during BP measurement? Choose all that apply	11	57.9
(11) Which one of the following is NOT **a reason that; after evaluating patients, primary healthcare providers should refer patients to higher levels of care?**	8	42.1
(12) Which BP value is the goal of management for elderly subjects (>75 years)?	7	36.8

Note. n = number of subjects answered the questions correctly

The percentages of correct answers to the 12 questions are shown in table4. The mean number of correct answers was 6.42 ± 6.25 (range 2–12). The absolute number of guidelines conforming answers in the total study population is shown in Figure 3. From the questions: two, four, five, and twelve questions were answered by 1(5.3%) health practitioner; while seven questions and eight questions were answered by2(10.5%) health practitioners. Six questions and nine questions were answered correctly by 4(21.1%) study participants. Among the remaining 3(15.8%) study participants answered three questions correctly and none of the study participants have answered less than two questions. The knowledge status of health practitioners in the total study participants is presented on figure 4. Analysis of the replies to the questionnaire showed that similar proportion of the participants had good5(26.3%)and poor5(26.3%)knowledge of hypertension guideline/2016, whereas 9(47.4%) of them had reasonable knowledge.

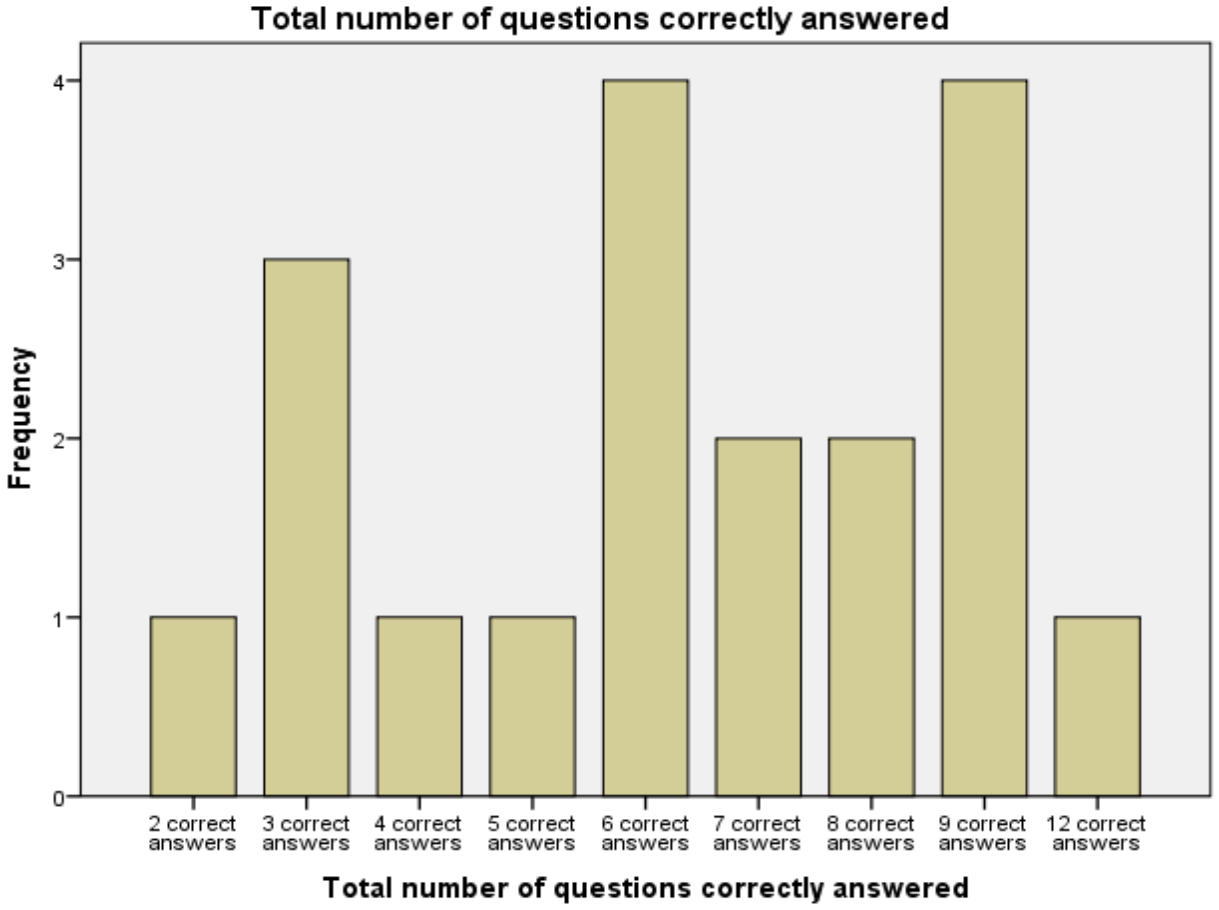

Figure 3: Absolute number of correct answers to the 12 questions on knowledge of HTN guideline in the 19 respondent health practitioners'.

