



**St. Paul Hospital Millennium Medical College, School of Nursing,
Department of Medical Surgical Nursing
Graduate Study Program**

**Undiagnosed hypertension and associated factors among long
distance bus drivers in Addis Ababa terminals, Ethiopia, 2022: a
cross sectional study.**

By: Melkamu Getaneh (BSc)

ADDIS ABABA, ETHIOPIA

February, 2022



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By: Melkamu Getaneh (BSc)

Advisors: Rahel Nega (MSc, Ph. D fellow)

Mekides Haile Gabriel (MSc, Ph.D. fellow)

**A Research Paper submitted to the Department of Medical Surgical Nursing;
Presented in Partial fulfillment of the Requirements for the Degree of masters
in cardiovascular nursing; St. Paul Hospital Millennium Medical College**

Addis Ababa, Ethiopia

February, 2022

Name of investigator	Melkamu Getaneh
Full title of the research project	Undiagnosed Hypertension and associated factors among long distance bus drivers in Addis Ababa terminals, Ethiopia 2021
Duration of the project	30 days
Study Area	Addis Ababa bus terminals
Total Cost of the project	25000 ETB
Source(s) of Funding	Saint Paul millennium medical hospital
Address of investigator	Cell Phone: +251925841566
	Email: melkamugetaneh11@gmail.com

ABSTRACT

Introduction: Hypertension is the major public health problem and often is unrecognized, of which detection and control of it should receive high priority. The level of undiagnosed hypertension and associated factors among long distance bus drivers is unknown in Ethiopia.

Objective: This study was intended to assess prevalence of undiagnosed hypertension and associated factors among long distance bus drivers in Addis Ababa bus terminals.

Methods: A facility -based cross-sectional study was employed on 391 long distance bus drivers from December 2021 to January 2022 in five cross country bus terminals in Addis Ababa. Standardized and structured questionnaire was adapted based on the World Health Organization stepwise approach to non-communicable disease study and translated to Amharic. This study applied face to face interview method for the data collection purpose on part 1 of socio-demographic, behavioral, knowledge, relevant medical history and part 2 approach on physical measurements of blood pressure and body mass index. Data was coded, cleaned and entered by Epi-data version 4.6, and exported to Statistical Package for Social Science version 26 for further analysis. Logistic regression analysis was employed. Variables with a P value < 0.25 in bivariable analysis were selected for multivariable logistic regression analysis. Independent variables with P value < 0.05 was considered as statistically significant variables. The magnitude of association between independent and dependent variables was measured by odds ratio with 95% confidence interval.

Results: In this study 391 study participants were involved with response rate of 97.1%. The prevalence of undiagnosed hypertension was 22.5 % (CI: 18.7%, 26.6%). In the final model, multivariable logistic regression, poor level of knowledge (AOR: 2.00, CI 1.08, 3.70), long-duration of driving per day (AOR: 2.50 , 95% CI 1.37-4.56), habit of chewing of chat 2.61 (AOR: 2.61, 95% CI: 1.44, 4.73), regular alcohol consumption (AOR=3.46; 95% CI: 1.70, 7.05), overweight(AOR:3.14, 95%CI 1.54,6.42) obesity (AOR: 3.21, 95% CI 1.35, 7.61) and regular physical exercise(AOR: 0.16, 95% CI: 0.09, 0.29) were statistically significantly associated with undiagnosed hypertension.

Conclusion: This study revealed that prevalence of undiagnosed hypertension among long distance bus drivers was 22.5%, which was associated with modifiable behavioral factors, lack of regular physical exercise, lack of adequate awareness and high body mass index.

Recommendation: Necessary preventive measures by stakeholders need to be implemented. These includes, increasing level of awareness about hypertension by community health workers, developing strategies and policies focusing on life style , behavioral, and occupational modifications.

Keywords: Undiagnosed Hypertension, long distance bus drivers, Addis Ababa

ACKNOWLEDGEMENT

First, I would like to express my deepest gratitude to almighty GOD for his continuous support. Next, I am grateful to Saint Paul's millennium medical college, Department of Medical Surgical Nursing for the opportunity. My sincere appreciation also goes to long distance bus drivers participated in this study, terminals mangers, all my data collectors and Supervisors. My heartfelt and genuine gratitude also go to my advisors Rahel Nega and Mekides Haile Gabriel for their guidance and effort in the preparation of this research work.

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List of Abbreviation and Acronym

ACC: American College of Cardiology

AHA: American Heart Association

BMI: Body Mass Index

BP: Blood Pressure

DBP: Diastolic blood pressure

DM: Diabetes mellitus

FMoH: Federal Ministry of Health

PIS: Plain in sight

HTN: Hypertension

mmHg: millimeter of mercury

MoT: Ministry of Transport

NCD: Non-communicable disease

SBP: Systolic blood pressure

SPHMMC: Saint Paul's Hospital Millennium Medical College

SPSS: Statistical package for social science

WHO: World Health Organization

1. INTRODUCTION

1.1. Background

High blood pressure is also known as Hypertension (HTN) is a condition in which there is an increased pressure of the blood against walls of blood vessels (arteries) (1). It is similarly defined as systolic blood pressure (SBP) ≥ 140 mm Hg and/or a diastolic blood pressure (DBP) ≥ 90 mmHg. Increased pressure therefore makes the heart difficult to pump blood and various macro and micro vascular complications (2).

Hypertension remains the major public health problem and leading contributor of cardiovascular related death and disability(3). One major cause of HTN's high morbidity and mortality is its asymptomatic nature and sub optimal health, which is intermediate between healthy and subclinical state (4). Due to this, HTN usually remained undiagnosed and untreated. It then causes chest pain, also called angina, heart failure, which occurs when the heart cannot pump enough blood and oxygen to other vital organs, arrhythmia, blurring of vision, kidney damage and kidney failure, rupture of arteries in the brain or stroke, which can lead to sudden premature death (5, 6).

Peoples with undiagnosed HTN are individuals who are plain in sight (PIS) and are not told by health professionals about their elevated Blood Pressure (BP). Globally, 41 % of women and 51 % of men, totally about 580 million people with high blood pressure don't know they have elevated BP. Most HTN is diagnosed during a medical visit for other health complains (7).

Long distance drivers are predisposed to high cardiovascular risk because of sedentary nature of their work, illiteracy and high risk behaviors. Though, their well-being has a great impact on safety of passengers and road users, drivers give low emphasis for their self-sustained health care and, they neglect their health (8). Different studies also show the risk and prevalence of cardiovascular disease is higher among long distance bus drivers than other population (8, 9).

In this manner there is lack of literature that identifies their health problems and puts mechanisms of enhancing their health status. This study will address magnitude and associated factors of undiagnosed HTN among long distance Bus drivers.

