ADDIS ABABA UNIVERSITY

SCHOOL OF MEDICINE

COLLEGE OF HEALTH SCIENCES

DEPARTMENT OF MEDICAL PHYSIOLOGY

Visual Impairment And Its Associated Factors Among Hypertensive Patients In South West Ethiopia Peoples Region Hospitals, Ethiopia, 2023.

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A Thesis Submitted to School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements of the Degree of Master of Science in Medical Physiology

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MSc Thesis

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ACRONYMS

BP- Blood Pressure

BMI- Body Mass Index

DM- Diabetes Mellitus

CI - Confidence interval

GABA- Gamma-aminobutyric acid

HTN - Hypertension

IOP- Intraocular pressure

LGN- Lateral geniculate nucleus

LMICs- Low and middle-income countries

RVO - Retinal vein occlusion

SES- Socioeconomic status

SC- Superior colliculus

URE- Uncorrected refractive error

VI- Visual impairment

WHO- World Health Organization

ABSTRACT

Background: WHO report shows that at least 2.2 billion people have near or distance vision impairment globally. It is more prevalent in low and middle-income countries. Little attention has been given to the prevalence of visual impairment (VI) among hypertensive patients in these countries, particularly in Ethiopia.

Objectives: To assess the prevalence of VI and its associated factors among hypertensive patients in South West Ethiopia Peoples Region hospitals, Ethiopia, 2023.

Materials and Method: An institution based cross - sectional study design was conducted on 423 study participants.Questionnaire, Visual acuity test, color vision test, slit lamp examination, retinoscopy, fundus examination, IOP measurement, perimetry examination, anthropometric and blood pressure measurements were used to collect data. Data was entered in to Epi data version 4.6 and then exported to SPSS version 26 for analysis. Bivariate and multivariate binary logistic regressions were used to determine the association between the independent and outcome variables. P-value <0.05 at 95% confidence interval was considered as statistically significant difference. Those variables which were found to have an association with the outcome variable at P<0.25 were entered to a multivariate binary logistic regression model. Statistical significance was interpreted using the adjusted odds ratio.

Results: The overall prevalence of VI among hypertensive patients was 39.72% (n=168; 95% CI: 35-44.4).Cataract (36.3%), Glaucoma (25%) and uncorrected refractive error (16.7%) were the leading causes of VI among hypertensive patients. History of ocular trauma (AOR = 3.84, 95%CI: 1.7-8.71,P=0.001), duration of hypertension (HTN) (AOR: 3.73, 95% CI:2.32-5.99, P=0.001), alcohol drinking (AOR = 2.27, 95%CI: 1.12-4.59,P=0.023) were significantly associated with visual impairment.

Conclusion and recommendations: More than one third of hypertensive patients in this study were visually impaired. The major cause of VI was attributed to cataract. Duration of HTN, history of ocular trauma and alcohol drinking were factors significantly associated with visual impairment. All concerned bodies should work together and focus on the identified factors for early prevention of VI among hypertensive patients.

Keywords: Hypertension, Visual impairment, Glaucoma, Cataract, Ethiopia.

1. INTRODUCTION

1.1 Background

Visual impairment(VI) is a condition in which the better eye's presenting distance visual acuity is less than 6/12(1). It can be also defined as the reduction in the ability to perceive light. It can cause anything from minor disability to total blindness. Uncorrected refractive errors, cataract, macular degeneration, glaucoma, diabetic retinopathy, corneal opacity, hypertension (HTN) and trachoma are the main causes of VI (1-7).

VI brought on by refractive error can be categorized as either distance and near presenting vision impairment. Visual acuity worse than 6/12 to 6/18 is considered mild distance vision impairment. Moderate distance vision impairment is visual acuity worse than 6/18 to 6/60. Visual acuity worse than 6/60 to 3/60 is considered severe distance vision impairment. A near visual acuity worse than N6 is considered near vision impairment. (1). Color blindness, inability to clearly differentiate color differences under normal lighting conditions, is another type of vision impairment (8).

Blood pressure that is consistently higher than 90mmHg of diastolic pressure and 140mmHg of systolic pressure at rest is known as HTN. It is one of the most prevalent health issues with grave repercussions. Some of its negative effects include hypertensive cardiopathy, nephropathy, stroke, retinopathy, and other peripheral complications (2).

Hypertensive retinopathy, hypertensive optic neuropathy, and hypertensive choroidopathy are all effects of HTN on the eyes. Fundus characteristics that are frequently observed in hypertensive retinopathy include focal and generalized arteriolar narrowing, micro aneurysms, intra-retinal hemorrhages, cotton-wool spots, hard exudates and optic disc swelling(2).

Although there are few studies on VI globally, most of these studies were not focusing on the association between HTN and VI. Prevalence of VI and the most common type of VI among hypertensive patients have not been investigated. The aim of the present study is therefore, to assess the Prevalence VI and its associated factors among hypertensive patients in South West Ethiopia people region hospitals.

1.2 Statement of the problem

According to a recent WHO estimate, at least 2.2 billion people worldwide suffer near- or far-sightedness, and in half of these cases, it might have been avoided (1). About 80–90% of the world's visually impaired persons reside in low- and middle-income countries (LMICs), where VI is more frequent (9).

According to a WHO research from 2021, 5.9 million individuals in Africa are predicted to be blind and 26.3 million people in Africa are estimated to have some type of VI (10). This means that 15.3% of the world's population of blind people lives in Africa. About 20 million individuals in Sub-Saharan African nations are estimated to have VI, and Ethiopia is thought to have some of the highest rates of blindness and low vision in the world (1.6% and 3.7%, respectively), of which 80% are preventable or treatable(9, 11).

In China HTN, diabetes and cardiopathy were main medical histories related with VI, with 13.41% having HTN (12).In Taiwan HTN was among the leading diagnosis 37.3% in visually impaired (13).In India the prevalence of VI among hypertensive patients is 26.4%(14).In the case of Sri Lanka 28.1% had a history of HTN with presenting VI (15). In Malaysia 50.4% of hypertensive patients have VI (16). A study conducted in Nigeria revealed that 56% of hypertensives had VI (2).

VI is a significant public health issue. Millions of people worldwide have experienced severe suffering, disabilities, poor mental health, accelerated cognitive decline, reduction in quality of life, productivity losses, and considerable economic implications (12).Early-onset severe vision impairment in young children can cause delays in motor, language, emotional, social, and cognitive development, which can have long-term effects. Children with VI who are of school age may also perform less well academically. Adults with VI frequently have lower rates of productivity and workforce participation as well as increased rates of anxiety and depression. For older people, VI can increase social isolation, difficulties walking, a higher risk of falls and fractures, and a larger chance of entering nursing or care earlier in life (1)..

The majority of people with VI live in developing countries and rural areas. Ageing, gender and medical histories such as HTN and diabetes mellitus have been identified as risk factors for VI. The prevalence of VI is unequally distributed throughout the world and is strongly associated

with socioeconomic status (SES) (12).Sleep quality ,alcohol consumption ,smoking, having a parent with VI, having never had an eye examination, illiteracy, bad economic status, overweight were factors independently associated with VI (17-21).

Although there are some published studies about VI globally, most of the researches were focusing on its association with factors such as age, socio economic factors and different resulting injuries like falls and fractures. The prevalence of VI and its association with HTN has not been investigated in Ethiopia.

1.3 Significance of the study

According to the available scientific data, VI among hypertensive patients in Ethiopia is poorly addressed, indicating that there is a knowledge gap on hypertension induced VI among hypertensive patients, health care providers and other stakeholders. The study will raise awareness and close the knowledge gap among patients and stakeholders about hypertension-induced VI. Hypertensive patients who were diagnosed with VI were referred to the ophthalmology unit for additional evaluation and management. It may also be used as a baseline for other studies on related issues.

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2. LITERATURE REVIEW

2.1 The magnitude of visual impairment in hypertensive patients

According to a cross-sectional study done among residents of Tianjin, China's rural areas, 13.41% of hypertension patients had VI (11).From 31.3% in 2005 to 43.4% in 2014, according to a second follow-up study carried out in Northeast China (21), the prevalence of VI has significantly increased. According to a study done in Eastern Taiwan, the incidence of VI was higher among hypertensive patients with HTN that had been present for more than 10 years, with a frequency of 64.3% among these individuals (13).

Another cross-sectional investigation among people in Sri Lanka who were 40 years of age and older in a medical officer found that 28.1% of those who presented with VI had a history of HTN (15). According to a study done on elderly people in Hyderabad, India, hypertensive people have a prevalence rate of VI of 26.4% (14). According to a study conducted in Malaysia, people who have rising blood pressure are more likely to report VI, with 76.7% of hypertension patients reporting VI (16).A prevalence percentage of 39.3% is revealed by the same study conducted in Afghanistan(18). HTN is linked to VI, with a prevalence rate of 53.1%, according to a study that looked into the relationship between self-reported sleep duration and VI in Korean adults (20).

According to various researches, there are significant differences in VI prevalence among hypertension patients in Africa. A community-based study carried out in a rural area of Abia State, Nigeria, revealed that 58.3% and 53.9%, respectively, of the participants with HTN had low visual acuity (2). A cross-sectional study conducted in Uganda's Mulago hospital between November 2015 and February 2016 found that, with a prevalence rate of 20.4%, impaired vision is one of the most common signs of presentations among study participants with hypertensive crisis.Another study that looked into the incidence and factors contributing to blindness and partial sight in a community of Tunisian diabetes patients included HTN as one condition connected with VI and discovered that 10% of people were blind and that 24.8% had partial sight(6).

2.2 Pathogenesis of visual impairment in hypertensive patients

HTN has significant, frequently asymptomatic, multisystemic consequences. The effects of high blood pressure do not spare the eye; eye blood vessels are just as susceptible to high systemic BP as other bodily vessels are. However, the eye is unique in that it enables early visualization of the direct consequences of high blood pressure (24, 25).

Systemic HTN has been associated with a number of serious eye illnesses and has the potential to alter ocular anatomy and function. It is linked to pathological abnormalities in the retinal vasculature as well as a decreased number of peri foveal arterioles and venules. On the other hand, persistently high blood pressure can cause arteriosclerosis and alter the size of precapillary arterioles, increasing blood flow resistance and decreasing perfusion. More precisely, elevated blood pressure worsens retinal microvascular abnormalities, raises intraocular pressure (IOP), and increases the likelihood of retinal vein occlusion (RVO) and diabetic retinopathy (25).

The retinal vascular cells may also experience apoptosis and other degenerative alterations in HTN (25). A significant contributing element to retinal neovascularization and vessel leakage has been identified as vascular endothelial growth factor. Additionally, microvascular rarefaction, decreased peri foveal capillary flow velocity, and lower circulatory efficiency are all related to HTN (9, 10). Furthermore, there is compelling evidence that the renin-angiotensin-aldosterone system (RAAS), which is crucial in HTN, affects the pathophysiology of eye disease because it may be responsible for the vasoconstriction of the retinal vascular bed and the control of IOP. The RAAS that control growth factor pathway stimulation, angiogenesis, proliferation, and inflammation appear to be crucial in the process of ocular pathology. (26).

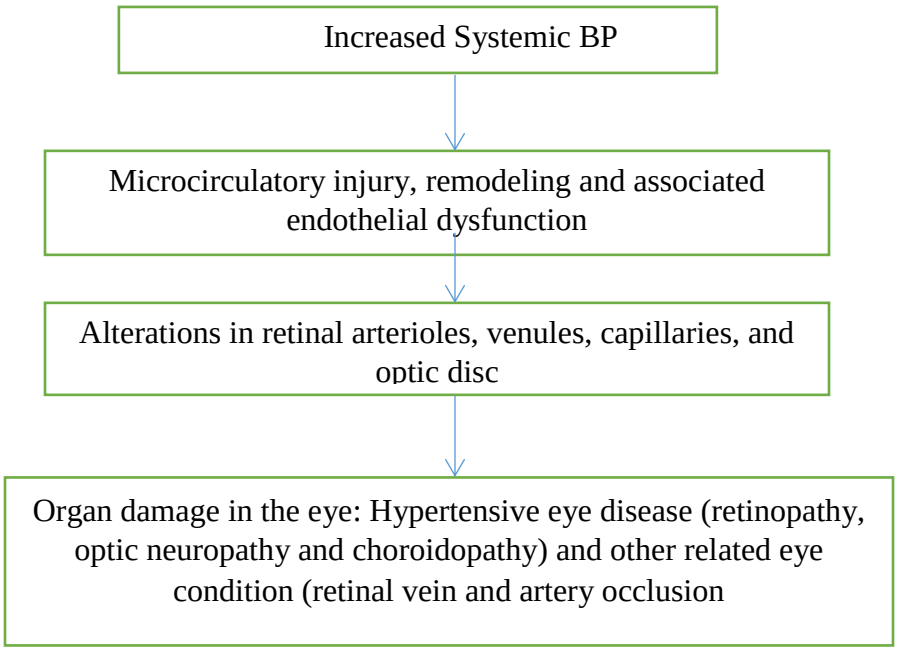

Figure 1: **Pathogenesis of visual impairment in hypertensive patients**

2.3 Factors that contribute to visual impairment among hypertensive patients

2.3.1 Socio demographic factors

Distance VI is thought to be four times more prevalent in low- and middle-income countries than in high-income ones, according to the WHO. In terms of near vision, rates of untreated near VI are believed to be higher than 80% in sub-Saharan Africa while they are claimed to be lower than 10% in high-income countries (1).The prevalence of blindness and low vision showed a similar trend in different economic situations, but was reduced in the group with well-developed economic status, according to a study conducted in China that found VI is related to income level(4). The findings of another study conducted in Afghanistan, which indicated that the prevalence of VI was higher in individuals with reported poor economic level than in participants with good economic status, supported the theories raised above (18) .