Health practitioners' in the study were highly positive towards the HTN guideline (2016), with mean attitude score of23.63 ± 4.13, rangingfrom11to30 ona30-pointscale.Health practitioners 'responses to attitude statements are given in Table 5.A total of 75 (19.5%) patients were managed in compliance with guidelines. The mean compliance of health practitioners to hypertension management guideline was 3.95 ± 4.76 ranging from 0 to 14 per maximum of 21 patients observed per health practitioner

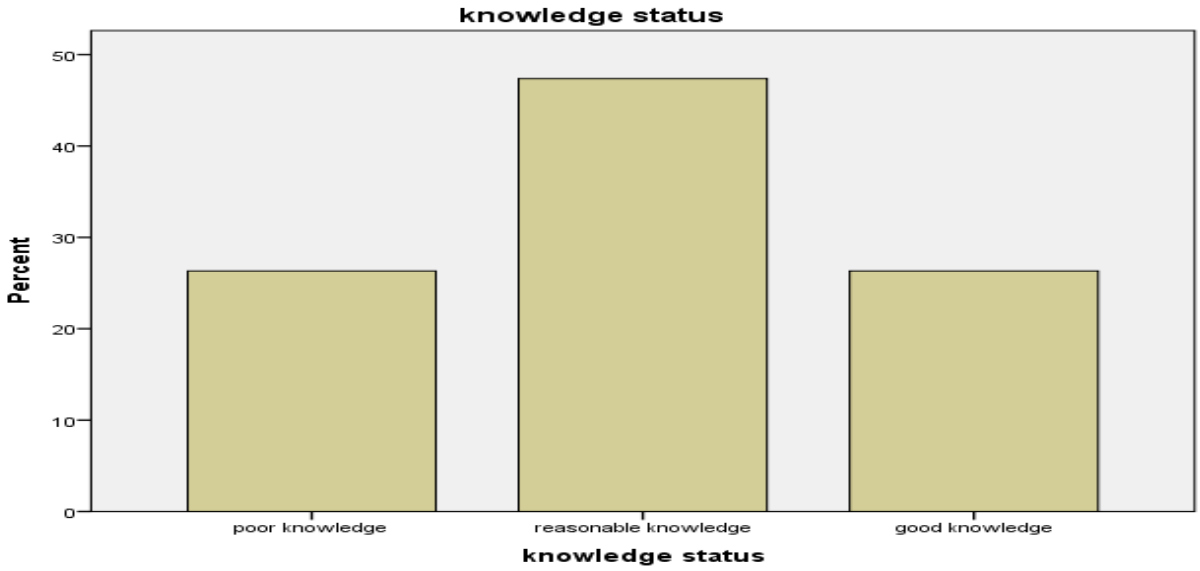

Figure 4: Health practitioners' knowledge status On the basis of criterion used for adequate knowledge

Table 5: Attitude towards and compliance to HTN guideline (2016)

Statements	SD	D	UD	A	SA
I have trust in the recommendations and developing committee of HTNG(2016)	1	-	-	11	7
HTNG(2016) on the management of hypertension is helpful for Health practitioners'	2	-	-	8	9
Adherence to HTNG (2016) Would produce desired out come	1	1	1	8	8
HTNG(2016) is motivated by desire to cut cost	-	-	4	9	6
HTNG(2016) decreases doctors' autonomy	6	6	3	4	-
HTNG(2016) is too rigid to apply to individual patients	3	6	5	5	-
compliance to HTN guideline (2016) Mean (±SD)	3.95(±4.76)				

Note: mean is used to show health practitioners' compliance to guideline as Mean (±SD); HTN= hypertension; A=strongly agree; A=agreed=undecided; A=disagrees=strongly disagree.

5.2. Bivariate Analysis

5.2.1. Health practitioners' compliance to Hypertension management guideline and health system related factors

Table 6 presents the results of the bivariate analyses between the health practitioners' compliance to HTN management guideline and health system related factors. Those health practitioners' who were working at health center were more compliant (4.4, ±5.3) than those working at hospital(3.0, ±3.5). However, this difference was not statistically significant (p=0.555).Among the study participants those who said they have close supervision were more compliant with mean compliance of (4.0, ±4.8) than those who said they don't (1.8, ±2.8); and this difference was statistically significant (p=0.001). Statistically significant difference have also seen (p=0.049) between health practitioners' who said resources that needed for hypertension management are available and those who said resource not available; those with available resources were more compliant (5.6, ±5.1) than those with no resource available (1.1, ±2.3).