1.2. Statement of the problem

Globally, around one billion people are affected by HTN, and it is predicted to increase to 1.5 billion by 2025 (10). It is estimated that it could result in 54% of all strokes, 47% of all Ischemic heart disease and 7.6 million premature deaths. Apart from its high prevalence, most individuals do not know and controlled their BP status (11). Cross-sectional survey of the US population showed half (48.2%) of individuals with HTN did not have their BP under control, and the chief cause was lack of early diagnosis (12). According to the World Health Organization (WHO), there is a significant gap in diagnosis of HTN and about 46% of adults with HTN are unaware that they have the condition (2).

Prevalence of HTN and, remaining undiagnosed, is highest in low-income and middle-income countries than in developed countries (13). In 2015, 8.5 million deaths were associated with HTN, of which low-and middle-income countries contribute 88% (14). Undiagnosed HTN is contributing largely to the great burden of HTN in sub-Saharan Africa mainly because of poor health awareness, lack of access to services and low socioeconomic status (15).

The 2021 report of WHO indicates ,the prevalence of HTN in Ethiopia is 25 % (7). Different studies in Ethiopia also show higher prevalence of HTN in the general population and its estimated prevalence is 15.6% (16, 17). It is also shown that a small percentage of people were aware of their BP status and the estimated prevalence of undiagnosed HTN in Ethiopia is 12.3% (18).

The issue becomes the main cause for hospital admission and death from HTN. Recent study shows HTN caused the highest medical admission and 13.05 % of all medical mortality from its complications. From this 17.5% did not know they were hypertensive (19). This indicates more work is desired to spot the disease early.

It has been shown internationally and in Africa that HTN was varied according to different occupations, and drivers are among professionals in whom it is more prevalent (13, 20). Long distance Bus drivers are one of the risk and targeted groups for cardiovascular mortality and morbidity from HTN. Additionally, it is showed that they are 3 times riskier to develop CVD than other drivers (9, 21, 22). A systematic review and meta-analysis of 26 studies also shows that more than one third of long distance drivers have HTN (23).

This is mainly due to increase in prevalence of undiagnosed HTN among them (24-26). This places them for cluster of HTNs complications and of risk factors of CVDs such as silent myocardial

infarction and stroke in the general population (9, 27, 28). These complications are becoming a concern while driving and causing road traffic accidents (29, 30).

Identified causes of Bus drivers vulnerability to HTN are ; poor job satisfaction, long duration of working hours, insufficient breaks in between shifts, low levels of exercise, emotional aggressive behavior towards busy traffic roads, and blaring working environment (9, 30). In addition, unawareness of their HTN risk behaviors such as alcohol consumption, smoking, regular high calorie diets and eating under stressful conditions are the factors (27). For the reason that they lack awareness of the asymptomatic nature of HTN, their risk behavior and low socio-economic status, they are becoming highly likely to live with HTN without diagnosis (24-26).

World Health Organization states, automated devices can be used in self-measurement, but risk assessment and associated factors by health professional remains the only appropriate approach to diagnose HTN (13). In addition, risk reduction strategies such as prevention, early detection by targeting individuals at a risk and control programs of HTN were some advocated strategies to reduce the impact of HTN on lives and economy (31).

From few studies conducted among different community parts in Ethiopia, identifying risk factors, reduction of risky behavior by delivering health education and carrying out timely BP check-ups are recommended strategies to reduce burden of undiagnosed HTN. (18, 32, 33). In 2020, federal ministry of health Ethiopia (FMOH) tried to set a new program on improvement of control and prevention of HTN at a primary health facilities of which screening and diagnosis are the component (34). But implementation of these measures are poor among Bus drivers in Ethiopia. In other countries: annual health checkups, early screening, free periodical HTN campaign, onsite clinics and health education are recommended means to detect HTN among bus drivers (24, 35).

In Ethiopia, there is no adequate effort in provision of these strategies by stake holders, including the ministry of transport (MoT). In addition, to the best of my knowledge, adequate research hasn't been conducted in exploring the level of PIS of HTN in Ethiopia. Little is known and revealed on the level of undiagnosed HTN and its associated factors among HTN risk group.

Therefore, it is vital to know the magnitude and the contributory factors of the problem. This study estimated the level of undiagnosed HTN and its associated factors among long distance bus drivers in Addis Ababa cross country bus terminals.

1.3. Significance of the study

The proposed study provided up-to-date information which primarily may benefits the targeted group as it pinpointed the factors for undiagnosed HTN. As a result increase early diagnosis and initiation of treatment. In addition, this study can help different stakeholders to formulate valuable policies and strategies to address identified factors to undiagnosed HTN among Bus drivers. It can also enable different non-governmental organizations on prevention of HTN among high risk groups.

The finding of this study will be an input for FMoH to plan and develop policies and interventional strategies in engagement of prevention of HTN at a community level. For the nursing profession, the study will increase commitment of the career as community nursing that will capacitate a primary healthcare. Finally, for researchers, the study may be a baseline data to conduct a further study. It could also be scaled up to other areas of the country to identify PIS among HTN high risk groups.

2. LITERATURE REVIEW

High blood pressure is one of the cardiovascular conditions in bus drivers that results from long working hours and insufficient breaks in between shifts. They are one part of the community who's uncontrolled and undiagnosed HTN is predominant (33).

2.1. Magnitude of undiagnosed hypertension among long distance bus drivers.

Concerning the magnitude of undiagnosed HTN among long distance Bus drivers it was shown by different studies to have various extent. The variation was due to different factors of which genetic predisposition among south East Asian countries. They are shown to have greatest odds of HTN (AOR=2.8) (36). According to cross sectional study in Saudi Arabia in 2003 the incidence of HTN among long distance drivers was 38.7% (37). Similar study conducted in Istanbul, Turkey in 2009 indicates, the prevalence rate of HTN among long distance Bus drivers were 31.4 %.(38). Recent literatures revealed, the magnitude of undiagnosed HTN among long distance drivers were 70.1%, 83.7%, 75.9% and 38.7 % in Karnataka India, Kerala India, Lagos Nigeria and Ghana respectively (27, 35, 39, 40).

Whereas, Comparative cross-sectional study conducted in 2013 in Sokoto Nigeria between short and long commercial bus drivers in Sokoto, Nigeria shows only 28.8 % of hypertensive bus drivers know they have HTN (41). Similar study conducted between young male bus drivers and young male non-bus drivers in 2019 in Bengaluru, India shows the prevalence of undiagnosed HTN among bus drivers was 10%(25).

2.2. Factors associated with undiagnosed hypertension among long distance bus drivers.

Some previous studies done among long distance Bus drivers have identified that factors increases odds of undiagnosed HTN among these populations were : socio-economic factors such as older age, and low economic status owed to low monthly income, higher years of experience, being married , and large family size. In addition, behavioral factors such as smoking, chewing chat, drinking alcohol, and increased BMI increased chance of undiagnosed HTN.

While identified factors for decreased odds of undiagnosed HTN among long distance Bus drivers were higher educational status, good diet habit, regular exercise activity during driving and good knowledge of cause, sign and symptom, prevention, mode of treatment, complications of HTN (9, 27, 35, 40).