People with lower levels of education were more likely to have VI (12), and lower levels of education tended to be connected with VI (5). Participants who had not completed secondary school had a much higher prevalence of vision loss than those who had completed secondary and

university education, according to a study done in South Africa(19).This was further demonstrated by a study done in Ghana, which found that the highest prevalence of blindness was among pensioners without a formal education(21).

Numerous academic works have also linked age and VI. Low vision and blindness rose dramatically with age, according to a study done among adults in the US(3).In China, older participants had higher estimates of the prevalence of blindness and impaired vision, with the rate rising quickly with age(4). In general, the frequency of blindness and moderate to severe VI increased with age(21).In general, women had a higher prevalence of VI than men did (5), and women also had a higher chance of developing VI(12).

2.3.2 Health related factors

Numerous studies carried out in various locations throughout the globe have shown many health-related aspects that are connected to VI. For instance, a research done in Malaysia found a substantial link between diabetes and VI, and most investigations have found that people with greater levels of diabetes are more likely to report VI (16). Another study that involved older people in eastern Taiwan found that patients with HTN or diabetes mellitus for longer than ten years had a greater prevalence of VI (13).

In a research carried out in China, the prevalence of VI was considerably greater in the overweight/obese group than in the underweight and normal groups (27).According to a study done in Ethiopia, adults with a history of eye trauma were 4 times more likely to have VI than adults without a history of eye trauma in the past, and those with a family history of eye problems were 7 times more likely to have VI than adults without a history of family eye problems (28).

2.3.3 Behavioral factors

Numerous studies have shown a connection between VI and other behavioral traits like substance usage, amount of sleep, and exposure to television and mobile devices. The frequency of VI was found to be considerably higher among smokers than among never-smokers in a study of elderly Chinese people(5). Another Chinese study that demonstrated the strong link between alcohol use and VI found that heavy consumption (414 drinks per week) and higher frequency (4 drinking days per week over the previous 30 days) were both substantially linked to higher risks

of VI (29). According to studies from India (30), VI was also shown to be higher among people who currently chewed tobacco.

Self-reported sleep duration and VI had a U-shaped relationship, with both very short (5 h/night) and very long (9 h/night) sleep durations strongly related with VI risk, according to a study done among Korean people (20). Exposure to television and smartphones is the other behavioral component with the strongest association to VI nowadays. According to a study done in Ethiopia, mobile/computer/video game exposure >4 hours/day and television exposure distance 2 m were independently substantially linked with VI (17). Another South Korean study confirmed the aforementioned finding, noting that longer daily smartphone use was linked to a higher risk of experiencing numerous ocular symptoms and that higher prevalence rates for ocular symptoms were seen in groups with greater exposure to cellphones.(31).

2.4 Conceptual framework

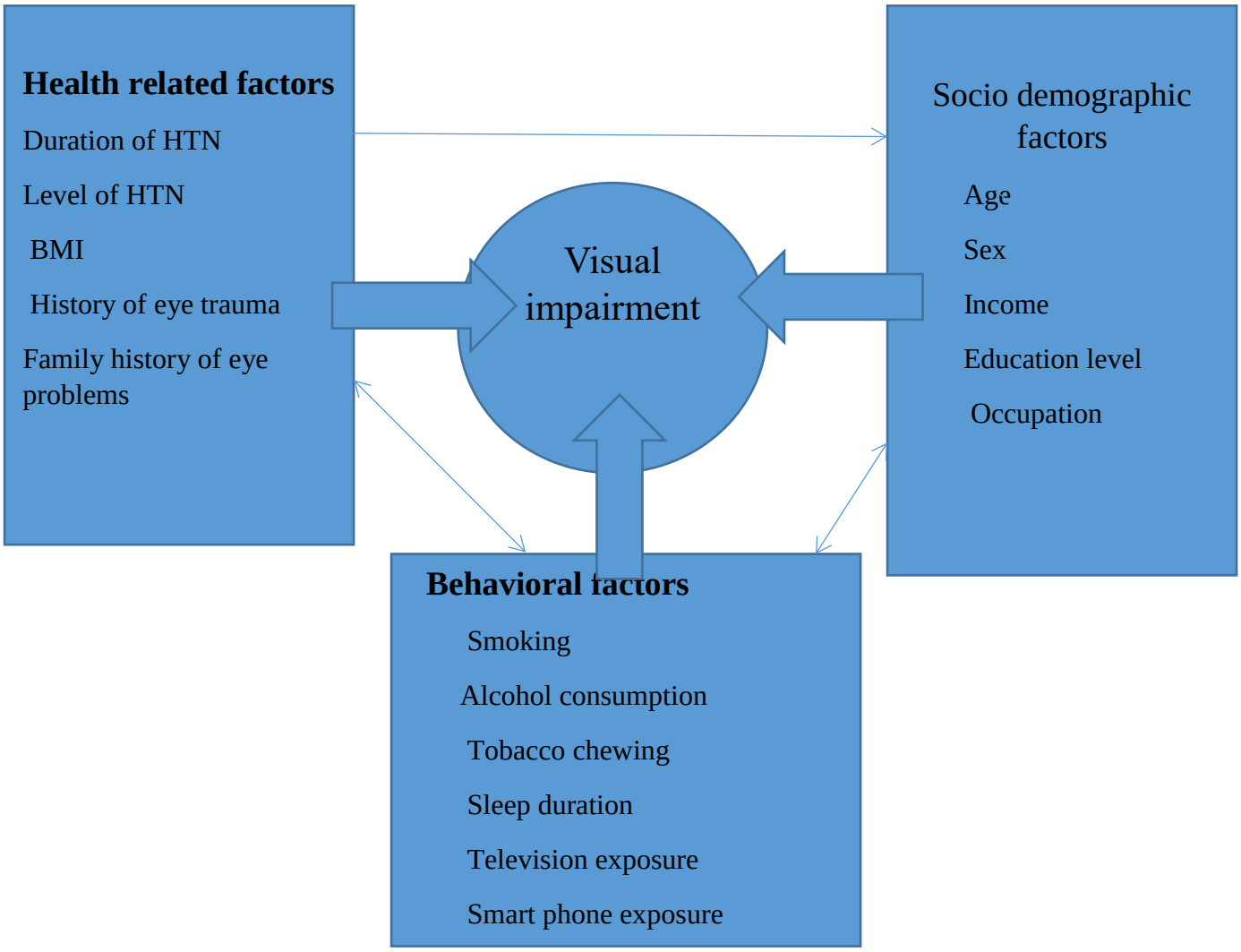

Figure 2: Conceptual framework of visual impairment

3. OBJECTIVES

3.1. General objective

- To assess the prevalence of VI and its associated factors among hypertensive patients in South West Ethiopia Peoples Region hospitals, Ethiopia, 2023.

3.2. Specific objectives

- To determine the magnitude of VI among hypertensive patients in South West Ethiopia Peoples Region hospitals, Ethiopia, 2023.
- To assess the types of VI among hypertensive patients in South West Ethiopia Peoples Region hospitals, Ethiopia, 2023.
- To identify factors associated with VI among hypertensive patients in South West Ethiopia Peoples Region hospitals, Ethiopia, 2023.

4. MATERIALS AND METHODS

4.1 Study area and period

The study was conducted in South West Ethiopia Peoples Region hospitals from September 10 to December 10, 2022. South West Ethiopia Peoples Region is a regional state in Southwestern Ethiopia that was split off from the Southern Nations, Nationalities, and Peoples Region on 23 November 2021. It consists of the Sheka, Keffa, Bench Sheko, Dawro, West Omo Zones and Konta special district. The capital of this region is Bonga which is located 456 kilometers south west of Addis Ababa, the capital city of Ethiopia. The working language of the region is Amharic. This region has a population of 2.3million.There are four hospitals in this region namely Bonga Gebretsadik Shawo memorial hospital, Mizan Teppi University teaching hospital, Teppi general hospital and Tarcha general hospital.

4.2 Study design

An institution based cross - sectional study design was used.

4.3 Population

4.3.1 Source Population

The source population of the study was all hypertensive patients who had follow-ups or were newly diagnosed in the mentioned hospitals during the data collection period.

4.3.2 Study Population

The study population was all hypertensive patients who had follow-ups or were newly diagnosed during the data collection period and fulfilled the inclusion criteria.

4.4 Inclusion and Exclusion Criteria

4.4.1 Inclusion Criteria

Study participants (18 years and above) who were newly diagnosed with HTN or had follow-ups.

4.4.2 Exclusion Criteria

- Patients who were not willing to participate in the study and were unable to give informed consent.

- Critically and mentally ill patients who could not be cooperative.
- Diabetic patients

4.5 Sample size determination and sampling technique

4.5.1 Sample size determination

The sample size was calculated by using single population proportion formula with 95% confidence interval (CI), margin of error (d) of 5 % and proportion of 50%(p=0.5)

$$n = \frac{(Z\ \alpha/2)^2 \times p\ (1-p)}{d^2} = \frac{(1.96)^2 \times 0.5\ (1-0.5)}{(0.05)^2} = 384$$

Adding a non-response rate of 10%, the total sample size was 423

Where:

n = the desired sample size

z =1.96 at 95% confidence interval (CI)

p = proportion of VI which is 50 % since no study has been conducted on VI among hypertensive patients

d = margin of error = 0.05

4.5.2 Sampling Technique

Systematic random sampling method was used to select study participants. Every 6th participant was selected from the list in each hospital during data collection (K=N/n=6, where N is the total number of hypertensive patients who did have follow-up or newly diagnosed during the data collection period (2500) and n is the calculated sample size(423)). A random number 4 was selected between 1 and 6 as a starting study unit. Hypertensive patients on follow up were selected from each hospital by using the proportion allocation formula:

$$\text{Proportion allocation (nf)} = \frac{n \times nh}{N}$$

Where n is the sample size

nh is number of hypertensive patients in the given hospital

N is the total number of hypertensive patients in the four hospitals

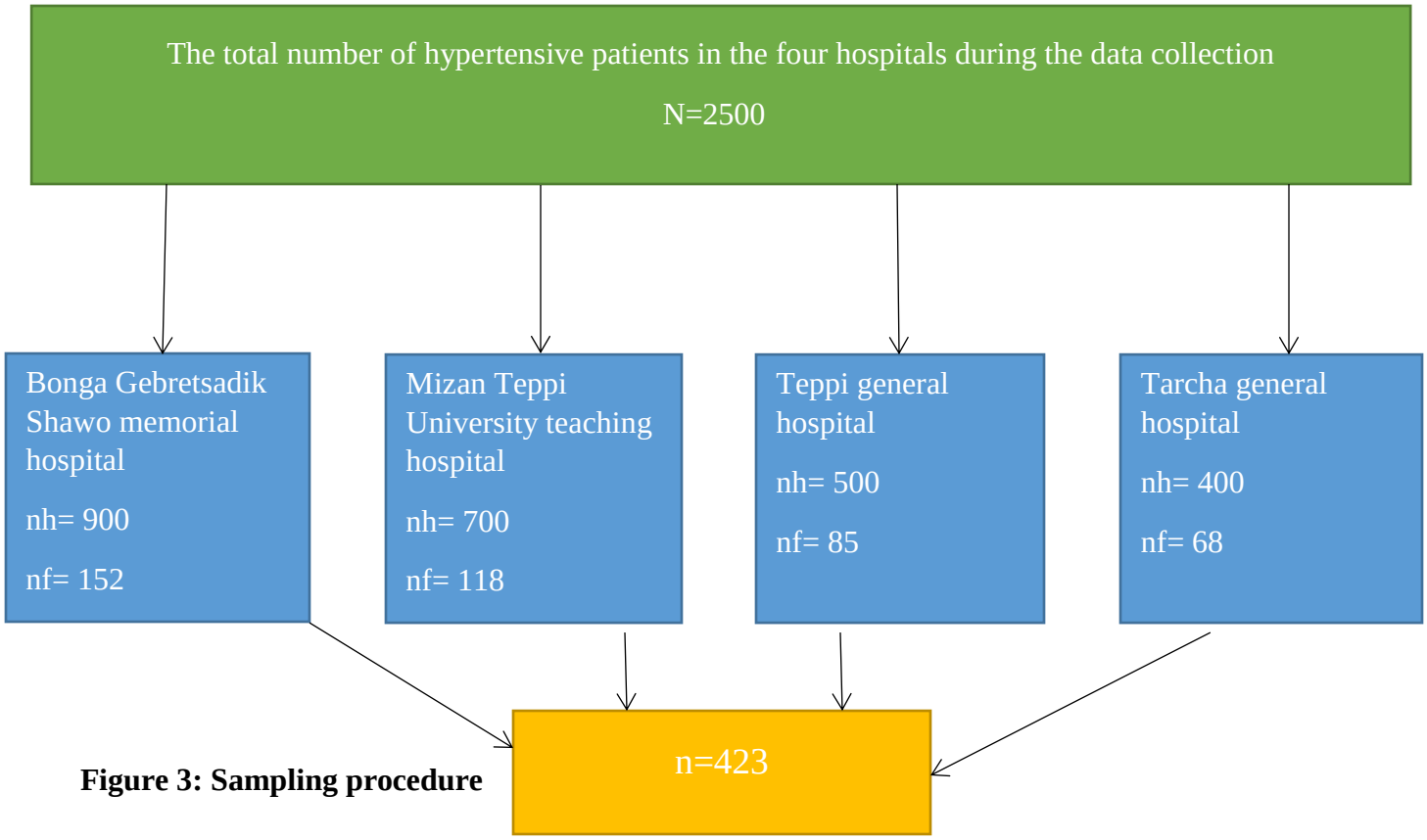

Figure 3: Sampling procedure

4.6 Study Variables

4.6.1 Dependent Variable

- VI

4.6.2 Independent Variable

- Socio demographic variables: Age, sex, income, occupation. educational level
- Health related variables: BMI. duration of HTN, level of HTN, history of eye trauma .family history of eye problems
- Behavioral Variables: Substance use related (smoking, alcohol consumption), sleep duration, television and smart phone exposure.

4.7 Operational Definition

Normal vision: Having visual acuity ≥6\12 in the better eye(1).

Visual impairment: Having presenting visual acuity less than 6\12 in the better eye (1)

Mild visual impairment: Having visual acuity worse than 6\12 but better than 6\18 in the better eye (1).

Moderate visual impairment: Having visual acuity worse than 6\18 but better than 6\60 in the better eye (1).

Severe visual impairment: Having visual acuity worse than 6\60 but better than 3\60 in the better eye (1).

Blindness: Having visual acuity worse than 3\60 (1)

Color blindness: Those who read 9 or less plates out of 15(8).

Normal color vision: Those who read 13 or more plates out of 15(8).

Underweight: Having a BMI less 18.5 kg/m^2 (32).

Normal Weight : Having a BMI from 18.5 to 24.99 kg/m^2 (32)

Overweight: Having a BMI from 25 to 29.99 kg/m^2 (32).

Obese: Having a BMI greater than 30 kg/m^2 (32).

Every day smoker: An adult who has smoked at least 100 cigarettes in his/her lime time and who now smokes every day (33).

Current smoker: An adult who has smoked at least 100 cigarettes in his/her lime time and who currently smokes cigarettes (33).

Alcohol drinker: Having 5 or more (4 or more for females) drinks on occasion in the past 30 days(34)**.**

Ever alcohol user: use of alcohol, at least once in an individual's life time (35)

Current alcohol user: a person who has consumed alcohol at least once within the last 30 days (35).

Duration of sleep: Classified as short length (≤ 5hr) and long sleep (≥ 9hr) (36).

Duration of hypertension: time from the patients' diagnosis with HTN to the data collection period (13).

Television and smart phone exposure: reading or watching at least once a day for not less than 2 hr.(31).

4.8 Data collection tools and process

4.8.1 Questionnaire

. Data on sociodemographic variables, behavioral characteristics, HTN, and associated health characteristics of patients were gathered using a pretested interviewer-administered structured questionnaire. To preserve uniformity, the questionnaire was first written in English, then translated into Amharic and the local tongues, and finally returned to English. Patients themselves and/or their families provided the information for the data collection, which was carried out by two trained data collectors under the direction of the primary investigator.

4.8.2 Eye Examination

Visual acuity test, color vision test, slit lamp examination, retinoscopy, fundus examination, IOP measurement and perimetry examination were performed. Visual acuity test was done in each eye separately .The "Snellen's" illiterate "E" chart was used by hanging on a wall at a distance of 6 meters in a well-illuminated room at a height of 2 meters. Participants were sitting 6 meters away from the chart and covered one eye, while the other eye was examined. They did read and determined the direction (for illiterate) of the letters they saw with their uncovered eye. The examiner asked them to read smaller and smaller letters until they could no longer accurately distinguish letters.

The Ishihara pseudo-chromatic color plate test (24th edition) was used to assess color vision. According to Ishihara guidelines, the test was carried out in a space with the ideal amount of natural lighting. The distance between the people being tested and the chart was 75 centimeters (cm), and no more than three seconds were allowed between each response. Out of 24 plates used for the color vision screening test, 1-17 were stated as per the Ishihara guidelines. The values from Plate 1–15 were evaluated to establish whether or not color vision was normal or

deficient. The color vision was considered to be normal if 13 or more plates could be read normally. According to the Ishihara 24-plate edition guidelines, color blindness was assumed to exist if fewer than nine plates could be read regularly. In reference to Plate 14 and 15, only those who read the numerals, 5 and 45 and read them easier than those on 10 and 9 were regarded as abnormal readings.

Using a slit lamp examination, cataract was evaluated. To facilitate the inspection, the examiner used fluorescein, a specialized dye. They either applied it to the white of the eye with a tiny, thin paper strip or as an eye drop. The eye drops used to dilate the pupils were subsequently given to the patient by the examiner. The drops took around 20 minutes to start working. To keep their heads steady, participants did rest their chins and foreheads against the microscope rest. As soon as that was done, the examiner lit the slit lamp and turned out the room lights. Examining the lens and/or optic nerve allowed for the diagnosis of cataract (lens clouding) and glaucoma (damage to the optic nerve), respectively.

IOP measured using a tonometer, and a perimetry examination was used to test for glaucoma. Local anesthetic drops were administered by the examiner first, and then fluorescein. The examiner then made sure the patient was relaxed and facing the slit lamp. The ocular pressure was then determined by lightly touching the surface of the eye with a tiny point. The force needed to gently flatten a specific portion of the cornea was used to gauge the ocular pressure. The patient was instructed to click a button during the perimetry examination to indicate which light spots they could see after being shown a series of them. Their peripheral vision, which is frequently the first part of glaucoma to impact, started to show some dots. If the patient can't see the spots in the periphery, it may mean glaucoma has damaged the patient’s vision.

Fundus examinations were carried out with ophthalmoscope to look for any signs of hypertensive retinopathy and optic neuropathy like arteriolar narrowing, arteriovenous crossing, papilledema and others. The examiner performed this exam by shining a beam of light through the pupil to view the back of the eye ball. To allow better inspection pupil was dilated by tropicamide. Retinoscope was used to look for refractive errors. The examiner used retinoscope to shine light in to the patient’s eye and observed the reflex off the patient’s retina in a semi dark room at working distance of 66cm.

The examination was conducted by senior optometrists. The data of these examinations was collected by the data collectors based on the prepared data collection material, adapted from different related literatures All study participants who had VI after examination were linked to the ophthalmology unit for the appropriate management and follow-up.

4.8.3 Anthropometric measurements

The weight of study participants was measured by using a standard balance and height was measured by using height measuring device attached to the balance. BMI was calculated by dividing weight (kg) by height (m^2). During the measurement, each participant was made to use light cloth with no shoes.

4.8.4 Blood pressure measurement

Blood pressure (BP) was recorded by using sphygmomanometer (XMEQSPHYRIAC14 length 54.5 cm, width 14cm).). After 15 minutes rest, BP was measured using the left arm. The two legs were on the ground and the arms were made in parallel with the heart.

4.9 Data processing and analysis

After being verified to be accurate, the obtained data was imported into Epi Data version 4.6. After that, it was exported into SPSS 26 for analysis. The connection between study variables was evaluated using the crude and adjusted odds ratio at a 95% confidence level. Calculated descriptive statistics include the median, interquartile ranges, and frequencies. In order to determine the variables that are linked to the result variable, associations between independent and dependent variables were first examined using a bivariate binary logistic regression analysis. A multivariate binary logistic regression model had the factors that were found to have a correlation with the outcome variable at P 0.25. Multivariate binary logistic regression's p value cutoff of 0.05 was used to determine whether variables qualified as having a statistically significant association with visual impairment.

4.10 Data quality assurance

To assure the quality of data, pre-test was conducted in a set up having similar socio-cultural characteristics with the study participants before the actual study begun .Training was given to

data collectors on the objectives of the study, data collection process and relevance of the study before data collection. Throughout the data collection time, data collectors were supervised and the completed questionnaire was cross checked daily for inconsistencies.

4.11 Ethical Consideration

The research was completed after receiving ethical clearance and approval from Addis Abeba University's Research and Ethical Review Committee and the Physiology Department's College of Health Sciences. Hospitals received official letters from the department requesting their authorization. Each patient was informed about the study and given the opportunity to provide written consent. The ability to leave the study at any moment was also made clear to the study participants. The interview was conducted in a private location to protect the participants' privacy, and they were made aware that there would be no compensation or consequences for taking part in the study. Throughout the data collecting and analysis procedure, participants' identities were kept private,while the information was used only for the objectives of the study. All study participants who had VI after examinations were linked to the ophthalmology unit for the appropriate management and follow-up.

COVID-19 preventive practices were adopted to protect the participants and data collectors. Both the participant and data collector washed their hands with water and soap or hand sanitizer before the interview began. The data collector and participants used face mask during the data collection

4.12 Dissemination of results

After being defended at the Department of Medical Physiology, School of Medicine, College of Health Science, Addis Ababa University, the thesis work will be submitted to the department and School of graduate studies of Addis Ababa University and South West Ethiopia Peoples Region hospitals. The result will be disseminated through workshops, seminars and published in an international, professional high impact journal.

5. RESULT

5.1. Socio - demographic characteristics of participants

A total of 423 hypertensive patients were included in this study, with a response rate of 100%. The age of participants ranged from 25 to 80 years with the median age of 57 ± 11 years. More than half 218 (51.54%) of the study participants were females. Majority of the study participants were married 359 (84.87%) and illiterate 260(61.47%).Out of the study participants, 140(33.10%) study participants were farmer, while 236(55.79%) of them had a monthly income of less than 2000 Ethiopian birr (Table 1).

Table 1: Socio Demographic Characteristics of Study Participants (n=423).