Table 6: Compliance to hypertension management guideline and health system factors

Variables	Compliance to HTNG (2016) Mean (±SD)	*P*value*
Resource available		
Yes [a]	5.6(±5.1)	0.049
No	1.1(±2.3)	
Supervision		
Yes [a]	4.0(±4.8)	0.001
No	1.8(±2.8)	
Work place		
Health center [a]	4.4(±5.3)	0.555
Hospital	3.0(±3.5)	

Note. HTNG= hypertension management guideline; SD = standard deviation; P-values were obtained by using the chi-square test for categorical variables. Mean (±SD) was used to express compliance status of health practitioners';*p<.05. [a] Reference group. There were no missing data during the analysis (n=19).

5.2.2. Compliance to Hypertension management guideline and health practitioners' related factors

Table 7 presents Compliance to Hypertension management guideline and health practitioners' related factors. Those whose age is >30 have shown more compliance to hypertension management guideline than those ≤30 with mean compliance 4.0(±4.8) and 3.9(±4.7) respectively. But the difference seen between these age groups were not statistically significant (p=0.967).Male health practitioners' had better compliance (4.2, ±4.5) to the guideline in managing hypertensive patients than their female partners. However, this difference was not statistically significant (p=0.781).

Even though study groups with <2 years of clinical experience shown better compliance (4.6, ±8.0) than 2-4 years' experience (4.5, ±3.9) who complied more than who have 5-8 years of clinical experience (3.9, ±5.3) than those with >8 years (2.3, ±3.2), Statistically significant difference was not observed (p=0.521) between compliance these groups.

When we compare health practitioners' compliance with their professional background, Nurses have shown more compliance (8.8, ±6.2) to the guideline than their counter general practitioners (3.0, ±3.5) and health officers. But the difference between the study groups was not statistically significant (p=0.094). Health practitioners' with BSc qualification were more compliant (4.4, ±5.3) compared to Medical doctors whose mean compliance was (3.0,±3.5). And again the difference between them was not statistically significant (p=0.555).

Among study participants, those who had training on the guideline have better compliance (8.7, ±3.7) than their counter untrained parts (1.1, ±2.3); and the difference between these groups have shown statistical significance (p=0.001). Study participants with good knowledge have better compliance (5.2, ±5.4) than those who have poor knowledge of guideline and better compliance (4.8, ±6.1) than who have reasonable knowledge whose compliance was (2.8, ±3.8). However the difference between these groups were not statistically significant (p=0.894).Health practitioners with total attitude score of ≤20 have more (6.5, ±3.5) compliance than whose total attitude score was >25 (4.4, ±5.9) whose compliance was better than those who had total attitude score of 21-25 (3.3, ±4.6). But the difference between these study groups have no statistical significance (p=0.815).

Table 7: Compliance to hypertension management guideline and health practitioners' related factors

Variables	Compliance to HTNG (2016) Mean (±SD)	*P*value*
Age		
≤30	3.9(±4.7)	0.967
>30 [a]	4.0(±4.8)	
Sex		
Male [a]	4.2(±4.5)	0.781
Female	3.5(±5.6)	
Year of clinical experience		
<2 years [a]	4.6(±8.0)	0.521
2-4 years	4.5(±3.9)	
5-8 years	3.9(±5.3)	
>8 years	2.3(±3.2)	
Professional background		
GP	3.0(±3.5)	0.094
Health officer	2.4(±3.7)	
Nurse [a]	8.8(±6.2)	
Qualification		
BSc [a]	4.4(±5.3)	0.555
MD	3.0(±3.5)	
Training status		
Not trained	1.1(±2.3)	0.001
Trained [a]	8.7(±3.7)	
Knowledge of HTNG		
Poor knowledge	4.8(±6.1)	0.894
Reasonable knowledge	2.8(±3.8)	
Good knowledge [a]	5.2(±5.4)	
Attitude towards HTNG		
≤20 [a]	6.5(±3.5)	0.815
21-25	3.3(±4.6)	
>25	4.4(±5.9)	

Note. HTNG= hypertension management guideline; GP= general practitioners; MD=Medical doctors SD = standard deviation; P-values were obtained by using the chi-square test for categorical variables-test for continuous variable. Mean (±SD) was used to express compliance status of health practitioners';*p<.05. [a] Reference group. There were no missing data during the analysis (n=19).