2.2.1. Socio demographic characteristics

The distribution of the prevalence of newly diagnosed HTN showed variations across all age groups. In Nigeria, elder Bus drivers were more likely to develop HTN than younger ones (AOR= 1.090) (27). While in Ghana, older Bus drivers were shown 5 times more likely to be undiagnosed of HTN (AOR= 5.43) (35). In turkey, risk of HTN was shown increment from 23.6% to 42.2 % among drivers < 35 years of age to $\geq$ 50-year group respectively (38). This studies showed that aging was an independent risk factor for undiagnosed HTN. In contrary a cross-sectional study which was conducted in the Dano district, Ethiopia in 2020 shows individuals of younger age group between 19-33 years old were twice more likely to be left undiagnosed of HTN (AOR=2.5) (33).

Studies found economic status of an individual imposed an effect on diagnosis of HTN. Being low economic status was highly associated with remaining undiagnosed than being in higher socioeconomic status, and the risk of remaining undiagnosed for HTN increased with decreasing socioeconomic status. According to a population-based cross-sectional study in Nepal in 2016, the poorest wealth quintiles were twice more likely to have undiagnosed HTN than the richest ones (AOR = 2.49) (42).

Educational level of Bus drivers had an effect on the status of diagnosis. According to some studies, lower educational status increased the odd of HTN. Study conducted in Karnataka, India revealed that 40.3% of drivers who studied up to primary level had HTN and 13.5% of who studied up to diploma had HTN. Whereas, none of those who had studied up to graduate level were hypertensive (39). A cross-sectional study in Boma, Kongo in 2018 shows higher prevalence of undiagnosed HTN was found among participants of secondary education (24)

However, other studies in Kerala India, Sirilanka and Kuna didn't find significant association between educational level and awareness of HTN (40, 43, 44).

Studies argue that, long duration of working experience in long distance driving has been shown to be significantly risk factors for HTN. In India and Nigeria, bus drivers who were employed for a mean duration of 16.4 +/- 8.22 years were found to be more hypertensive than fewer years of experience respectively (27, 40). In Kerala, India, non-hypertensive were employed for 13.40 ± 8.10 years (40). Similarly, a study in Karnataka, India also shows significant positive association between the longer duration of service and HTN, 71.4% of Bus drivers whose duration of services is more than 30 years were shown having HTN (39). Nevertheless, these studies have not addressed how remaining undiagnosed of HTN is associated with duration of experience of the drivers.

Concerning marital status and family size effect on undiagnosed HTN, in Kerala India from drivers who was married and who had family size of more than 4, 49.5% became hypertensive (40).

2.2.2. Knowledge of hypertension

Knowledge of HTN cause, symptoms, prevention, complication, and its treatment mode were shown having significant consequences on an individual's state of diagnosis. In some surveys, it is shown, good awareness and knowledge about HTN initiates people to be diagnosed. According to cross sectional study conducted in 2021 among bank workers in Bahir Dar, Ethiopia those who had moderate knowledge of HTN were four times likely to have undiagnosed HTN compared to those who had good knowledge (AOR= 3.81) and those who had poor knowledge were six times to be undiagnosed than those who had good knowledge (AOR= 6.19) (45).

Similarly, in Dano, Ethiopia, participants with low knowledge about cause, risk factors and prevention method of HTN were twice more likely to left undiagnosed of HTN than those who had good knowledge (AOR= 2.3) (33). A community-based cross-sectional study conducted in 2020 in Huwela, Ethiopia showed significant association of undiagnosed HTN with no awareness about high BP. In this study, 39.7% knew about HTN symptoms and 41.8% knew that HTN could cause complications (32).

2.2.3. Behavioral characteristics

Smoking is shown to be significantly associated with HTN. According to the cross sectional studies in Srilanka and Hong Kong, half of long distance Bus drivers were smoking at least 5 cigarettes daily and they were shown having higher odds HTN (9, 44). In contrary, in Istanbul, the

prevalence of HTN is high among non-smoker (34.8%) than smoker (28.4%) Bus drivers (38). While in Ghana current smokers are 7 times (AOR = 7.09) and former smokers are 2 times (AOR = 1.83) risk to have undiagnosed HTN than non-smokers (35). However, a cross sectional study conducted among Taipei Bus Drivers in 2012 shows no significant difference was observed regarding smoking and HTN (46).

Some community based cross sectional studies in Ethiopia revealed chewing chat increased risk of having undiagnosed HTN, because chat chewers were less likely to develop symptoms of HTN. In Huwela Ethiopia, people who chewed khat had over 4 to 5 times higher risk of developing undiagnosed HTN than non-khat chewer (AOR= 4.6) (32). Similar study conducted in Dano Ethiopia shows, more than one quintile 123 (21.6%) of the study participants were khat users and from them 48.2% left unscreened of HTN (33). In contrary, in Bahir Dar bank workers 2.1 % were chewing chat but there was no significant association with undiagnosed HTN (45). As this substance is only consumed in east Africa studies conducted among long distance Bus drivers hadn't addressed the association between chewing Khat and undiagnosed HTN.

A study in Srilanka has shown 13.3% of bus drivers consumed alcohol daily (44). Where as in Kerala India 50.5 % of bus drivers drank alcohol, of which 38.1% are daily drinkers and 13.7% bus drivers are daily alcohol drinkers while 86.7% bus drivers are occasional drinkers in India (40). According to a cross-sectional study in Ghana, bus drivers who consumed alcohol were 3 times riskier to have undiagnosed HTN (AOR= 3.19) (35).

From the above literatures, smoking, khat chewing and alcohol consumption causes individuals asymptomatic and increases their tendency to be undiagnosed and stay with the disease undetected.

Drivers consume high calorie diet and low nutritional content fast foods on their journey. This may be due to lack of knowledge about healthy eating including how to choose, prepare and portion healthy food. In addition some drivers could not afford the cost of fruit and vegetables and enjoyed their habitual consumption of convenience food. In Ghana and Australia, 91.3% and 54.4% of bus drivers consumed unhealthy high calorie diet respectively (35, 47).

Regular High calorie diets such as egg, red meat causes HTN among drivers and has been shown significantly associated increased the odd of having HTN and undiagnosed HTN. Study in Kerala

India revealed that from long distance Bus drivers who consumed regular high calorie diet, 35 % and 91.3% respectively had HTN (40).

In some countries bus drivers consume recommended fruit serve. A work-place cross-sectional study among Australian bus drivers in 2021 drivers showed 44% of bus drivers consumed the recommended 2 serves of fruit per day and 11% consumed the recommended 5 serves of vegetables. And this decreased odd of having undiagnosed HTN. (47).

Eating habit and condition has been discussed to be risk factor for undiagnosed HTN in Ghana, 81.8% used to eat while driving and under stressful condition, and 40.8% used to eat let at night. They were higher to have undiagnosed HTN than drivers of normal diet habit with (AOR= 2.43), (AOR= 4.68) (AOR= 8.97) respectively (35).