Variables	Frequency	Percentage (%)
Age(years)		
<40	**20**	**4.73**
40-64	**233**	**55.08**
>64	**170**	**40.19**
Sex		
Male	**205**	**48.46**
Female	**218**	**51.54**
Marital status		
Married	**359**	**84.87**
Single	**13**	**3.07**
Divorced	**25**	**5.91**
Widowed	**26**	**6.15**
Educational level		
Illiterate	**260**	**61.47**
Primary and Junior	**75**	**17.73**
Secondary and College	**35**	**8.27**
University	**53**	**12.53**

Occupation		
Farmer	**140**	**33.10**
Merchant	**98**	**23.17**
Civil Servant	**105**	**24.82**
Unemployed	**23**	**5.44**
Retired	**57**	**13.48**
Monthly Income(Birr)		
<2000	**236**	**55.79**
2000-5000	**86**	**20.33**
>5000	**101**	**23.88**

5.2 Hypertension and related health characteristics of participants

Among the total participants, 213(50.35%) of them had known that they are hypertensive for less than five year and 372(87.94%) had no diseases other than HTN. On the other hand, 376 (88.89%) participants had no history of ocular trauma and 385(91.02%) had no history of ocular infection.Among the study participants, 413(97.64%) had no family history of eye problems. Majority of the respondents 300(70.92%) had a body mass index between 18.5 and 24.99 (Table 2)

Table 2: Hypertension and Related Health Characteristics of Study Participants (n=423)

Variables	**Frequency**	**Percentage (%)**
Duration of HTN		
< 5 year	**213**	**50.35**
≥ 5 year	**210**	**49.65**
Disease other than HTN		
Yes	**51**	**12.06**
No	**372**	**87.94**

History of ocular trauma		
Yes	**47**	**11.11**
No	**376**	**88.89**
History of ocular infection		
Yes	**38**	**8.98**
No	**385**	**91.02**
Family history of eye problems		
Yes	**10**	**2.36**
No	**413**	**97.64**
Body mass index(kg/m²)		
<18.5	**12**	**2.84**
18.5-24.99	**300**	**70.92**
25-29.99	**101**	**23.88**
≥30	**10**	**2.36**
Systolic blood pressure(mmHg)		
< 140	**146**	**34.52**
≥ 140	**277**	**65.48**
Diastolic blood pressure(mmHg)		
<90	**224**	**52.96**
≥90	**199**	**47.04**

5.3 Behavioral characteristics of participants

Among the participants, 272(64.3%) of them had a sleep duration of 5-8 hours. Out of the respondents, 186(43.97%) had exposure to television, from which 124(66.67%) watched from a distance of greater than 2 meter. From the study participants, 163(38.53%) had rarely used mobile phones, while Only 1(0.24%) respondent was a cigarette smoker. Almost all study participants (99.05%) had never chewed chat in their life time. Majority of the participants 357(84.4%) had history of drinking alcohol in their life time, from which 44(12.32%) had history of alcohol drinking in the last 30 days (Table 3)

Table 3: Behavioral Characteristics of Study Participants (n=423).

Variables	Frequency	Percentage (%)
Duration of sleep(Hours)		
< 5	**10**	**2.36**
5-8	**272**	**64.30**
>9	**141**	**33.33**
Exposure for TV		
Yes	**186**	**43.97**
No	**237**	**56.03**
Exposure distance(Meter)		
<2	**62**	**33.33**
≥2	**124**	**66.67**
Mobile phone use		
Always	**40**	**9.46**
Frequently	**62**	**14.66**
Sometimes	**60**	**14.18**
Rarely	**163**	**38.53**
Never	**98**	**23.17**
Chat chewing		
Yes	**4**	**0.95**
No	**419**	**99.05**
Ever alcohol drinker		
Yes	**357**	**84.40**
No	**66**	**15.60**
Current alcohol drinker		
Yes	**44**	**12.32**
No	**313**	**87.68**
Type of alcohol in the last 30 days		

Beer	**25**	**56.82**
Tej/Tela	**19**	**43.18**
Cigarette smoking		
Yes	**1**	**0.24**
No	**422**	**99.76**

5.4 Prevalence of Visual Impairment

Among the study participants, 168(39.72%) were visually impaired (Figure 4). From these, 65(38.69%) had mild VI, 74(44.05%) had moderate VI, 20(11.9%) had severe impairment and 9 were blind (Figure 5).

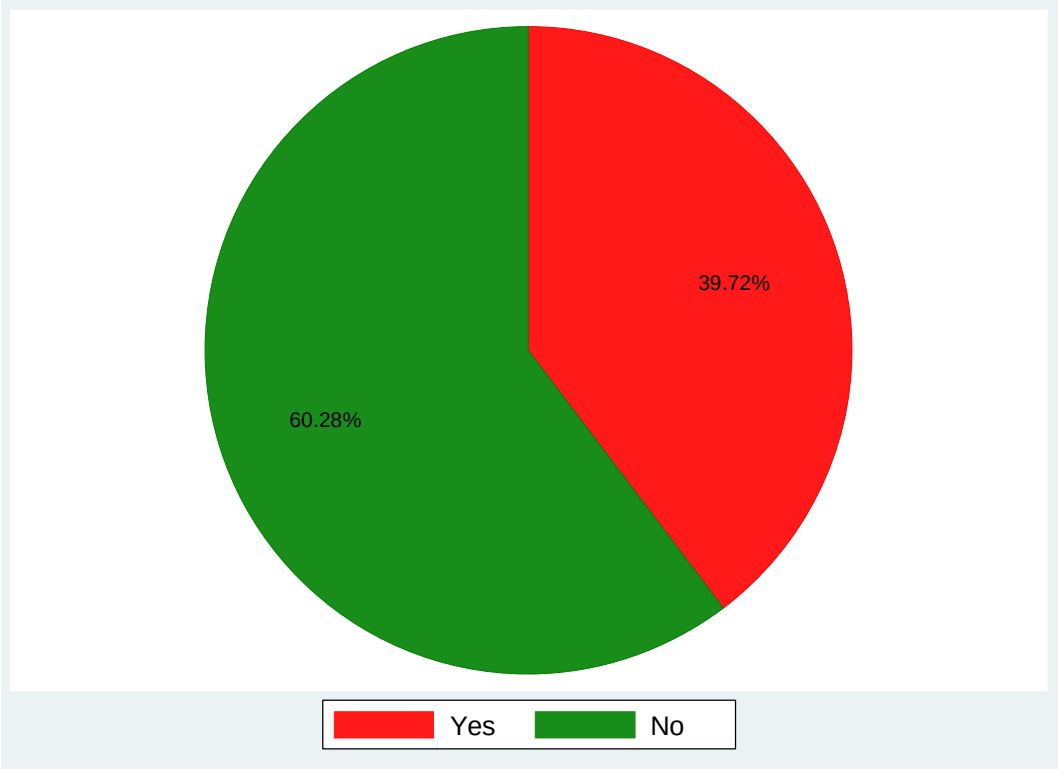

Figure 4: Prevalence of VI Among Hypertensive Patients.

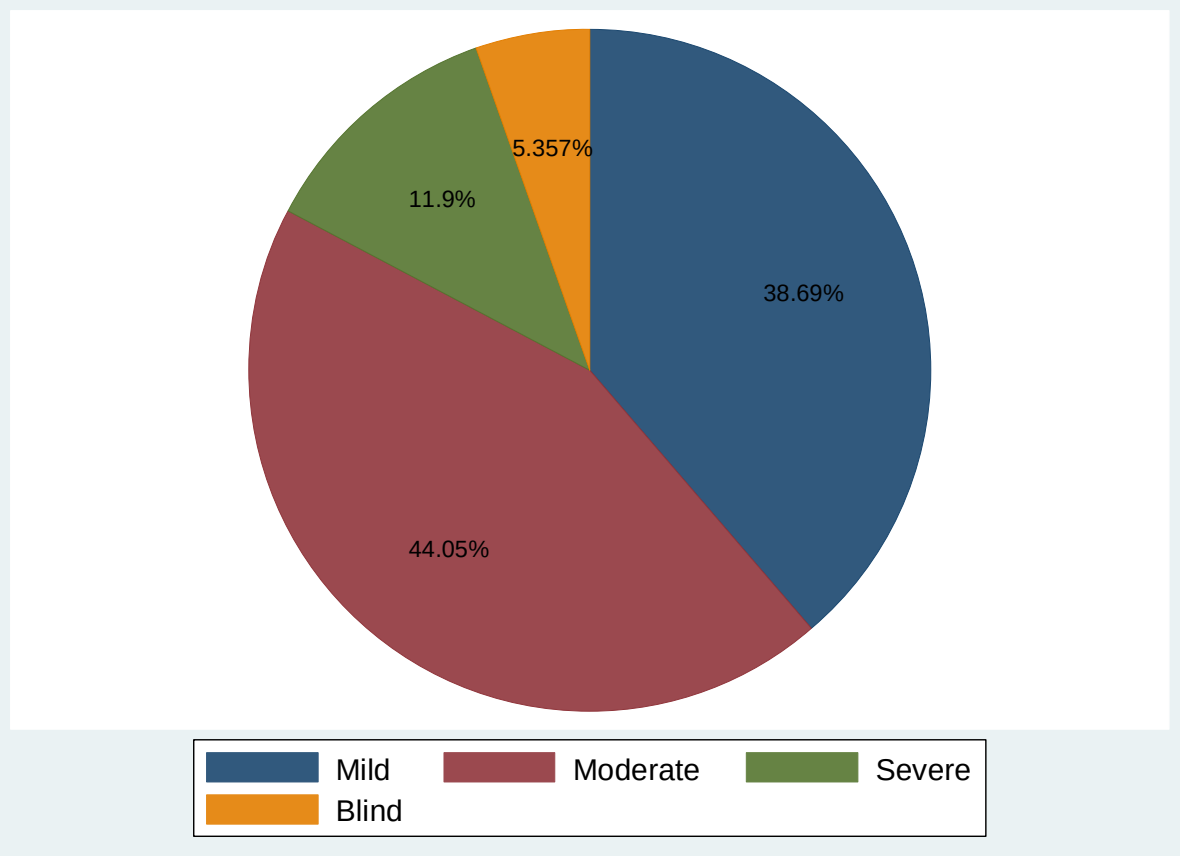

Figure 5: Level of Visual Impairment among Hypertensive Patients.

5.5 Types of Visual Impairment

Cataract was the most frequent 61 (36.3%) type of VI in this study. 49 (25%) participants had glaucoma. Uncorrected refractive error was observed in 28(16.7%) subjects. Out of 28 study participants with uncorrected refractive error, 17 (60.7%) had hypermetropia, 9(32.1%) had myopia and 2(7.2%) had astigmatism. Color blindness was seen in 16 subjects (9.5%). Out of 16 cases, 6(37.5%) were deutan, 3(18.8%) were protan and 7 (43.7%) were unclassified. 12(7.1%) had optic neuropathy and 9 subjects (5.4%) had hypertensive retinopathy (Figure 6).

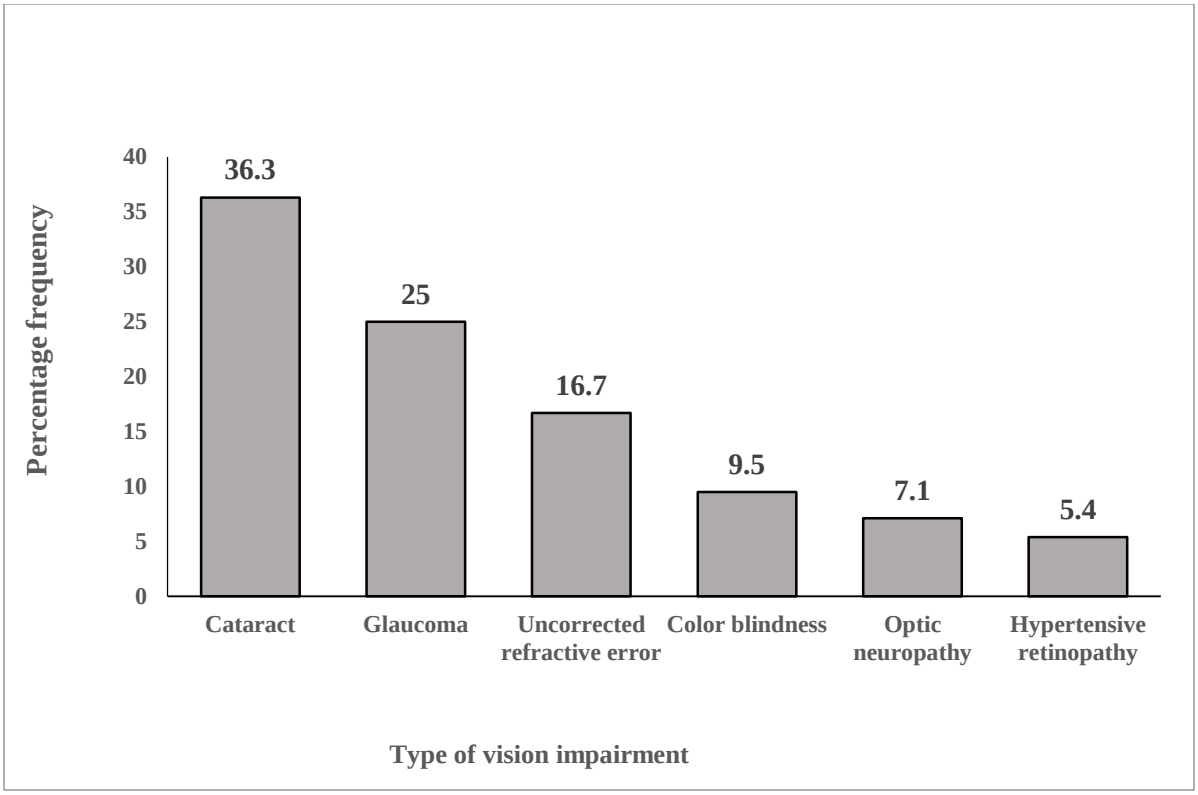

Figure 6: Types of Visual Impairment among Hypertensive Patients (n=168).