5.2.3. Health practitioners' compliance and patient related factors

Table 8 shows health practitioners' compliance to hypertension management guideline and patient related factors. Health practitioners have shown better compliance (0.2, ±0.4) when they have treated patients with hypertension only and patients with stroke than when they have treated patients with diabetes mellitus (0.1, ±0.3). However this difference have no statistical significance (p=0.817). Patients who have been on their first visit to the health practitioners' were treated more compliantly (0.4, ±0.5) than those who were on their follow up visit (0.1, ±0.3). And this difference have shown statistical significance of (p=0.000).

Table 8: Health practitioners' compliance to hypertension management guideline and patient related factors.

Variables	Compliance HTNG (2016) Mean (±SD)	*P*value*
Co morbidities		
No co morbidities [a]	0.2(±0.4)	0.817
HTN+DM	0.1(±0.3)	
HTN+STROKE	0.2(±0.4)	
App status		
First visit [a]	0.4(±0.5)	0.000
Follow-up	0.1(±0.3)	

Note. HTNG= hypertension management guideline; HTN=hypertension; DM= diabetes mellitus; App status= appointment status; SD = standard deviation; P-values were obtained by using the chi-square test. Mean (±SD) was used to express compliance status of health practitioners';*p<.05. [a] Reference group. There were no missing data during the analysis (n=19).

5.3. Multivariate analysis

Table 9 shows result of multivariate analysis of significant factors of hypertension management guideline compliance. In this model, availability of resource (adjusted odds ratio [AOR] =0.400,95% CI: =0.203-0.788), supervision status (adjusted odds ratio [AOR] =0.497, 95% CI: =0.308-0.892), training status (adjusted odds ratio [AOR] =0.250, 95% CI: =0.107-0.584), and appointment status (adjusted odds ratio [AOR] =0.091, 95% CI: =0.024-0.352) had significant positive association with compliance to hypertension management guideline.

Table 9: Multivariate analysis of factors of hypertension management guideline compliance

Variables	B	SE	P value	AOR	95% CI
Resource available	0.915	0.346	0.018	0.400	0.203-0.788
Ref=yes					
Supervision	0.725	0.138	0.038	0.497	0.308-0.892
Ref=yes					
Training status	0.288	0.764	0.036	0.250	0.107-0.584
Ref=trained					
App status	2.394	0.688	0.001	0.091	0.024-0.352
Ref=initial					

Note: AOR= adjusted odds ratio CI=confidence interval; B=beta; SE=standard error; App stat=appointment status; ref=reference group .Only statistically significant results are given in the table.

6. Discussion

In this study overall compliance of health practitioners' to FDREMOH HTN guideline were found to be poor; only 75(19.5%) of patients were managed following the guideline. This finding is less than a finding from study in Malaysia which similarly revised medical record of patients and observed 67.1% of them received guidelines compliant treatment(33).It's also less than finding of Malaysian clinical practice guideline which indicated that more than two third (73.5 %) of the total treatment were in compliance with clinical practice guideline(36), and less than the finding from south Africa with over all compliance of 51.9%(42). This poor compliance is mostly because the study participants have very poor compliance to life style recommendations which is applied for only79 (20.6%) of patients.

The mean compliance of health practitioners to hypertension management guideline was 3.95 ± 4.76 ranging from 0 to 14 per maximum of 21 patients observed per health practitioner. This finding is comparable to a study which find The median number of guidelines compliant prescriptions was 13 (range 5–20) per 20 patients seen per each health practitioner(48).From the study we could see that13(68.4%) of the health practitioners' were males and the mean age of the health practitioners' were 33.9 years (± 7.8). Regarding professional background; 6(31.6%) were general practitioners' (GPs), 9(47.9%) were health officers (HOs) and 4(21.1%) of them were nurses; 13(68.4%) of them had BSc degree and 6(31.6%) of them were medical doctors and their mean year of clinical experience were 5.3years (± 3.3); most of; 13(68.4%) of them were

enrolled in health centers whereas 6(31.6%) were in hospital; 12(63.2%) had resources for management of hypertension; there were7(36.8%) trained and 5(26.3%) health practitioners who had close supervision. These characteristics of the study participants is incomparable with other studies because of variation in methodology and characteristics of the study participants; which found mean age of the physicians to be 41.05 ± 8.71 years and 59 (73.8%) were males 41 (51.2%) of them to have practiced for more than 10 years(48).