Concerning physical activity level, sedentary nature of driving profession has been shown direct cause for HTN. Study in Australia shows 25.9% of bus drivers do not perform any 30-minute episodes of moderate intensity physical activity averagely per week and 51.7 % of them sit for 7 or more hours per day (48). Study among Taipei drivers shows that from bus drivers who perform physical exercise only 1 time a week, 35% become hypertensive, and drivers who perform 6-7 times a week, only 6% were hypertensive (46). Similarly, in Hong Kong, physical inactivity was an independent risk factor for HTN. Only 7.9% of bus drivers did physical exercise for >1 hour per day (9).

Some studies revealed that higher body mass index (BMI) among bus drivers have increased odds of elevated BP. Cross sectional study in North Kerala India and Istanbul Turkey shows that BMI greater than 25 had significant positive association and 55.2% of Bus drivers with BMI of 25-29.99 were hypertensive the prevalence of HTN among underweight is 14.8 % and is increased to 47.1 % among obese drivers (38, 40). According to a study in Nigeria, a significant association was found between HTN and obesity, from hypertensive long distance Bus drivers 41.7% were overweight (27).

The study conducted in Huwela, Ethiopia also indicates, those people with higher BMI are three to four times more likely to have undiagnosed HTN than individuals with a lesser BMI (AOR=3.5) (32). Study in Lagos, Nigeria shows significant positive association was found between BMI, and

35% were overweight, 13.3% were obese (27). In contrast to these studies, a cross-sectional study conducted in Italy on investigating obesity among , they are at a decreased risk of obesity (AOR = 0.45) (49).

2.2.4. History of co-morbidities.

Studies have been shown that having a family history of HTN is associated with undiagnosed HTN. Cross sectional study among Dano, residents, Ethiopia says adults with family history of HTN were 3 times more likely to remain undiagnosed compared to those who do not have family history, whereas individuals with comorbid chronic diseases were less likely to have undiagnosed HTN and both factors were having significant association with undiagnosed HTN with (AOR= 3.01) and (AOR= 0.314) respectively (33).

Chronic diseases, specifically having diabetes mellitus (DM) maintained the significance in predicting undiagnosed HTN. In Huwela, Ethiopia, the risk of undiagnosed HTN was three times among people with DM than among people without DM (AOR=3.2). Whereas, people with a family history of HTN had three times the risk of undiagnosed HTN compared to those without (AOR=2.7) (32).

Generally, previous studies conducted in India, Nigeria and Australia on the prevalence of HTN and undiagnosed HTN among long distance Bus drivers were single-centered studies (25, 27, 47).Where as in Ghana it was conducted only in two bus terminals (35). Through this study, as it will be conducted at cross-country bus drivers in Addis Ababa, it will have a better, sound, and valid result.

CONCEPTUAL FRAMEWORK

Conceptual frame work adapted from different literatures showing the association between different independent variables on undiagnosed hypertension among long distance bus drivers in Addis Ababa terminals 2021 (9, 35, 40, 45, 50).

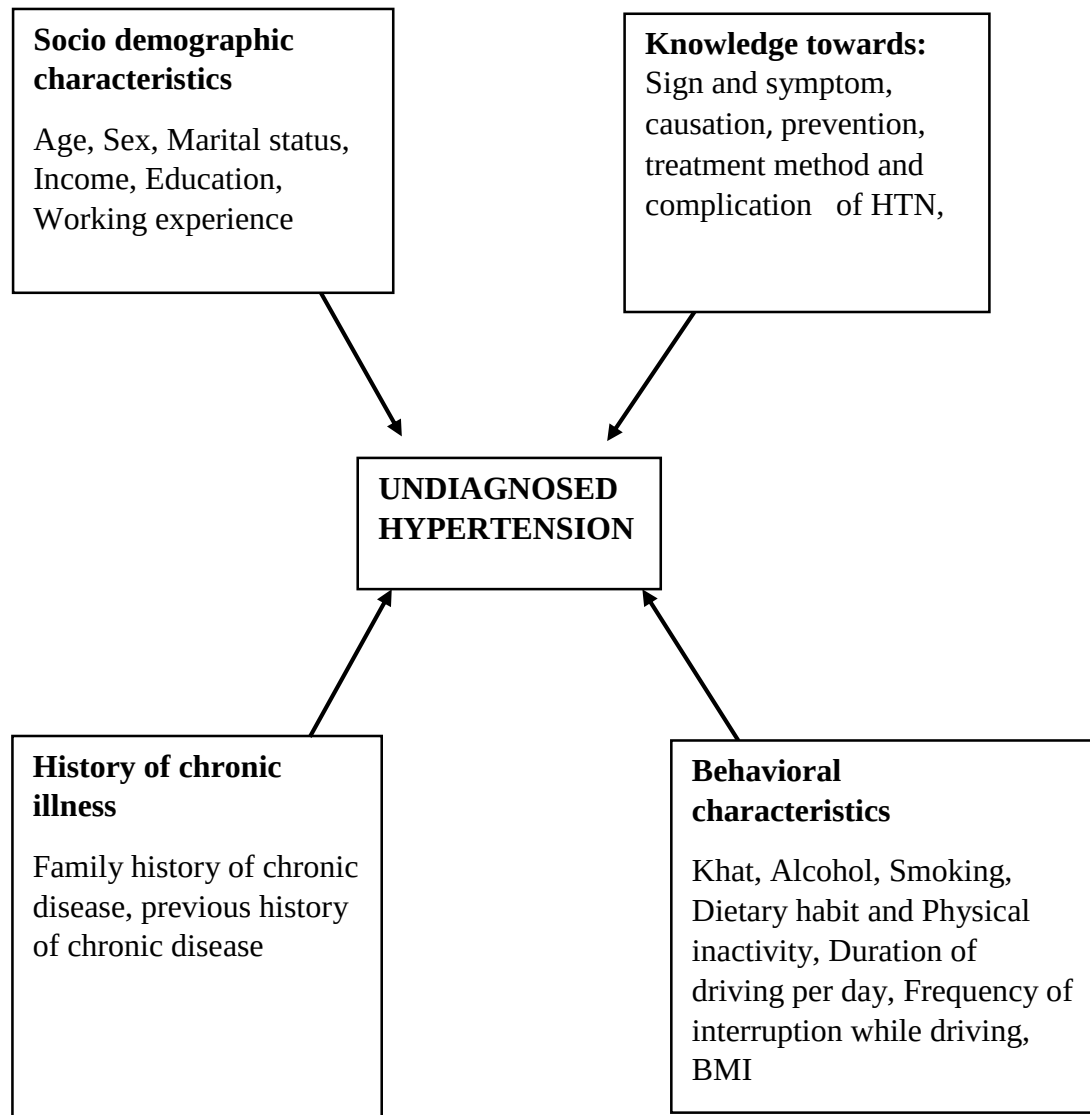


Figure 1: Schematic presentation showing conceptual frame work of Undiagnosed Hypertension and its associated factors among long distance Bus drivers in Addis Ababa Bus terminals 2021.