5.6 Factors associated with visual impairment among hypertensive patients

In this study, age, occupation, monthly income, duration of HTN, history of ocular trauma, duration of sleep, exposure to TV, mobile phone use and alcohol drinking were significant factors for VI in bivariate logistic regression analysis at P<0.25.In multivariate logistic regression analysis, duration of HTN, history of ocular trauma and alcohol drinking were factors significantly associated with VI at $P < 0.05$.

It was found that participants with duration of HTN of five or more years were about 3.73 times more likely to have VI as compared with participants with HTN duration of less than five years(**AOR**: 3.73, **95% CI**:2.32-5.99) .

Participants who had a history of ocular trauma were 3.84 times more likely to have VI as compared to participants with no history of ocular trauma (**AOR** = 3.84, **95%CI**: 1.7-8.71).The odds of VI among respondents who had history of alcohol drinking was 2.27(**AOR** = 2.27,

95%CI: 1.12-4.59) times more likely than those with no history of alcohol drinking. However, VI was not affected by age, sex, marital status, educational level, occupation, monthly income, duration of sleep, exposure to TV, mobile phone use,level of HTN, history of ocular infection, family history of eye problems, and chat chewing (**Table 4**).

Table 4: Bivariable and Multivariable Binary Logistic Regression Analysis (n=423).

Variables	Visual impairment		COR	AOR(95%CI)	P-Value
	Yes(%)	No(%)			
Age (years)					
<40	**4(20)**	**16(80)**	**1.00**	**1.00**	
40-64	**73(31.33)**	**160(68.67)**	**1.83**	**0.75(0.17-3.25)**	**0.699**
>64	**91(53.53)**	**79(46.47)**	**4.61**	**2.51(0.58-10.79)**	**0.216**
Occupation					
Farmer	**65(46.43)**	**75(53.57)**	**1.73**	**1.25(0.59-2.65)**	**0.566**
Merchant	**33(33.67)**	**65(66.33)**	**1.02**	**0.78(0.37-1.61)**	**0.494**
Civil Servant	**35(33.33)**	**70(66.67)**	**1.00**	**1.00**	
Unemployed	**8(34.78)**	**15(65.22)**	**1.07**	**0.96(0.29-3.22)**	**0.946**
Retired	**27(47.37)**	**30(52.63)**	**1.80**	**0.8(0.36-1.76)**	**0.578**
Monthly Income(Birr)					
<2000	**104(44.07)**	**132(55.93)**	**1.15**	**1.51(0.78-2.91)**	**0.217**
2000-5000	**23(26.74)**	**63(73.26)**	**0.53**	**0.61(0.29-1.3)**	**0.201**
>5000	**41(40.59)**	**60(59.41)**	**1.00**	**1.00**	
Duration of HTN					
< 5 year	**53(24.88)**	**160(75.12)**	**1.00**	**1.00**	
≥ 5 year	**115(54.76)**	**95(45.24)**	**3.65**	**3.73(2.32-5.99)**	**0.001****
History of ocular trauma					
Yes	**28(59.57)**	**19(40.43)**	**2.48**	**3.84(1.7-8.71)**	**0.001****
No	**140(37.23)**	**236(62.77)**	**1.00**	**1.00**	
Duration of sleep(Hours)					
< 5	**4(40)**	**6(60)**	**1.33**	**2.14(0.45-10.13)**	**0.338**

5-8	**91(33.46)**	**181(66.54)**	**1.00**	**1.00**	
>9	**73(51.77)**	**68(48.23)**	**2.14**	**1.45(0.84-2.51)**	**0.182**
Exposure for TV					
Yes	**61(32.8)**	**125(67.2)**	**0.59**	**0.72(0.36-1.47)**	**0.370**
No	**107(45.15)**	**130(54.85)**	**1.00**	**1.00**	
Mobile phone use					
Always	**12(30)**	**28(70)**	**0.55**	**0.59(0.21-1.68)**	**0.323**
Frequently	**20(32.26)**	**42(67.74)**	**0.61**	**1.17(0.47-2.93)**	**0.742**
Sometimes	**21(35)**	**39(65)**	**0.69**	**0.90(0.35-2.29)**	**0.820**
Rarely	**72(44.17)**	**91(55.83)**	**1.01**	**1.17(0.65-2.11)**	**0.604**
Never	**43(43.88)**	**55(56.12)**	**1.00**	**1.00**	
Alcohol drinker					
Yes	**152(42.58)**	**205(57.42)**	**2.32**	**2.27(1.12-4.59)**	**0.023 ***
No	**16(24.24)**	**50(75.76)**	**1.00**	**1.00**	

Note: COR: Crude odds ratio, AOR: Adjusted odds ratio, CI = Confidence Interval. *, and ** indicates statistically significant difference at $p< 0.05$ and $p<0.01$, respectively.

6. DISCUSSION

6.1 Prevalence of Visual Impairment

VI results in numerous serious medical, psychological, social, and economic problems (5). It has caused significant suffering, disability, poor mental health, increased cognitive deterioration, deterioration in quality of life, loss of productivity and enormous economic consequences for millions of people around the world (12). In this study, the prevalence of VI among hypertensive patients was 39.72% (n=168; 95% CI: 35-44.4), which is higher than studies done in Taiwan 11% (13),India 30.1% (14),Sri Lanka 21.3% (15),Afghanistan 22.6% (18) and Saudi Arabia 13.9% (37). The relatively higher prevalence and discrepancy with the above mentioned studies could be attributed to many factors. The first reason could be attributed to differences in visual acuity cut point in defining VI. In our study, VI was defined with visual acuity less than 6\12. This wasn't the case in all the above mentioned studies, at which VI was defined as, visual acuity of less than 6/18. Another reason could be differences in the method used in defining VI. In this study visual acuity of the better eye was used to define VI that yields a relatively higher prevalence than using best corrected visual acuity, which was used in studies done in India (14), Sri Lanka (15), and Saudi Arabia (37). The other possible reason could be attributed to the socioeconomic status and quality of life differences between study participants involved in our and previous studies. The studies done in Taiwan (13), India (14) and Sri Lanka (15) involved a narrower age group than this study which might be another reason for the higher prevalence of VI in our study. The study in Sri Lanka (15) was done among medical officers, unlike our study in which most study participants were illiterate farmers. This educational status difference might cause difference in the magnitude of VI among hypertensive patients between previous studies and the current one.

In contrast, the prevalence of VI in our study was lower than studies conducted in Nigeria 56% (2), Malaysia 46% (16) and Central Republic of Congo 70.8% (38). This discrepancy might be due to many factors. Differences in age of the study patients could be one of the reasons contributing to the prevalence difference between the current study and previous studies. In studies done in Malaysia (16) and Central Republic of Congo (38), the age of the participants was greater or equals to 60 years, while hypertensive patients with age of 18 and above were

involved in our study. Advancing age might lead to decrement of the normal function of the eye tissues and thus increased incidence of ocular pathology. Another reason for higher prevalence in previous studies could be the fact that that all the studies were population based, while our study was hospital based. This might result in a lower magnitude of VI in this study.

The prevalence of VI obtained in the study conducted in South Africa, 36.1% (39), nearly equals the prevalence obtained in our study.

6.2 Types of Visual Impairment

In agreement with many other surveys, cataract was found to be the leading cause of VI in our study. This study indicated that 36.3 % of VI cases were due to cataracts**.** A community based study conducted among hypertensives in Nigeria revealed that the major cases 37.6% of VI were attributed to cataract (2). Cataract, mostly characterized as nuclear sclerosis, had a major influence on the visually impaired elderly population in Eastern Taiwan and was the main cause of VI taking about 45% of cases (13). Studies conducted in china (4, 5) also revealed that majority of VI was attributed to cataract. The same was true in studies conducted in India (14), and Afghanistan (18). Although cataract was the leading cause of VI in our study, its prevalence was less than in the studies conducted in China (4), Eastern Taiwan (13) and India (14). The discrepancy could be attributed to age span of participants of the respective studies. The participants involved in the above studies were aged 60 years and above, while hypertensive patients with age of 18 and above participated in our study. Advancing age might worsen HTN and its complications that increase the incidence of cataract.

Glaucoma was the second cause of VI in our study, making up 25% of the visually impaired. This result is in agreement with a study in Nigeria, in which glaucoma (32.8%) was the second leading cause of VI among hypertensive patients (2). A study conducted in China also showed that cataract and glaucoma were considered as the main causes of VI (4). According to study conducted in Afghanistan, glaucoma was one of the three common causes of VI following cataract and uncorrected refractive error (18). A recent study conducted in Korea stated that HTN was associated with an increased incidence of glaucoma, with Patients having higher systolic BP (≥140 mmHg) were more likely to have glaucoma compared with subjects with a systolic BP <

120 mmHg (43).Another important study in Denmark suggests that antihypertensive treatment may have a preventive effect on the development of glaucoma (44).

This study showed that uncorrected refractive error (16.7%) was the third main common cause of VI. This finding was in agreement with study conducted in China in that 14.5% of hypertensive patients showed uncorrected refractory error (4). A study conducted among the elderly in India showed that uncorrected refractive error was the second leading (27.0%) cause of VI following cataract (14). Another study conducted in Saudi Arabia (36%) showed that uncorrected refractive error was the leading causes of VI (37). The relatively lower percentage frequency in our study could be explained by the fact that the estimated occurrences for causes of visual impairments in our study were based on the proportion of each cause in relation to all other causes, so the proportions of refractive errors were relatively lower due to the concomitant causes (e.g., cataract and glaucoma). In our study hypermetropia (60.7%) accounted for most of the cases of uncorrected refractive error, followed by myopia (32.1%) and astigmatism (7.2%). This is in line with the results of a study conducted in Saudi Arabia, where hypermetropia accounted for 60% of cases of uncorrected refractive error followed by myopia and astigmatism (37). The possible reason for this might be the revelations of the study that explored the relationship between the refractive state of the eye and high blood pressure. This study concluded that there is association between essential arterial HTN with hypermetropia, which has not been previously reported.

In the present study, the percentage prevalence of color blindness among visually impaired was 9.5%, while the overall prevalence was 3.8%. Our literature search did not reveal any studies examining color blindness together with other VI types, although many studies assessing the prevalence of color blindness existed. So we couldn’t compare its relative percentage frequency among VI cases with other studies. Similar results were seen in a study conducted in Japan among middle aged hypertensive patients, which had prevalence of color blindness of 4.37% (48). Our finding was also in line with study conducted in USA, which had 4.2% prevalence of color blindness among hypertensive patients (49). Another study in Greece had similar prevalence of color blindness of about 3% (50). Study conducted in Iraq had relatively higher prevalence of color blindness of about 8.47% (51). The possible reason for the discrepancy might be the difference in race. There aren’t many published reports which asses the relationship between systemic HTN and ocular neurological functions such as color vision.

Hypertensive retinopathy is the major ocular disease resulting directly from HTN and in this study, it accounted for 5.1% of VI cases. This was in line with study conducted in Nigeria, in which 3.4% of the VI was hypertensive retinopathy (2). Another study in Canada revealed that 8.6 % of the cases of VI were hypertensive retinopathy (53). Optic neuropathy which also results from HTN was seen in 7.1 % of the visually impaired subjects in our study. Study conducted in Nigeria had nearly similar percentage frequency of about 6.8% of optic neuropathy among visually impaired (2).

6.3 Factors Associated with Visual Impairment

This study reveals that participants who had a history of ocular trauma were 3.84 times more likely to have VI as compared to participants with no history of ocular trauma. Similarly, a studies conducted in China (55) and Malawi (56) showed that history of ocular trauma was positively associated with VI. VI was also higher among those with a history of previous eye injury in a study conducted in Saudi Arabia (37). The reason why participants who had a history of ocular trauma had more chance of developing VI could be due to injury to the eye like corneal trauma leading to ulceration, injury to the eyelid or surrounding bones around the eye causing vision loss including blindness (57, 58).