In the study mean number of correct answers to knowledge assessing questions was 6.42 ± 6.25 (range 2–12) as compared to another study that found mean score of correct answers to be 5.3 points(46).From the questions: Six questions (half of total), were answered correctly by 4(21.1%) study participants and none of the study participants have answered less than two questions; which was comparable to a study whose only 20.1% of the study population correctly answered at least six of the questions (44).This better score of knowledge status is related to training and because some of the guideline terms were similar to other international guidelines such as WHOs. In current study, similar proportion of the participants,5(26.3%) had good and 5(26.3%) poor knowledge of hypertension guideline/2016, whereas 9(47.4%) of them had reasonable knowledge. However this finding is less than study which showed 40% of the physicians knew the guidelines adequately(45) and was much less than a study whose 73.07% of study populations had adequate knowledge of guidelines (33).

Most of health practitioners' in the current study showed positive attitude towards the HTN guideline (2016), with mean attitude score of23.63 ± 4.13, ranging from11 to 30 ona30-pointscale.They trust the guideline as well as its developers. Almost all of them believed that the guideline is useful for them and complying to it would produce best patients' outcomes. This health practitioners' attitude was very close to study from Malaysia, in which mean attitude score of 23.15 ± 1.34 was found(33).

According to this study finding, health practitioners' who were working at health center were more compliant but no significant association was found with compliance to the guideline. Having close supervision and resources that needed for hypertension management were also found to have better compliance than their counter parts on bivariate analysis. These factors also found to have positive association with the dependent variable; compliance to HTN guideline on

multivariate analysis at (adjusted odds ratio [AOR] =0.497, 95% CI: =0.308-0.892), ([AOR] =0.400, 95% CI: =0.203-0.788) respectively.

Even though previous studies didn't show these factors have association with HTN guideline, it was expected that the better the health system, the better the outcome will be; and this finding shall be one of the strengths of the current study.

Advanced age (>30) and male sex have also been found to comply more, with mean score of 4.0(±4.8) and 4.2(±4.5)respectively, with no statistical significance found at bivariate analysis. The reason of this finding can be advantage of having more numbers compared to their counter parts as explained at health practitioners' biographic characteristics.

The study also found study participants with less clinical years of experience and BSc qualification were seen to comply better than those with long duration of experience and medical doctors. This finding was inconsistent with study conducted in Hong Kong, which stated health practitioners' with higher qualifications and longer duration of practice performed better as compared to health practitioners' with lower qualifications(50). The reason to the contrary finding is that study from Hong Kong was a large number of study participants survey and in the current study there was again quantitative advantage of the complying study groups.

Previous study stated degree of compliance to guideline can be affected by their specialty and coo work(49); and in the current study nurses have shown more compliance (8.8, ±6.2) to the guideline than their counter general practitioners (3.0, ±3.5) and health officers. But the difference between the study groups was not statistically significant (p=0.094).

Training was found to have positive effect on the health practitioners' compliance to HTN guideline in multivariate analysis (adjusted odds ratio [AOR] =0.250, 95% CI: =0.107-0.584). This factor was not also indicated in previous studies; but, it is obvious that training can bring such out comes as found in this study.

Study participants with good knowledge were found to have better compliance with the guideline in the management of hypertension. This finding is consistent with finding of study which Statistically significant correlation was observed between knowledge and practice scores(33). And this finding is against studies from Italy (45)(46).

Statistically no significant association was found between health practitioners' attitude and their compliance. Applying positive Attitudes can be influenced by many factors, such as their knowledge, past clinical experience, beliefs about guidelines, outcome expectations, peers' opinions, and guidelines characteristics (41).

Health practitioners' compliance to HTN guideline is found to have significant positive association with patients appointment status (adjusted odds ratio [AOR] =0.091, 95% CI: =0.024-0.352);in which patients on their initial visit found to receive compliant treatment. The reason is that most of health practitioners' tend to give life style recommendations to patients whom they have met for first time and didn't apply same for patients who are on second and consecutive visits. This justification was indicated on a table of patients' treatment characteristics.

Health practitioners have shown better compliance (0.2, ±0.4) when they have treated patients who had hypertension only and hypertensive patients with stroke than when they have treated hypertensive patients with diabetes mellitus (0.1, ±0.3).This finding is consistent to a study from Malaysia that showed Doctors poorly adhered to guidelines in hypertensive patients with diabetes (40).The reason is because patients with concurrent co morbidities of overlapping path physiological pathways and management like hypertension and cardiovascular disease are more likely to receive guidelines adherent management(31).

Strengths and Limitations

This study was designed to assess health practitioners' compliance to the federal democratic republic of Ethiopian hypertension management guideline which was part of NCD guideline/2016 and factors that were associated to their compliance. It provides some insight on how future studies need to be designed; so some important strengths and limitations should be mentioned.