3. OBJECTIVES

3.1. General objectives

To assess prevalence of undiagnosed hypertension and associated factors among long distance bus drivers in Addis Ababa bus terminals, Ethiopia, 2021.

3.2. Specific objectives

1. To assess prevalence of undiagnosed hypertension among long distance bus drivers in Addis Ababa bus terminals, Ethiopia 2021.
2. To identify factors associated with undiagnosed hypertension among long distance bus drivers in Addis Ababa bus terminals, Ethiopia 2021.

4. METHODS

4.1. Study Area

This study was carried out at cross-country bus stations (terminals) in Addis Ababa. Addis Ababa is the capital city of Ethiopia and the African Union. Again, it is the largest city in Ethiopia, with a population of 5,006,000 according to the 2021 Addis Ababa, Ethiopia Metro Area Population (51). There are 5 cross-country bus terminals in Addis Ababa and 752 long-distance bus drivers whose initial point is Addis Ababa. They serve as an initial and destination point for many passengers across the country. According to information gathered from terminals logistic, around 1000 to 1600 cross-country passengers are served each day by these terminals. In addition, there are totally 318 long-distance cross-country buses locally known as TATA, and the carrying capacity of each bus ranged from 60 to 70 passengers.

4.2. Study period

This study was carried out from December 15 2021 to January 15, 2022.

4.3. Study design

Facility based cross sectional study was performed from December 6, 2021 to January 6, 2022 on professional bus drivers who travel at a radius of greater than 200 km from Addis Ababa.

4.4. Population

4.4.1. Source population

All long-distance bus drivers whose initial point is Addis Ababa, Ethiopia were the source population.

4.4.2. Study population

All sampled long-distance passengers' bus drivers who were registered on file of private road transport union at selected terminals and travel at a distance of greater than 200 km per day from Addis Ababa (35, 52).

4.4.3. Study unit

- Individual long distance bus driver was the study unit.

4.4.4. Eligibility criteria

Inclusion criteria

- Long distance bus drivers who have professional driving license and who were constantly working full time at each station.

Exclusion criteria

- Long-distance bus drivers who are severely ill.
- Long distance bus drivers who have working experience of less than 6 months.

4.5. Sample size determination

The sample size for first specific objective was calculated by using a single population formula by considering the following assumptions: the proportion of the problem ($P=0.387$) from a similar study conducted in Ghana in 2020 (35). Margin of error ($d=0.05$), level of significance ($\alpha=0.05$), $Z_{\alpha/2}$ at 95% CI=1.96 and 10% contingency rate. And the sample sizes for the second specific objective was calculated by double population proportion formula using epi data as described on table 1, and compared with the first specific objectives sample size.

Sample size for first objective

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

Where n_0 = sample size, $Z_{\alpha/2} = 1.96$, p =proportion of the problem from last literature which is 38.7%, d = margin of error.

$$n = \frac{(1.96)^2 0.387(0.613)}{0.05^2} = 365$$

By adding 10 % non-response, rate the final sample size was 402.

Sample size for the second specific objective

The table below shows sample size calculated for different associated variables of second specific objective using double population proportion formula and open epi, by considering: prevalence of the problem among exposed and unexposed to undiagnosed hypertension and odds ratio from literatures, exposed to unexposed ratio of 1 as it is cross sectional study, non-response rate of 10%.

Table1: sample size for different independent variables.

S.no	Variables	% of undiagnosed HTN in exposed	% of undiagnosed HTN in unexposed	Exposed to unexposed ratio	OR	Non response rate	Sample size Using 95% CI	Reference
1	Age 50-69	60.8%	39.2%	1	5.09	10%	184	(35)
2	Experience greater than 10	71.4%	7.3%	1	3	10%	290	(35)
3	Knowledge	18.7%	6%	1	6.2	10%	240	(45)
4	Alcohol	76%	24%	1	3.19	10%	34	(35)
5	Smoking	20.1%	79.9%	1	7.09	10%	26	(35)
6	FH of HTN	23%	76.5%	1	2.7	10%	32	(32)

Since the calculated sample sizes for 2nd specific objective was less than that of the first specific objective, a final sample size of 402 of was taken.

4.6. Sampling technique and procedures

The list of the long distance bus drivers who have a professional driving licence and who were constantly working full time at each station was accessed from the stations registered file of private road transport union (Mahiber). From the list obtained at each station, using population proportion formula described below, the proportional allocation of study participants for the corresponding station was estimated from total sample size determined. Then, their identification tag was entered into SPSS software and then a

computer-generated simple random sampling technique was employed to select calculated number of participants at each station as diagrammatically expressed on the Fig 2.

$$n_0 = \frac{n \times f_0}{N}$$

Where

N = total population

f_0 = long distance bus drivers at each bus terminals

n_0 = proportionally calculated sample size for corresponding station

n = total sample size

The diagram below shows the probability proportion to size allocation number of participants based on total number of long distance bus drivers in each terminals found in Addis Ababa.