In our study, participants with HTN duration of five or more years were about 3.73 times more likely to have VI as compared with participants with duration of less than five years. A study conducted among the elderly in eastern Taiwan stated that there was a higher prevalent trend of VI among patients with a longer duration of HTN (13). Similarly, other studies in Bangladesh (59), India (60) and Pakistan (61)) revealed that the risk of developing VI was higher with increase the duration of HTN This could be due to retinal vascular changes induced by increased BP for longer period. Arteriosclerosis and changes in the size of the precapillary sphincters increase blood flow resistance and reduces perfusion. Besides, chronic high BP decreases choroidal circulatory flow and increases intraocular pressure. This could lead to permanent vision loss including blindness (25).

It was also found that participants who had a history of alcohol drinking were 2.27 times more likely to have VI than those with no history of alcohol drinking. This was supported by studies conducted in China (62) and Turkey (63). Another study conducted in China showed that alcohol drinking is strongly associated with VI (29). Alcohol use leading to visual loss may be explained

by its probable impact on GABA activity. The ganglion and bipolar retinal cells, the lateral geniculate nucleus (LGN), the superior colliculus (SC), and the visual cortex are among the structures that contain this neurotransmitter and are involved in the processing of visual information. Alcohol mimics the effects of GABA through interacting with GABA receptors in the brain (GABA agonists), rather than increasing GABA itself.

7. STRENGH AND LIMITATIONS OF THE STUDY

7.1. Strength of the study

- The study is first of its kind in Ethiopia.
- Data was collected from all study participants with 100% response rate.
- All hospitals in the region were included in the study.
- The study was conducted in multiple sites.
- Many diagnostic tests for VI were conducted.

7.2. Limitations of the study

- Cross-sectional study design makes it difficult to draw causal relationships between dependent and independent variables/factors.
- The interview was based on individuals' memory, and recall bias may exist.
- Since the study was hospital based , a conclusion to the community cannot be made

8. CONCLUSION

More than one third of hypertensive patients in this study were visually impaired. The major causes of VI in this study were attributed to cataract and glaucoma. Duration of HTN of five or more years, history of ocular trauma and alcohol drinking were factors significantly associated with visual impairment among hypertensive patients.

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9. RECOMMENDATIONS

- Government should give attention to VI resulting from HTN to decrease its social, economic and political burden.
- Health professionals should give health education for hypertensive patients, which is vital for early and proper management.
- Further large scale community based researches are required.
- Patients with hypertension are required to control their blood pressure.

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ANNEXES

Annexes I: Information sheet and consent form

Part I: English version

Information sheet

My name is ……. (Data collector's name); I'm collecting information for the research titled as assessment of the prevalence of VI and its associated factors among hypertensive patients in South West Ethiopia Peoples Region hospitals. This study is approved by the ethical and review committee of the department of Medical Physiology, School of Medicine, Addis Ababa University. Dear participants, you are kindly requested to participate in this study. Here is some important information which helps you to decide whether you participate or not in the study.

1. **Objective**: the objective of this study is to assess the prevalence of VIand its associated factors among hypertensive patients in South West Ethiopia Peoples Region hospitals
2. **Procedures to be carried on**: If you agree to participate, you will be asked some general questions about yourself and specific questions on the risk factors and associated factors. Important eye examinations will also be performed
3. **Expected benefit**: What we will learn from the research will be used to recommend policy makers and health planners to appropriately design effective and accessible services in order to monitor VI in hypertensive patients early. In the course of the interview, you may learn new information about VI in hypertensive patients.
4. **Risks and discomforts:** In this particular study there are no procedures and questions that may harm or give you a feeling of discomfort.
5. **Confidentiality:** The information given by the patient will serve only for this study, not for any other purpose and will be kept confidential.
6. **Termination of the study:** participation in the study is voluntary. Refusal to participate involves no penalty or loss of benefits. You have every right to accept or refuse participation in this study at any time. If you have any question about the study, you can reach the principal investigator **Daniel Assefa** at the department of Medical Physiology, School of Medicine, Addis Ababa University. PhoneNo: **0931973181** .Emal:**daassada18@gmail com**.

Written consent form

Information about the study has been explained to me by the data collector. I understood that the objective of this study is the prevalence of VI and its associated factors among hypertensive patients and the information given will serve only for this study, not for any other purpose. It has also been explained to me that, all the information that I will give will be kept confidential and will have no harm to the participants. Therefore,

A. I agree to participate in this study □

B. I disagree to participate in this study □

Data collector's name ----------Signature----------Date----------

Part II Amharic version

ስለ ጥናቱ መረጃ ለተሳታፊዎች በአማርኛ

ስሜ ----------ይባላል (የመረጃ ሰብሳቢዉ ስም)። ይህን መረጃ የምሰበስበዉ በአ.አ ዩኒቨርሲቲ ሕክምና ት/ቤት ፊዚዮሎጂ ት/ክ እንዲሰራ ለተፈቀደለት የምርምር ጽሑፍ ሲሆን ፣የምርምሩ ርእስም የሚያተኩረዉ በዚህ ሆስፒታል የሚታከሙ የ ደም ግፊት ህመምተኞች ላይ የሚከሰት የማየት እክል ላይ ነዉ:: እርስዎም በዚህ ጥናት እንዲሳተፉ ፍቃድዎን በአክብሮት እጠይቃለሁ። በጥናቱ ለመሳተፍም ሆነ ላለመሳተፍ ለመወሰን እንዲያስችልዎት ስለጥናቱ የሚከተሉትን ማብራሪያዎች እባክዎ ይመልከቱ፡

1. **የጥናቱ ዓላማ**፡ የዚህ ጥናት ዓላማ በአዋቂ ታካሚዎች ላይ ያለዉን የ የማየት ችግርና የችግሩን ምክንያቶች ለማዎቅ ነዉ::

2**. አካሄድ**፡ በዚህ ጥናት ላይ ታካሚዉ የተለያዩ ምርመራዎች የሚደረጉለት ይሆናል

3. **ሊደርስ የሚችል አደጋ**፡ ጥናቱ በጤናዎት ላይ ምንም አይነት አደጋ ወይም ችግር አያስከትልም።

4. **ከጥናቱ የሚገኘው ጥቅም**፡ በጥናቱ ላይ በመሳተፍዎ ምንም አይነት የገንዘብ ክፍያ አይሰጥዎትም።

5. **ምስጢራዊነት**፡ የማንኛውም የጥናቱ ተሳታፊ መረጃ በምስጢር ይያዛል። የእያንዳንዱን ግለሰብ መረጃ ከዋናው ተመራማሪና ከሃኪሙ በስተቀር ማንም ሊያዉቀዉ አይችልም።

6. **ፈቃደኝነት**፡ ተሳታፊዉ በጥናቱ ለመሳተፍ ፈቃደኛ ያለመሆን፡ ማንኛውንም መረጃ ያለመስጠት እንዲሁም ጥናቱን በማንኛውም ጊዜ የማቋረጥ መብቱ የተጠበቀ ነው።

ጥናቱን በተመለከተ ምንም አይነት ጥያቄ ካለዎት በሚከተለው አድራሻ ሊያገኙን ይችላሉ።

ስም፡ ዳንኤል አሰፋ ፣ ፊዚዮሎጂ ት/ክፍል ፣ ሕክምና ት/ቤት፣ አ.አ ዩኒቨርሲቲ

ስልክ፡ 0931973181 ፣ ኢሜል፡ daassada18@gmail com.

የስምምነት መጠየቂያ ቅጽ ለተሳታፊዎች በአማርኛ

የጥናቱ ተሳታፊ መለያ ቁጥር----------

ጥናቱን በተመለከተ በቂ ማብራሪያ ተደርጎልኛል። የጥናቱንም አላማ በሚገባ የተረዳሁ ሲሆን፤ የ ደም ግፊት ህመምተኞች ላይ የሚከሰት የማየት እክል ላይ ሲሆን የምሰጠውም መረጃ ለዚህ ጥናት ብቻ የሚውል በመሆኑ በኔ ላይ ምንም አይነት ጉዳት እንደማያደርስ እና የምሰጠው ማንኛውም መረጃ በሚስጥር እንደሚጠበቅ ተገንዝቤአለሁ።

ስለሆነም በዚህ ጥናት ለመሳተፍ፡

ሀ. ፈቃደኛ ነኝ □

ለ. ፈቃደኛ አይደለሁም □

የመረጃ ሰብሳቢው ስም---------- ፊርማ-------ቀን--------/-------/--------

Part III: Kaffinoonoo version

Preechi qiihoo qoodetiinooch

Taa shigoo ----------gettehe(qiihoon kiichoo shigoo). Hiin qiiho kiicebeto Addis Ababa university iiwee dooye kexoche fiizollojji dooye kuxona shunoyichi dagetti phiree koroo tunemona phireechi shiimboo konjoo bii imiibete hiin hosipitalochi daawebeti daamee ceniiwoye xaame xuqii biiyechinoo tumechi hallebeti aafe beggii iirootee toomoochiiyee. Iitoo hiini phirochi qoodditemochdaggoon oogiiyona eechoo. Hiinii phiirochii ittoo qoodiiyoono tuneba iitoo qoodiiyachee iitoo geetega shiichii wusanee iitoo imabeteena iitoon degeemi phiiree toomoochi hiiniiyee deshi ciinootii:

1 **Phiiree gaaboo:** Hinii phiiree gaaboo oogoogee ashee aafee ciini toomooch aakaamee beeti luaamii wayee iiriitoochi naabooni aariiyoo.

2 **Shaalliigiichoo:** Hinii phiriree toomoochii aafee ciini qaayee biiyee choo afeechoona waajjii biiyee miiriimoora giiyeemoona.

3 **Shaagoo haakimmi hayiiboo:** Phiiroona iitoo gediho itoo iiwechi hayibon woyena iirayon doubiyache

4 **Phiiroochee daaneemi gaacoo:** Phiiroona iitoo qoodiiyeetoochii qoocheemi gijoo alloone

5 **Qiihee quiittino:** Qilhoo eacheti aashendochi qiihoo maacoona yecheehee iikee iikee qiihee imechiinaochii qihooo inde phirechona haakkimonoy machii konliyoona ariiyoon hookaache.

6 **Dagoo:** Qoodechoo phiiroona qoodiiyaacheemooch qaayoo qiihee bayoo tune moona phiiroon bi shuuneeti giizooba neechoo haakkoo bi wuuroonee.

Phiiree toomoochi aabiiyoona echo daabiimii adiirashoona danoo haakiiyeeti.

Shigo: Danelli Assafi fiizoologi dooyee kuxoochi iiwee doyeechi Addis Abbabi universitiichi.

Kekee hoddoo: 0931973181 Iimello: daassada18@gmail com.

Mashame eache qijo qoodiyechino kaaffinoona

Pirroch bariyee hadoo----------

Pirron beqiimoona taachi birriyoo geddetone. Piirochi inde shalligon diigeneto ta tunemona doome cenii waye dame gitee biiyechiinoo toomoochi shaagiibeti aafee ciinni iireate tomochi tunemona too imabettii qihoo hinni pirochi bachi hecheemo biitonomonaatoo toomochi qmumi xuxoon woyena iiraaton shaakiyachemo tunemona too imaabeti qihoo wottaa tunoni diigeneto taune.

Ebii tunetochii hiinii piroochii

Daaggecho taane □

Daaggecho taatoon taane □

Qihon kiichecho shigo ---------- duko---------- deco --------

Part IV: Dawrotsuwa version

S`anayigagetus kalliyagetu ittiipetetsa

Suntsay----------gettettee(marka shishiyagasuntsa). Ha markay yidossay Addisaba harggiya pilligiya timirtiya goliyappe pissologiya ootsanadin matay immetedda pilliqiya s`aafiyagetsa giolode. Pilligetiya hullg`e kaaray k`onc`c`issiyawe ha hospitaliyan akamettiyagetti suutsa sugetsa sakkettiyagetu bollen gakkiya s`eella kena. Hintte ha pilligetsan kallanaw intte sleniya immana malaa bonchihuwan ooehayiy. Ha pilligetsa kaallanaw woy kallenan is`akawa k`achchanaw danddayisanamala pilligetsasi kalliya biletsa s`ellite.

1 **Pilligetsa hallichchoy:** Ha pilligetsa hallichoy wozamatu sakkettiyawanttan deittasissa metuwanne he metuwa gaasuwa eranaga.

2 **Hametsa:** Ha pilligetsa bollan s`akketiyawe dumma dummag haytsa halggiya s`eelluwa gidee.

3 **Gakkana danddayiya metuwa:** Pilligetsay sorotetsabollan ayba metuwawoy danuwa gatsana danddeyena.