Previously some studies have been conducted to assess only compliance to HTN guidelines and others intended to assess effect of few variables to HTN guideline; few others of them involved only general practitioners (medical doctors). So this study tried to bridge these gaps by studying several factors association with HTN guidelines including patient factors which enables us to detect difference between patients who was managed following guideline and those who didn't.

More over other professionals such as nurses and health officers were study participants for this study.

The other Strength is that Multivariate logistic regression models were developed to test association between health practitioners' compliance to the guideline and dependent factors, which makes it different from some descriptive studies.

The main limitation of this study is that, the results may not be generalizable to the general population because the study areas were not chosen by randomization; instead it was selected based on accessibility and the investigators interest. Sample size was also another reason for lack of generalizability since it was difficult to get large number of health practitioners', it was calculated for patients rather than calculating for the health practitioners' themselves.

As the study was based on medical records review, compliance of health practitioners to some factors couldn't be assessed that have been recommended to be followed on the guideline, such as assessment parts including risk assessment, BP measurement procedures, body mass index (BMI) and laboratory requests.

7. Conclusions

Complying to guidelines were believed to reduce risk of long-term morbidity and mortality, improve quality of life, and bring lower healthcare costs (18)(19).

As per my knowledge, this is the first study in Ethiopia which assessed health practitioners' compliance to HTN guideline and its associated factors. Only 75(19.5%) of patients were managed following the guideline; which indicates nearly more than two third of patients were not managed following the FDREMOH hypertension guideline, primarily due to a lack of recommending lifestyle modifications. The majority of health practitioners 'complied with the pharmacological antihypertensive treatment protocols for 238 (62.0%)of the patients.

Even though several health system related, health practitioners' related and patient related factors had association with complying with HTN management guideline, availability of resource (adjusted odds ratio [AOR] =0.400, 95% CI: =0.203-0.788), supervision status (adjusted odds ratio [AOR] =0.497, 95% CI: =0.308-0.892), training status (adjusted odds ratio [AOR] =0.250, 95% CI: =0.107-0.584), and appointment status (adjusted odds ratio [AOR] =0.091, 95%

CI:=0.024-0.352) were found to have significant positive association with compliance to hypertension management guideline, in multivariate analysis.

8. Recommendations

Further research needs to be conducted using large scale health care units, better study design and an adequate sample size to confirm the finding of this study. In addition, further evaluation of compliance of health practitioners to the remaining components; particularly the assessment and diagnosis parts of the guideline needs to be conducted.

FDREMOH, policy makers, health administrators and other stake holders need to consider expanded training and close supervisions for health practitioners' involved in hypertension management. And; moreover, supplies required for assessment, diagnosis, treatment and all aspects of management of hypertension needs to be adequately provided so that effectiveness and efficiency of practice could be enhanced.

In Ethiopia, further research on compliance of health practitioners' with hypertension management guideline and patient' health outcome such as association between compliance and patient blood pressure control needs to be assessed.

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10. Appendices

Appendix I- Information Sheet for the Institution and informed consent

Title of the Research Project: health practitioners' compliance with hypertension management guideline and its associated factors in Ilubabor and Bunobedelle zones, 2020

Name of Investigator: Gebremeskel MulatuTesfaye (Bsc in nursing)

Name of the Organizations: Ilubabor and BunoBdelle zones primary health care units.

Name of the Sponsor: AAU

Introduction: This information sheet is prepared Ilubabor and BunoBdelle zones primary health care units' administration and NCD Outpatient coordinating office. The aim of the form is to make the above concerned office clear about the purpose of research, data collection procedures and get permission to conduct the research.

Purpose of the Research Project: The aim of this study is to assess the health practitioners' compliance with HTN management guideline and its associated factors in Illubabor and Buno Bedelle zones.

Procedure: In order to achieve the above objective, information which is necessary for the study will be taken from HTN patients' medical record data's and from health practitioners' involved in HTN care through questioners'.

Risk and /or Discomfort: Since the study will be conducted by taking appropriate information from medical chart, it would not inflict any harm on the patients. The name or any other identifying information was not recorded on the questionnaire and all information taken from the chart and health practitioners'' will be kept strictly confidential and in a safe place. The information retrieved will be only be used for the study purpose.

Benefits: The research have no direct benefit for one whose document/ record is included in this research. But the indirect benefit of the research for the participant and other clients in the program is clear. This is because if program planners are preparing predicted plan there is a benefit for clients in the program of getting appropriate care and treatment services. Of all, the

research work has a paramount direct benefit for health care planners and managers, especially for those on HTN/NCD program planning and management.