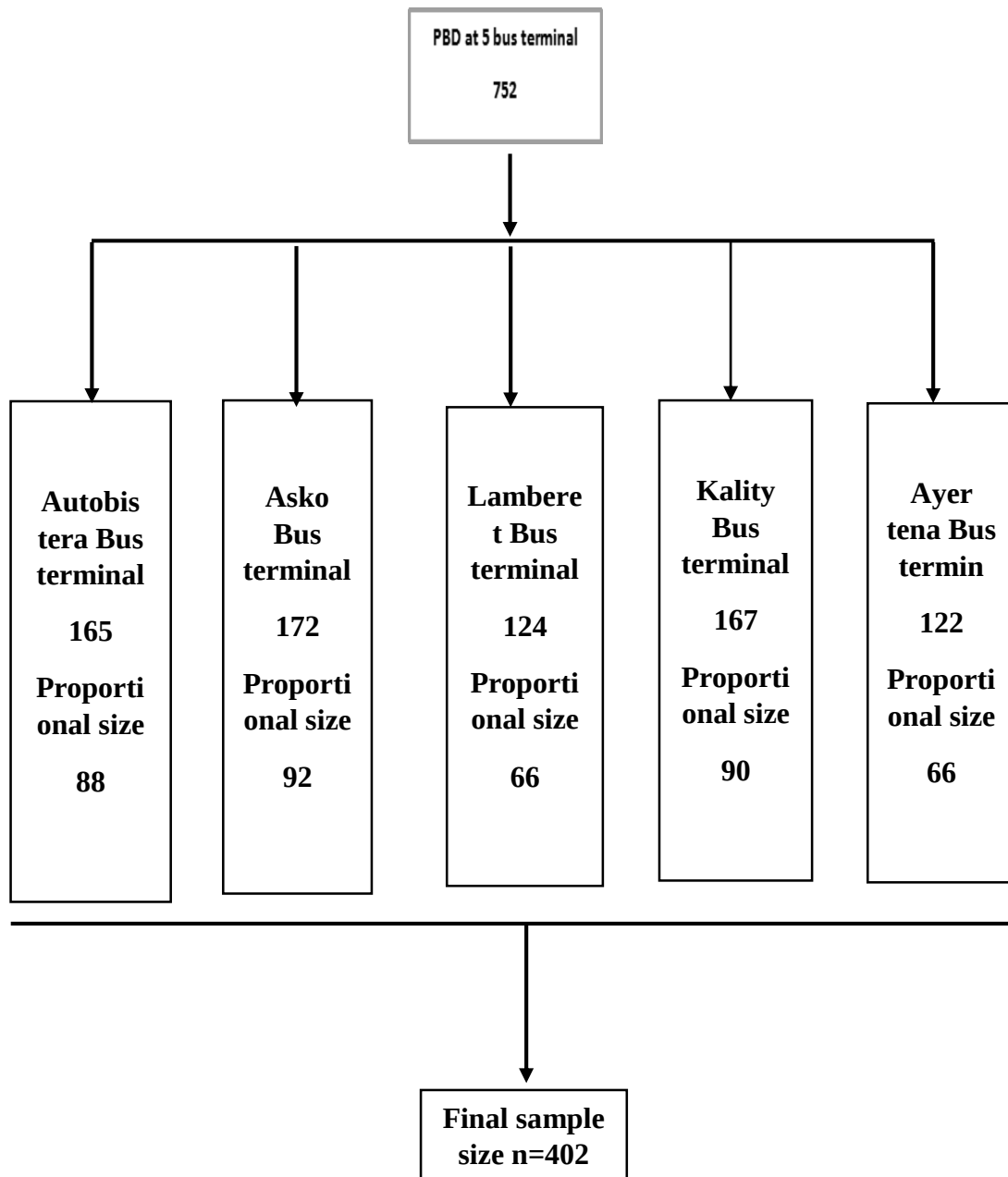


Fig 2. Sample size proportional allocation diagram of long distance bus drivers in Addis bus terminals, Addis Ababa, 2021.

4.7. Measurements

4.7.1. Study variables

Dependent (outcome variable)

- Undiagnosed hypertension.

Independent variables (factors)

- Socio demographic factors (Age, sex, marital status, family size, income, education, and work experience).
- Behavioral factors (Khat, Alcohol, Smoking, Dietary, Physical Inactivity, BMI, duration of driving, interruption between driving).
- Knowledge factors (knowledge about cause, knowledge about sign and symptom, knowledge about prevention, knowledge toward treatment method and knowledge about complications of HTN).
- History of chronic illness (Family history of chronic disease, comorbidities, previous history of chronic disease).

4.8. Tools and Methods of Data Collection

A structured questionnaire was adapted based on the WHO stepwise approach to NCD study and was translated to the local language, Amharic. This study applied part 1 and part 2 (50). Part 1 consists; WHO approach on socio-demographic, behavioral, and, HTN related knowledge, and relevant medical history questionnaires and part 2 approaches contains physical measurements of BP and BMI.

The pretest of the questionnaire was done on 5% of calculated sample size among 20 long distance bus drivers at the bus terminal in Sululta, town, Finfine special zone. The result was not included in the final result of the study. Five data collectors and one supervisor whose profession was Bachelor of Science in nursing were recruited and one-day training was given about the tool and data collection. Then the data collectors was deployed to the data collection after they come up to consensus on the tool. To minimize inconvenience, the primary investigator of the study and the supervisor critically followed the data collection process.

After an identification tag was given to those sampled, the day and study time was arranged at their own convenient time (after they returned to the station finishing their journey). Data collection was performed in a selected room of the station collaboratively arranged for this purpose. Face to face interview was conducted on a questionnaire containing information about their socio-demographics, behavioral, knowledge of HTN and history of chronic illnesses and comorbidities. Before measuring BP, each driver was asked regarding alcohol, caffeine intake, chat chewing, smoking, and stressful condition within two hours and rested for 30 minutes.

Their BP was taken 5 minutes apart 3 times in a sitting position from non-dominant arm using digital omicron blood pressure apparatus, then the average of the last two measurements was considered to determine BP status. The new 2021 ACC/AHA and international journal of HTN guideline was used to report participants as having HTN. According to ACC/AHA guideline individual with SBP greater than 140 mmHg and DBP 90 mmHg are hypertensive (53).

4.9. Operational definition and definition of terms.

Undiagnosed HTN: In this study long distance bus drivers was considered having undiagnosed HTN if he was without medically confirmed HTN and is newly diagnosed with HTN during the study time (6, 54, 55). Hypertension was diagnosed based on AHA and international journal of HTN guidelines. Accordingly, after the individual was rested for 5 minutes, the left arm or non-dominant arm was used to measure BP. If the first measurement of SBP was greater than 140mmHg or DBP greater than 90 mmHg, two additional measurements were taken 5 minutes apart, and the average was used to confirm HTN. If the first measurement of SBP was less than 140 mmHg and DBP was less than 90 mmHg, no need for additional measurement (53).

Experience

Participant was asked how many duration he drives and was classified according to the driving license cycle.

First cycle: if he served less than or equal to 2 years

Second cycle: if he served 3-5 years

Third cycle: if he drives 6-10 years

Fourth cycle: if he served greater than 10 years

Monthly income.

Participants were asked how much is his monthly income and categorized according to the Ethiopian income tax index of 2020 into < 5200 ETB and >5201 ETB (56).

Knowledge of HTN

To measure the level of knowledge of HTN, a score using percentage was awarded based on the 22 questions of each questions getting 3 points. The level of knowledge was given based on the mean value they scored and the mean value of the level of knowledge was 41.46. A score above the mean value was labelled a good knowledge and a score below the mean value was labelled a poor knowledge.

Family history of HTN: Participant was considered having a family history of HTN if he mentions a first degree relative having chronic disease.

History of chronic disease: Participant was considered having previous history of diagnosis with any chronic illness.

Physical activity (35)

A Participant was considered physically active if he can perform aerobic exercise (such as walking, biking, dancing and racing) or anaerobic activity (body building) for at least 150 minutes a week.

Smoking

A participant was an active smoker if he used tobacco regularly in a minimum of once per week in the previous 12 months (45).

Alcohol

A participant was alcohol consumer if he drank any alcoholic beverages on a regular basis per week in a minimum of one portion of alcohol such as 1 glass of wine, 1 bottle of beer, a 50g of ouzo or the like (45).

Hours of driving

A participant was asked the average daily driving hours and classified into greater than and less than 9 hours per day (57).

BMI

The drivers were weighed without shoes in kilogram (kg) on a prepared mechanical anthropometric scale. In addition, their height was measured in appropriately calibrated meter. The BMI was then calculated and interpreted according to the WHO guideline (58).

Normal BMI if BMI was between 18.5 kg/m² to 25 kg/ m².