4 **Pilligetsappe betiya go`a:** Pilligetsan bollon madetidigo ayibane biira demissena.

5 **S`uuraa:** Ha pilligetsa ootsidage bare markka s`uuran oykke. Hawa qishshawu ittiitti aasay shiishiya markka wanna hakkimiyappe harray onikka eranna danddayenna.

6 **Enotetsa:** Kaalliyage pilligetsan kaallanaw mayetibenaga gidopeatin markka immenagee hegaddanikko pilligetsa aywodiyankka k`ans`iya matsay naagetidaga.

Pilligetsa s`eelliyagan ayibamallanne oshay deyabagidikko hasohwan demana donddayitsa.

Suntsay: Daniel Assefa , pissology timirtte keetsaa , sakkettina asaa c`addiya timirte qollege, Adisaba yunibersitiyappe.

Silkiya paydoy: 0931973181 Imeliya: daassada18@gmail com.

Masetussa ooshaa shik`wwaa daawurosuwan  pilligetsa s`eelahan

Wakena k`onicetaly oseteda----------

Pilligeta k`ataa maharada ak`k kussaa haninia suutsa sugeta hariga chani gakiyaba s`eelowa bolla giidide imiya filligiagetaa haa piligetsaw s`aala peeshiya gidiyaw boolaa abane dhanuwa gatenauanne imiya aiyba maala filligiaetaa kosuwani nanaguasaiy seeletiyist.

Hannowass hawanni filligiata satefetenaw

Dossetetaa □

Giddenawaa □

Marka shishiyagasuntsa ---------- firmaiya---------- kenoiya --------

Part V: Shekkinoonoo version

Piirttoo mixxo qoodiyechino

Taa shigoo ----------getteyaye (qiihoon kiichoo shigoo). Hiin qiiho kiicebeto Addis Ababa university iiwee arrije`o kerro fiizollojji arrije`o kuxona shunoyichi dagetti piirttoo shicho tunemona piirtoo shiimboo konjoo bii imiibete hiin hosipitalochi daawebeti daamee ceniiwoye xaame xuqii biiyechinoo tumechi hallebeti aafe beggii iirootee toomoochiiyee**.** Haanii piirtoo ittoo qoodiiyoono tuneba iitoo qoodiiyachee iitoo geetega shiichii wusanee iitoo imabeteena iitoon degeemi phiiree toomoochi hiiniiyee deshi ciinootii:

1 **Piirttoo gaaboo:** Hanii piirttoo gaaboo oogoogee ashee aafee ciini toomooch aakaamee beeti luaamii wayee iiriitoochi naabooni aariiyoo.

2 **Shaalliigiichoo:** Hanii piirttoo toomoochii aafee ciini qaayee biiyee choo afeechoona waajjii biiyee miiriimoora giiyeemoona.

3 **Shaagoo fakkeyi adaagoo:** Piirttoo iitoo gediho itoo iiwechi adaagoo woyena iirayon doubiyache

4 **Piirttoo daaneemi gaacoo:** Piirtoo iitoo qoodiiyeetoochii qoocheemi gijoo alloone

5 **Qiihee quiittino:** Qilhoo eacheti aashendochi qiihoo maacoona yecheehee iikee iikee qiihee imechiinaochii qihooo inde phirechona haakkimonoy machii konliyoona ariiyoon hookaache.

6 **Dagoo:** Qoodechoo phiiroona qoodiiyaacheemooch qaayoo qiihee bayoo tune moona piirtoo bi shuuneeti giizooba neechoo haakkoo bi wuuroonee.

Piirtoo toomoochi aabiiyoona echo daabiimii adiirashoona danoo haakiiyeeti.

Shigo: Danelli Assafi fiizoologi dooyee kuxoochi iiwee doyeechi Addis Abbabi universitiichi.

Kekee hoddoo: 0931973181 Iimello: daassada18@gmail com.

Eache qijo qoodiyechino Shakikinoona

Piirtoo bariyee fadoo----------

Piirtoo beqiimoona taachi birriyoo geddetone. Piirtoo inde shalligon diigeneto ta tunemona doome cenii waye dame gitee biiyechiinoo toomoochi shaagiibeti aafee ciinni iireate tomochi tunemona too imabettii qihoo hinni pirochi bachi hecheemo biitonomonaatoo toomochi qmumi xuxoon woyena iiraaton shaakiyachemo tunemona too imaabeti qihoo wottaa tunoni diigeneto taune.

Ebii tunetochii hiinii piirtoo

Daagge taane □

Daagga taane □

Qihon kiichecho shigo ---------- duko---------- Kanno --------

Part VI: Benchnona version

Xinatashmen merejaan tesatafin

Taa suumi ----------masteskum (merejaa jubdasi yiskuu suum). Haasha merejaa dubdaaskuy Addis Ababa university akim temertbet fiizollojji masetesku temertenta qayde mastetam eestush meremero tsufii yifetaan meremerush toh gahend notsekush hoospitalshakaan akaamasni yiskendi suut chon faagenasend debem bestii yiskuush afpuug debememagzewo. yentined xinatashmen yonnta eyaardensuyoshan yont shunz websamta oochiskwo. Xinatashkaan yennti eeyadensayoshena tsonti shunush yennti ersashenkuyoshen xinataash akaga taas hasham tor beeqindee.

1 **Xinatash alamoo:** Xinatash alamoo asa eqinasenda akaamasen yiskend daden yiskugn sis eratoo eraatend naabz ernagezwo.

2 **Yihaam:** Xinataashn akaamasni yiskendi ba badam badam yiskend hay mermeraa yiyoshen yisusuyoo.

3 **Atenii hakenkush iratt:** Xinatash yontaaga deegdebm er irat hasensaarguyoo

4 **Xinatashakaan yaabsetenkuush gats :** Xinatashkaan yenti eyardan ergzi yonten qotsensarguyo.

5 **Eyachgah:** Onogon petuushaa xinatashkaan yiskuu asi gaahez eyaachi uxensiyoo. Naasa maarmaar yiskuush hakima yecham eraasi eersyoo koyistarguyoo.

6 **Shoon:** Haashkan eeyardaand esendi ba eyarden sayeshen shanshadeyend harogon petushez aseen haxensaargend xinatashez bakoyo abam debmii haensende.

Xinataashkaan noteskush nooch adiirashoona danoo haakiiyeeti.

Suumo: Danelli Assafi fiizoologi masetesku Addis Abbabi universitiichi.

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Aseshun ooch kits Benchnonam

Xinatashkaan yiskush asiyiyam baad atiyiskush fiyad----------

Xinatash noteskuush mooyat gah tam estuuyo. Fagnasend deebem ateeskuush af beq eraat yifetaan tana osayiskush gah xintashyoshen biich atensush yifetuyoshen tadebm er erati ateersugoo petooyz ta osayskush gah eyacham ostenshush petooyz ta eruyoo.

Hasha xinatash yiskush

Shuntanuye □

Shunartanuye □

Merejja dubdaaskush suum ---------- firmo---------- Kanno --------

Annexes II: Questionnaires

English Version Questionnaire

Part one: Socio-demographic characteristics

Number	Variables	Response
101	Age	_____year
102	Sex	1. Male 2. Female
103	Marital status	1. Married 2. Single 3. Widowed 4. Divorced
104	Education level	1. Illiterate 2.Completed Primary and junior 3.Completed Secondary and College 4.Completed University and above
105	Occupation	_____
106	Monthly income	_____

Part Two: HTN and related health characteristics

Number	Variables	Response
201	When did you come to know about your HTN?	1. < 5 year 2. > 5 year
202	Were you diagnosed for DM?	1. Yes 2. No
203	Do you have diseases other than HTN?	1. Yes 2.No
204	If yes to Q203, What diseases?	_____
205	Have you ever had an eye trauma?	1. Yes 2. No
206	Have you ever had an eye infection?	1. Yes 2. No
207	Is there a family member who has a history of eye problems?	1. Yes 2. No

Part Three: Behavioral characteristics

Number	Variables	Response
301	How long do you sleep at night?	_____
302	How often do you watch TV?	_____
303	From what distance do you watch the TV?	_____
304	How often do you use mobile phone?	1. Always 2. Frequently 3. Sometimes 4. Rarely 5. Never
305	Have you ever chewed chat in your life time?	1. Yes 2. No
306	If yes to Q305, Have you chewed chat within the last 30 days?	1.Yes 2.No
307	Have you ever drunk alcohol in your life time?	1.Yes 2.No
308	If yes to Q307, did you drink alcohol within the last 30 days?	1.Yes 2.No
309	If yes to Q308, what type of alcohol do you drink?	_____
310	Have you ever smoked a cigarette in your life time?	1.Yes 2.No
311	If yes to Q310, have you smoked within the last 30 days?	1.Yes 2.No
312	If yes to 311, how many cigarettes do you smoke daily(in pcs)?	_____

በ አማርኛ የተዘጋጀ መጠይቅ

ኮድ_____			
ክፍል አንድ፡- የተሳታፊዎች ማህበራዊ እና አካባብያዊ ሁኔታ			
ቁጥር			
101	እድሜ	_____	
102	ጸታ	1 ወንድ 2 ሴት	
103	የጋብቻ ሁነታ	1 ያገባ/ች 2 ያላገባ/ች 3 አግብቶ የፈታ/የፈታች 4 ባለቤት የሞተበት/ የሞተባት	
104	የትምህርት ደረጃ	1 ያልተማረ 2 አንደኛ ደረጃ ያተናቀቀ 3 ሁለተኛ ደረጃ ያተናቀቀ 4 ዪኒቨርሲቲ እና ከዛ በላይ	
105	ስራ	_____	
106	የወር ገቢ	_____	
ክፍል ሁለት፡- የ ደም ግፊት እና ተያያዝ ጉዳዮች			
201	የ ደም ግፊት እንዳለቦ ያወቁት መቼ ነው?	1 ከ አምስት አመት በታች 2 ከ አምስት አመት በላይ ይሆናል	
202	የ ስኪር በሽታ በምርመራ ተገኝቶብዎታል?	1 አዎ 2 አይ	
203	ከ ደም ግፊት ውጪ ሌላ ህመም አለብዎት?	1 አዎ 2 አይ	
204	ለ ጥያቄ ቁጥር 203 መልስዎ አዎ ከሆነ ምን አይነት ህመም	_____	

205	አይንዎ ላይ ጉዳት ደርሶብዎት ያውቃል?	1 አዎ 2 አይ	
206	የ አይን ኢንፌክሽን አጋጥምዎት ያውቃል?	1 አዎ 2 አይ	
207	የ አይን ችግር ያለበት ሰው በ ቤተሰብዎ ውስጥ አለ?	1 አዎ 2 አይ	
ክፍል 3፦ ከ ባህሪይ ጋር የተያያዙ ጥያቄዎች			
301	በ ቀን ምን ያክል ሰአት ይተኛሉ?	_____	
302	ቴሌቪዥን ማየት ምን ያህል ያዘወትራሉ?	_____	
303	ከ ምን ያህል ርቀት ላይ ሆነው ነው ቴሌቪዥን የሚያዩት?	_____	
304	ስልኮትን መጠቀም ምን ያህል ያዘወትራሉ?	1 ሁልጊዜ 2 በተደጋጋሚ 3 አንዳንዴ 4 አልፎ አልፎ 5 በጭራሽ	
305	ጫት ቅመው ያውቃሉ?	1 አዎ 2 አይ	
306	ለ ጥያቄ ቁጥር 305 መልስዎ አዎ ከሆነ ባለፉት 30 ቀናት ጫት ቅመው ነበር?	1 አዎ 2 አይ	
307	አልኮል ጠጥተው ያውቃሉ?	1 አዎ 2 አይ	
308	ለ ጥያቄ ቁጥር 307 መልስዎ አዎ ከሆነ ባለፉት 30 ቀናት ጠጥተው ነበር?	1 አዎ 2 አይ	
309	ለ ጥያቄ ቁጥር 307 መልስዎ አዎ ከሆነ ምን አይነት አልኮል ነበር የጠጡት?	_____	
310	ሲጋራ አጭሰው ያውቃሉ?	1 አዎ 2 አይ	

311	ለ ጥያቄ ቁጥር 310 መልስዎ አዎ ከሆነ ባለፉት 30 ቀናት አጭሰው ነበር?	1 አዎ 2 አይ	
312	ለ ጥያቄ ቁጥር 311 መልስዎ አዎ ከሆነ ምን ያህል?	1 አዎ 2 አይ	