Confidentiality: all the necessary measures will be taken to maintain and assure the privacy, confidentiality and all benefits of the patients. Charts will be reviewed at separate room, no mention is made about the names of the patients and care providers or anything related to the study. In addition, it will not be revealed to anyone except the investigator and it will be kept in key and locked system with computer password.

Person to contact: If you have any question you can contact any of the following individuals (Investigator and Advisors) and you may ask at any time you want.

1. GebremeskelMulatu; AAU University, College of Health Science, Department of Nursing: principal investigator.
   Cell phone: +251- 09 27807363;E-mail: gebre.gmt12@gmail.com
2. Mr. Daniel Mengistu, AAU University, College of Health Science, School of Nursing and mid wifery: Main-Advisor
   Cell phone: +251-9 11 119597; E-mail:mengistudaniel@yahoo.com
3. Mr. WudmaAlemu, AAU University, College of Health Science, Dept of Nursing:
   Co-Advisor Mobile phone- +251-9-11-553967;E-mail-wudma.alemu@yahoo.com

Informed consent form for health practitioners'

By understanding the foregoing information, I'm giving my consent to participate in a study entitled "health practitioners' compliance with hypertension management guideline and its associated factors in Ilubabor and Bunobedelle zones, 2020". I have read or it has been read to me the foregoing information about the nature of the study, benefits, voluntary participation, confidentiality and withdrawal from the study at any time without any harm. I have had the opportunity to ask questions about it and any questions I have been asked have been answered to my satisfaction. I consent voluntarily to be a participant in this study.

ID Number of Participant_____

Signature of Participant _____Date _____

Data collection tool and check list

This tool is prepared for the collection of socio-demographic, clinical, laboratory, treatment and outcome related information and on health practitioners' knowledge, attitude and other factors that are important for the assessment of health practitioners' compliance with hypertension management guideline and its associated factors in Ilubabor and Bunobedelle zones, 2020. All this information will be retrieved from individual patient medical recordand health practitioners' without mentioning the name of study participants. This information will be collected by health care providers (BSc midwifes) possibly working in the primary care units.

Contact information: Gebremeske lMulatu Tesfaye,Cell phone: +251-927807363,

E-mail:gebre.gmt122@gmail.com

Data collection date----------month----------Year----------

Name of the Hospital/health center ----------
Name of data collector---------- signature----------

Name of supervisor----------signature----------

Code No._____

Appendix II. Electronic data entry form

Study Identification Number: _____

Age: _____

Gender: 1. Male

2. Female

Last date of visit:_____

Time of first visit to the health personnel

Date: _____14/6/11_____

Blood Pressure: 150/100_____

Appointment status:

1. Initial
2. Follow up

Diagnosis/hypertension stage:

1. Prehypertension
2. Stage I hypertension
3. Stage II hypertension
4. Severe Hypertension/Hypertensive emergency/urgency
5. Others

Coomorbidities?

1. _____
2. _____
3. _____

Appendix II: (Continued)

Antihypertensive	Dosage	Frequency

Referred to higher facilities?

1. Yes
2. No

Was Lifestyle Modifications given?

1. Yes
2. No

Follow-Up Appointment

Date:	BP:	Antihypertensive	Dosage	Frequency

In terms of the referral or/and antihypertensive medication given in the first time of diagnosis and in terms of the treatment category, was the patient treated according to 2016 NCD/HTN guideline?

1. Yes
2. No

According to the blood pressure in the consecutive appointments, was the expected blood pressure level reached?

1. Yes
2. No

Appendix II: (Continued)

Table: Example of assessment of management compliance to hypertension management guideline /2016

Lifestyle Modifications	Pharmacological Treatment	Management compliance
YES	YES	YES
YES	NO	NO
NO	YES	NO
NO	NO	NO

Note. The variable management compliance is a combination of the variables Lifestyle Modifications and Pharmacological Treatment.

Appendix III. Questionnaire to be administered by health practitioners

Please answer the following questions about yourself:

(1) Sex

□Male

□Female

(2) Age (…in years)

(3) Designation

□General practitioner

□ Health officer

□ Nurse

(4) Qualification

□BSc

□Msc

□other, please specify

(5) Iamin clinical practice for… years.

(6) Specify the time period you have been at HTN/NCD/ADULT OPD

From……D/M/Y

To……D/M/Y

(7) I am Trained on NCD /HTN guideline

□ Yes

□ No

(8) In Which health care unit are you currently working

□ Health center

□Hospital

(9) Do you have a close supervision on HTN/ NCD guideline?

□ Yes

□No

(10) Does the health care unit that you are currently working in has equipments required for hypertension management (such as: all first line drugs recommended on HTN guideline, laboratory and other materials needed for HTN diagnosis, A separate NCD OPD, printed HTN guideline)?