Overweight if BMI was between 25 kg/m² to 29.9 kg/ m².

Obese if BMI was greater than 30 kg/m² to 34.9 kg/ m².

4.10. Data quality Assurance

The quality of data was assured by applying a properly designed data collection tool. Prior to the actual data collection, the reliability and internal consistency of the questionnaire was pretested and using (SPSS) scale of reliability test, cronbach's alpha value of questionnaires was 0.8. In addition to this, training was given for data collectors and supervisor about proper categorization, coding of the questions. Finally, data collectors were closely followed by the supervisor and principal investigator.

4.11. Data processing and analysis

Data entry was performed using Epi data version 4.6, cleaned, checked and exported to IBM statistical package for social science (SPSS) version 26. Descriptive statistics such as frequency, percentage and charts were used to describe socio demographic, level of knowledge, behavioral characteristics and the magnitude of the problem. Binary logistic regression analysis was used to determine associated factors for undiagnosed hypertension. A variable with P- value of < 0.25 were considered a candidate for a multivariable analysis. Multi collinearity between dependent variables and other assumptions of binary logistic regression was checked. Multivariable analysis was done using a stepwise binary logistic regression in order to assess for independent predictors

of undiagnosed hypertension. Every analysis was considered significant at a p value of less than 0.05 on two tailed probability distribution.

4.12. Ethical consideration

Before data collection, ethical clearance for the study was obtained from St Paul Hospital Millennium Medical College institutional review boards (IRBs) with reference number of 5714/14. In addition, a support letter was requested from the MoT. Informed consent was taken by explaining the study title, purpose, procedure and duration. Possible risks and benefits of the study were clearly explained for the participants. All the participants' information was kept confidential and anonymous by excluding their name or any other identifying information from the tool.

They were also informed well that they have full right to refuse to participate and/or withdraw from the study at any time if they had any difficulty. All participants were educated about the implication of having high BP and were informed of their BP readings. The information collected was kept in a private till data insertion and then kept for a reasonable time to be discarded so that it does not fall into the hands of other researchers who might misappropriate it. An individual with elevated BP was referred using prepared referral form to the nearest health facility to seek immediate medical attention.

4.13. Dissemination plan

The study result primarily will be presented to St Paul's Millennium Medical College. If the need arises, the research report will be disseminated to the FMOH and the MoT. The finding of the study will be sent and published to the reputable national or international journals.

5. RESULTS

5.1. Socio-demographic characteristics of study participants

In this study from a total of 402 study candidates, 391 were participated to complete the questionnaire and physical measurements correctly. This gives a response rate of 97.2%. Of all participants 391 respondents 100% were male drivers. Accordingly, the mean age of participants was 41.02 (S.D of 8.639) years, and the age group of less than 40 years represents the highest group which is 52.7 %. A large proportion of participants (76.7%) was married. The majority of participants i.e. 41.2% and 40.9% are Orthodox and Protestant religious followers respectively. A great percentage of participants, 79 % earn a less than 5250 ETB. A higher proportion of participants (52.4%) achieved a license or certificate level of education. Driving experience indicates, 45.3 % served less than 10 years. Table 2 below indicates the socio-economic characteristics of study participants.

Table 2: Socio-demographic characteristics of long-distance bus drivers, Addis Ababa bus terminals, Ethiopia, 2022 (n = 391)

Variables	Categories	Frequency	Percentage
Age	<29	18	4.6%
	30-34	82	21%
	35-39	106	27.1%
	40-44	47	12%
	45-49	77	19.7%
	50-54	36	9.2%
	>55	15	6.4%
Marital status	Single	65	16.60%
	Married	300	76.70%
	Widowed	26	6.6%
Religious	Orthodox	161	41.20%
	Muslim	27	6.90%
	Catholic	26	6.60%
	Protestant	160	40.90%
	Others(*)	17	4.30%

Educational level	High school	45	11.50%
	Certificate	205	52.40%
	Diploma	110	28.10%
	Degree	31	7.90%
Experience	<3 years	23	5.9%
	3-5 years	26	6.6%
	6-10 years	128	32.7%
	>10 years	214	54.7%
Income	<5250ETB	309	79.0%
	>5251	82	21.0%

* “Waqefata and Traditional beliefs”

5.2. Knowledge about hypertension

From the total participants 18.7%, 23.8%, 27.1%, 18.9, 21.5%, and 27.9% had a poor level of knowledge about the cause, symptom, prevention, treatment, and complication of hypertension respectively. Overall 55.8%, and 44.2%, have good and poor knowledge of hypertension respectively.

5.3. Participants' behavior characteristics

From total respondents 29.2% were smokers and 45 % of them were smoking at least 2-3 days per week regularly. Most (67.5%) of them reported that they were smoking 2-5 cigarettes at a time. Regarding hours of driving per day, 54.0 % of them were driving greater than 9 hours per day regularly. During their long trip, 62.9 % of them had no habit of interrupting for a break.

Concerning eating habits, it is reported by this study that only 17.6 % have the habit of eating fruit regularly and 90.8 % of them used to eat vegetables regularly. Of study participants, 4.1% of drivers have the habit of eating their meal while driving regularly and, 34.5 % of drivers consumed a high-calorie diet daily. Of the study participants, 30.7 % performed regular physical exercise and 38.9 % of them were performing jogging type of exercise. Half of the participants were performing regularly greater than 5 days per week (Table 4).

Table 4: Behavioral characteristics of long distance bus drivers, Addis Ababa terminals, Ethiopia, 2022 (n = 391).

Variables	Categories	Frequency	Percentage
Smoking	Yes	114	29.20%
	No	277	70.80%
Regular physical exercise	Yes	271	69.30%
	No	120	30.70%
Eating vegetable regularly	Yes	355	90.80%
	No	36	9.20%
Frequency of eating high calorie diet	Daily	135	34.50%
	Occasionally	172	44.00%
	Sometimes	84	21.50%
Chewing chat	Yes	264	67.50%
	No	127	32.50%
Frequency of eating while driving	Daily	16	4.10%
	Occasionally	97	24.80%
	Sometimes	137	35.00%
	Never	141	36.10%
Frequency of eating under stressful condition	Daily	36	9.20%
	Occasionally	143	36.60%
	Sometimes	212	54.20%
Hours of driving	<9hours	180	46.0%
	>9hours	211	54.0%
Regular eating of fruit	Yes	69	17.60%
	No	322	82.40%
Regular habit of interrupting while driving	Yes	145	37.10%
	No	246	62.90%

5.4. History of co- morbidities

Of 391 respondents 24.0 % of them had family history of hypertension, while 2.6 % of participants did not know about their family history of hypertension. Comorbidities with Diabetes Mellitus accounts for 23 (5.9%) of all participants and 4.6% were previously told to have cardiac problem. (Table 5).