Echino kaaffinoona

Kuxxo ikko : Iihaareechi maaiibeemadona aakoo barbee hiineeto

Haddoo	Aachoo	Wochoo
101	Eono	_____ naatooye
102	Aaniimoo	1. Aanaamoo 2. Maachee
103	Shaaggii huneetoo	1. Shaagito 2. Shaagano 3. Shagiibiichito 4.Biimaagechoo qitito
104	Dooyee dooqqoo	1. Dooyanoo 2.Ikkine daaqee dooyonchichitoo 3.Guttine daaqee dooyonchichitoo 4.University woye damibedaqqoo
105	Shunoo	_____
106	Aagene gaabiyoo	_____

Kuxxo Guttoo : Daame giifitona yee shetii mooqinoo

Haddoo	Aachoo	Wochoo
201	Daame giifito ittochii bemon itto arrittoo aatobaane?	1.< 5 naatooye 2. > 5 naatooye
202	Shukare biiyoo itto daamoche booshona danete?	1. Doonte 2. Dooniyache
203	Daame giifitoyemachi baare biitoittachi beta?	2. Betee 2.Allee
204	Yayee haddoo 203 eachochii itti wocho eeha tunegata amishashe biiyo?	_____
205	Itto aafe toomochi haayibo shagi arihe?	2. Eeha 2. Allaa
206	Aafee infectino ittoon done arihe?	2. Eeha 2. Allaa
207	Aafee bitee irratto betii aasho ittoo xibee daagochi bete ale?	2. Eeha 2. Allaa

Kuxxo Keemo: Shurritona tookii tesreti eachenoo

Haddoo	Aachoo	Wochoo
301	Heyochi ambiche saato tookotete?	_____
302	Televisinoni wodee kaalloo bego wooditite?	_____
303	Aami shahe wohochenone televisinon itto beegibeto?	_____
304	Itto keekon gaachoo wooddibetite?	1. Bulle aboon 2. Wocha wocha 3. Ikki ikee 4. Besha besha 5. Chironagachiyachii
305	Chatoon qaachaa ariitte?	1. Ariho 2. Ariyaachi
306	Yare haddoo 305 woocho ariho tunegata besheti 30 qeminoo daagoqi qaachaa arritte ?	1. Ariho 2. Ariyaachi
307	Alikolloni uchaa arritte?	1. Ariho 2. Ariyaachi
308	Yare haddoo 307 woocho ariho tunegata besheti 30 qemooch ucheetiitee?	1. Ariho 2. Ariyaachi
309	Yare haddoo 308, Alikolloni ucheetiitee?	_____
310	Siigaaroo cuufiiyaa ariitee?	1. Ariho 2. Ariyaachi
311	Eehee haaddoo 310 woochoo ariihoo tunegaa aafii besheti 30 qoomoochoo sigaaroo caafekkitee?	1. Ariho 2. Ariyaachi
312	Eehee haaddoo 311 woochoo ariihoo tunegaa amoomoo tuneehoo?	_____

Oshay Dawurotsuwa

Gelluwa ittaa : Satappetta mabaranne heraahanota

Payduwa		
101	Laytsa	_____
102	Mattummaa	1. Atumma 2. Mac`c`a
103	Soyizzuwa hanotta	1. Gelabenarowoy 2. Gelabenau 3.Akebenawa woy akebenaro 4. Akeyeddawa woyiko hayikeddawa
104	Timiritiya detsa	1. Tamaribenawa 2.Ittentto dettsa bettedawa 3. Loetto detssa bettedawa 4.Universtiya bettedawa woyikko hewappe bolla
105	Oosuwa	_____
106	Aginanne geliyashalluwa	_____

Gelluwa La`a : Sutra sugetsa oyketto yewuwa

Payduwa		
201	Sutsa sugeta sakku de`iyawa erowe awuddee?	1.Icheshu layitappe garsan 2.Icheshu layitappe bollagidde
202	Sukaria harigi miran bettedde?	1. Ee 2. Erikke
203	Sutsa sugetsappe karennara sakku de`iy?	1. Ee 2. Erikke
204	Osna paydduwa 203 zaruwae giddoppe aybbamala sakke?	_____
205	Ne ayfiya bolla metuugakieri?	1. Ee 2. Erikke
206	Ayifiya metuugakieri?	1. Ee 2. Erikke
207	Ayifiya metuu dei sooasani?	1. Ee 2. Erikke

Gelluwa Hezuwa : Eethara gaketide ooshatuwa

Payduwa		
301	Itti galasani woyisu satiyagisayi?	_____
302	Viduwa ayi kena biyayi?	_____
303	Viduwa ayikena hatote tsaniutade s`elayi?	_____
304	Silkkiya s`luusa appuntere bietee?	1. Ubato 2. Zara zara 3. Itti itti 4. Kala 5. Gamaka
305	C`atiya k`amii erittee?	1. Ee 2. Erikke
306	Osha paydduwa 305 zaruwa ee giddoppe aseddawa 30 galassa c`atiya k`amiierittee ?	1. Ee 2. Erikke
307	Alikoliya ushi erittee?	1. Ee 2. Erikke
308	Osha paydduwa 307 zaruwa ee giddoppe aseddawa 30 galassa matso`iya usha ushi erittee?	1. Ee 2. Erikke
309	Osha paydduwa 308 zaruwa ee giddoppe aybamela matso``iya usha ushi erittee?	_____
310	Sigara sabi erritee?	1. Ee 2. Erikke
311	Osha paydduwa 310 zaruwa ee giddoppe aseddawa 30 galassa sabidi eritte?	1. Ee 2. Erikke
312	Osha paydduwa 311 zaruwa ee giddoppe ayba keshee?	_____

Achino Shekkinoona

Kuxxo ikko : Iihaareechi maaiibeemadona aakoo barbee hiineeto

Faddoo	Aachoo	Wochoo
101	Natto	_____ naattoye
102	Aaniimoo	1. Aanaamoo 2. Maachee
103	Shaaggii huneetoo	1. Shaagito 2. Shaagano 3. Shagiibiichito 4.Biimaagechoo qitito
104	Ariyo toyo	1. Dooyanoo 2.Ikkine toyo kappato 3.Guttine daaqee kappato 4.University woye damibedaqqoo
105	Shunoo	_____
106	Aagene gaabiyoo	_____

Kuxxo Guttoo : Daame giifitona yee shetii mooqinoo

Faddoo	Aachoo	Wochoo
201	Daame giifito ittochii bemon itto arrittoo aatobaane?	1.< 5 naatooye 2. > 5 naatooye
202	Shukare biiyoo itto daamoche booshona danete?	1. Doonte 2. Dooniyache
203	Daame giifitoyemachi baare biitoittachi beta?	3. Betee 2.Allee
204	Yayee faddoo 203 eachochii itti wocho eeha tunegata amishashe biiyo?	_____
205	Itto aafe toomochi haayibo shagi arihe?	3. Eeha 2. Badonee
206	Aafee infectino ittoon done arihe?	3. Eeha 2.Badonee
207	Aafee bitee irratto betii aasho ittoo xibee daagochi bete ale?	3. Eeha 2. Badonee

Kuxxo Kejjo: Shurritona tookii tesreti eachenoo

Faddoo	Aachoo	Wochoo
301	Amo bedonee xumonee na`a tookarabetto?	_____
302	Amo bedonee Televisinono na`a cinnabeto ?	_____
303	Amo bedonee televisinon gessae wokaqaa?	_____
304	Amo bedonee mobilee silkoo na`a cinnabeto?	1. Bulle aboon 2. Wocha wocha 3. Ikki ikee 4. Besha besha 5. Chironagachiyachii
305	Chatoon qaachaa ariitte?	1. Ariho 2. Aritaachi
306	Yare faddoo 305 woocho ariho tunegata besheti 30 qeminoo daagoqi qaachaa arritte ?	1. Ariho 2. Aritaachi
307	Alikolloni uchaa arritte?	1. Ariho 2. Aritaachi
308	Yare faddoo 307 woocho ariho tunegata besheti 30 qemooch ucheetiitee?	1. Ariho 2. Aritaachi
309	Yare haddoo 308, Alikolloni ucheetiitee?	_____
310	Siigaaroo cuufiiyaa ariitee?	1. Ariho 2. Aritaachi
311	Eehee haaddoo 310 woochoo ariihoo tunegaa aafii besheti 30 qoomoochoo sigaaroo caafekkitee?	1. Ariho 2. Aritaachi
312	Eehee haaddoo 311 woochoo ariihoo tunegaa amoomoo tuneehoo?	_____

Ooch Benchnona

Keflo maax: Yiskush akabanawush gaaf yis

Piyad	Ooch	Wochoo
101	Biyarg	_____
102	Tsotoo	1. Eyaan 2. Maygn
103	Eyaard	1. Eyarsu 2. Eyasargu 3. Eyarsi fershku 4.Yimashta hayken
104	Temertoo derejya	1. Tamartnarguu 2.Yomaxish wuursu 3.Yonamush wuursu 4.Universitya uusha debma
105	Kayiits	_____
106	Eyarfem Eyardskush gez	_____

Keflo naam: Suut xurqaa yiyabana deyemi yiskeend iraat

Piyad	Ooch	Wochoo
201	Suut xurqii yint daden yiskushez weskenyoo?	1.< 5 bergaam 2. > 5 bergaam
202	Shukare puugi yent guuzqan yabstaase?	1. Yiwo 2. Yaabstarguu
203	Suut xuurk yafaraam dummars puugi yistte?	1. Yiwo 2.Kaayguu
204	Oochaa naam baala kazee 203 yeent kaartii yiwoo petaan haar zaar fagee?	_____
205	Yent agneem eraati aati erstee?	1.Yiwo 2.Kaayguu
206	Agnee yeent faagii erstee?	1.Yiwo 2.Kaayguu
207	Ye aappii yifagskuu aakkii yeent ketkaan yestee?	1.Yiwo 2.Kaayguu

Keflo Kaaz: Ye yiisbaana diiyeemi yeskened achened

Piyad	Ooch	Wochoo
301	Weeynteen abaashkaan aam kaartaa suurqstee?	_____
302	Televisinono aamkartii beeqstaadee ?	_____
303	Televisinon yeenti beqqagushen yehaki wosee ?	_____
304	Yentaaga selkezeen wesasamaan gasatseeni yestadee?	1. Kangoyinaam 2. Karsaa karsaa 3. Maxeen maxeen 4. wursensa 5. Chironagachiyachii
305	Chat teyaee erstaadee?	1. Yiwo 2. Tiyaee erartaaw
306	Ooch piyada 305 yosheen yeent kartii yiwoo petaan yizaam appaarken kastaam weynee ?	1. Yiwo 2. Ha`a
307	Uush ushkii erstadee?	1. Yiwo 2. Erartaaw
308	Ooch piyada 307 yentaa kaartii yiwoo petaan haar zaar ushaan ushkadee?	1. Yiwo 2. Erartaaw
309	Ooch piyada 308, Uush ushkii erstadee ?	_____
310	Siigaaraa chubeesh erstaadee?	1. Yiwo 2. Erartaaw
311	Ooch piyada 310 yentaa kartii petaan afaarqeen kastaam weyeen uushkaan chubshaadee?	1. Yiwo 2. Erartaaw
312	Ooch piyada 311 yentaa kartii yewoo petaan weskansekushoo?	_____

Annexes III: Physical Examination and Measurement format

Number	Type of measurement	Unit of measurement
401	SBP DBP	_____mmHg _____mmHg
402	Presenting visual Acuity	Right eye_____ Left eye _____
403	IOP	Right eye_____ mmHg Left eye _____mmHg
404	Slit lamp examination	Lense_____ Optic nerve_____
405	Perimetry examination	_____
406	Funduscopic examination	_____
407	Retinoscopic examiantion	_____
408	BMI Height_____ Weight _____	_____Kg/m^2
409	Random Blood Sugar (RBS)	_____Mg/dl

Annexes IV: Color vision test recording format

ID/Code No	Religion	Ethnicity	Nationality	Grade	Age	Sex
						□ Male □ Female

Number of plates	Normal person	Persons with Red-Green Deficiency				Persons with total color blindness and weakness
1	12	12				12
2	8	3				X
3	29	70				X
4	5	2				X
5	3	5				X
6	15	17				X
7	74	21				X
8	6	X				X
9	45	X				X
10	5	X				X
11	7	X				X
12	16	X				X
13	73	X				X
14	X	5				X
15	X	45				X
		Protan		Deutan		
		Strong	Mild	Strong	Mild	
16	26	6	6 (2)	2	2 (6)	X
17	42	2	2 (4)	4	4 (2)	X