 Yes

No

Pick the answer for each question that best matches your response.

(1) Which of the following blood pressure (BP) values defines hypertension in an adult subject without coo morbidities?

 ≥150/90mmHg

 ≥140/90mmHg

 ≥135/85mmHg

 ≥160/95mmHg

Other, please specify

(2) The absolute risk of cardiovascular events over 10 years in high risk patients is?

 <10%

10–20%

20–30%

30-40%

 >40%

Other, please specify

(3) Innewly diagnosed, uncomplicated hypertension and no compellingindications,allofthefollowingantihypertensivedrugclassesareagentsofchoiceoffirstline monotherapy**except**,

Beta blockers

Angiotensin Receptor Blockers

Diuretics

Calcium Channel Blockers

Angiotensin Converting Enzymes Inhibitors

Questionnaire to be administered by health practitioners (continued)

(4) Which are the BP values, that after repeated measurements, define elderly subjects (>75 years) as hypertensive?

- 140/90mmHg or more
- 135/85mmHg or more
- 165/95mmHg or more
- 150/90mmHg or more
- other, specify

(5) Which one of the following antihypertensive drug classes you would like to prescribe as first choice for hypertensive patient with angina?

- Beta Blockers, Angiotensin Receptor Blockers
- Angiotensin Receptor Blockers, Angiotensin Converting Enzyme Inhibitors
- Calcium Channel Blockers, Beta Blockers
- Angiotensin Converting Enzyme Inhibitors

(6) Which one of the following antihypertensive drug classes you would like to prescribe as first choice for hypertensive patients with proteinuric CKD?

- Beta Blockers, Calcium Channel Blockers
- Calcium Channel Blockers, ARB
- Alpha Blockers, Beta Blockers
- Angiotensin Converting EnzymeI nhibitors, Angiotensin Receptor Blockers

(7) Which one of the following antihypertensive drug classes you would like to prescribe as first choice for hypertensive patientswithsystolic heart failure? Choose that apply

- ACE inhibitor
- Beta Blockers
- Diuretics
- methyl dopa
- Dihydropyridine calcium channel blocker

Questionnaire to be administered by health practitioners (continued)

(8) Which are the appropriate examinations to be prescribed for the minimum diagnostic work-up of hypertensive patients?

□Serum potassium, urine analysis, serum creatinine,

□Serum potassium, urine analysis, urea,

□hemoglobin level, urine analysis, fasting serum glucose,

□Micro albuminuria, serum potassium, serum creatinine,

□Serum sodium, serum potassium, serum creatinine,

(9) Which is the definition of Stage 1 hypertension?

□ SBP 120-139 mmHg or DBP 80-89

□ SBP 140-159 mmHg or DBP 90-99

□ SBP >160 mmHg, or DBP>100 mmHg.

□others, specify

(10) Which of the following actions are wrong during BP measurement? Choose all that apply

□Taking more than one measurement.

□Patient rested before measurement

□Cuff placed over clothing

□Arm elevated above heart

□Deflating the cuff too quickly (> 2–3 mmHg/ beat)

□Re-inflating the cuff to repeat measurement after it has fully deflated

Questionnaire to be administered by health practitioners (continued)

(11) Which one of the following is **NOT** a reason that; after evaluating patients, primary healthcare providers should refer patients to higher levels of care?

 Blood pressure differences between the two arms in SBP > 20mmHg and / or DBP > 10 mmHg (confirmed by at least two measurements)

Patients with known or positive history of coronary heart disease, heart failure, stroke/ TIA, peripheral arterial disease (see above)

Urine positive for protein (on 2 or more occasions), microscopic haematuria or casts

 Negative urine glucose in undiagnosed or uncontrolled diabetic

(12) Which BP value is the goal of management for elderly subjects (>75 years)?

140/90mmHg or less

135/85mmHg or more

165/95mmHg or more

150/90mmHg or less

other, specify

Please circle the response that best describes our beliefs about NCD (2016) guideline on the management of hypertension

(1) I have trust in there commendations and developing committee of NCD(2016) guideline

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

(2) NCD (2016) guideline on the management of hypertension is helpful for primary health care practitioners'

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

(3) Adherence with NCD (2016) guideline would produce desired outcome

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

(4) NCD (2016) guideline is motivated by desire to cut cost

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

(5) NCD (2016) guideline decreases health practitioners' autonomy

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree

(6) NCD (2016)guidelineistoorigidtoapplytoindividualpatientsStronglyDisagree

1. Strongly Disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly Agree