Table 5: Clinical related characteristics of long-distance bus drivers, Addis Ababa terminals, Ethiopia, 2022 (n = 391)

Variables	Categories	Frequency	Percentage
Diabetes mellitus	Yes	23	5.9%
	No	368	94.1%
Cardiac problem	Yes	16	4.1%
	No	375	95.9%
Family history of hypertension	Yes	94	24.0%
	No	287	73.4%
	Don't know	10	2.6%

5.5. Body mass index

Concerning BMI level, 32.0 % of the participants were overweight, while 20.5 % of them were obese (Fig.1).

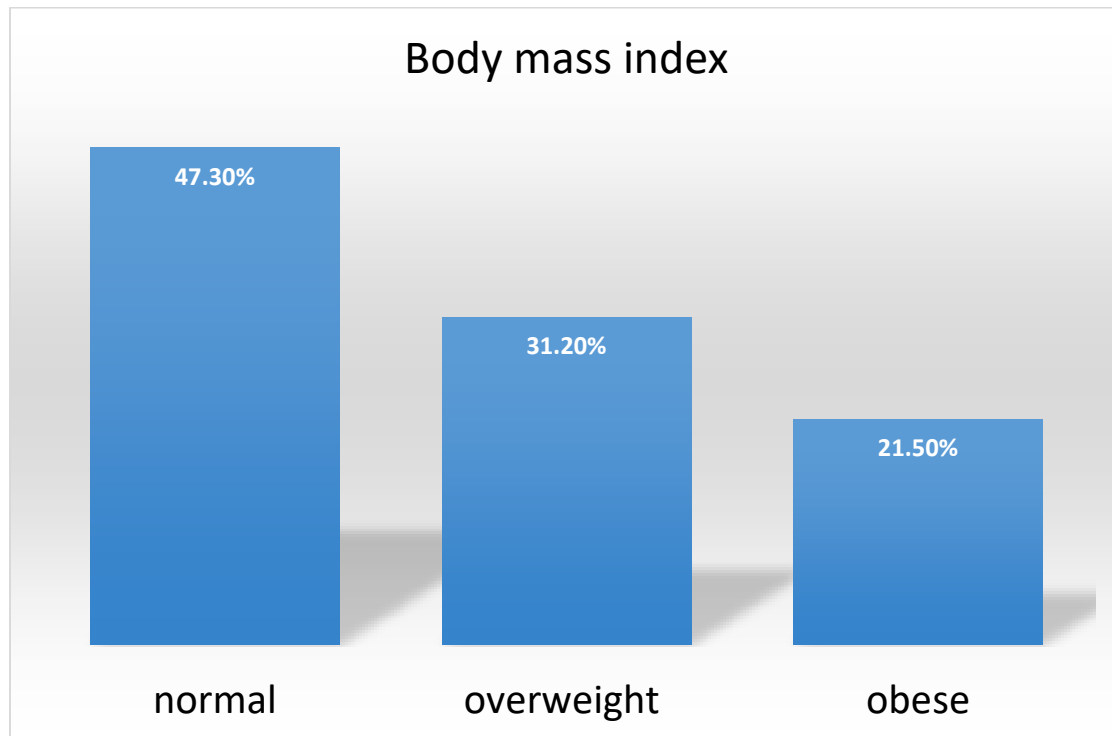


Figure 3: Body mass index of long distance bus drivers in Addis Ababa terminals 2021.

5.6. Prevalence of undiagnosed hypertension

The prevalence of undiagnosed hypertension with this study is 22.5% (CI: 18.7%, 26.6%) and out of 391 participants, 298 had normal blood pressure. The remaining 7 had elevated blood pressure at the first measurement however their blood pressure level decreased to normal after the second and third blood pressure checkup. Among those hypertensive individuals, 71.5% have stage I hypertension, 28.74 % have stage II hypertension and 1.1% have severe HTN.

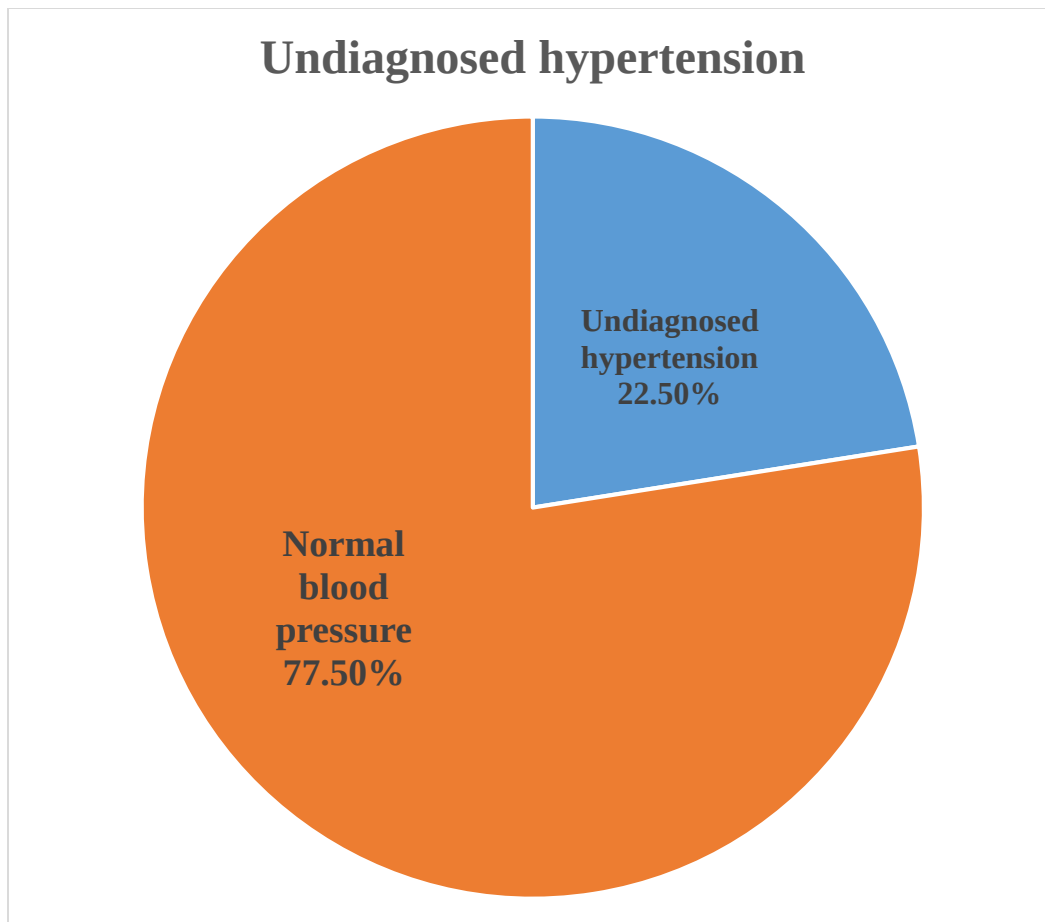


Figure 4: Prevalence of undiagnosed hypertension among long distance bus drivers in selected bus of Addis Ababa: 2022.

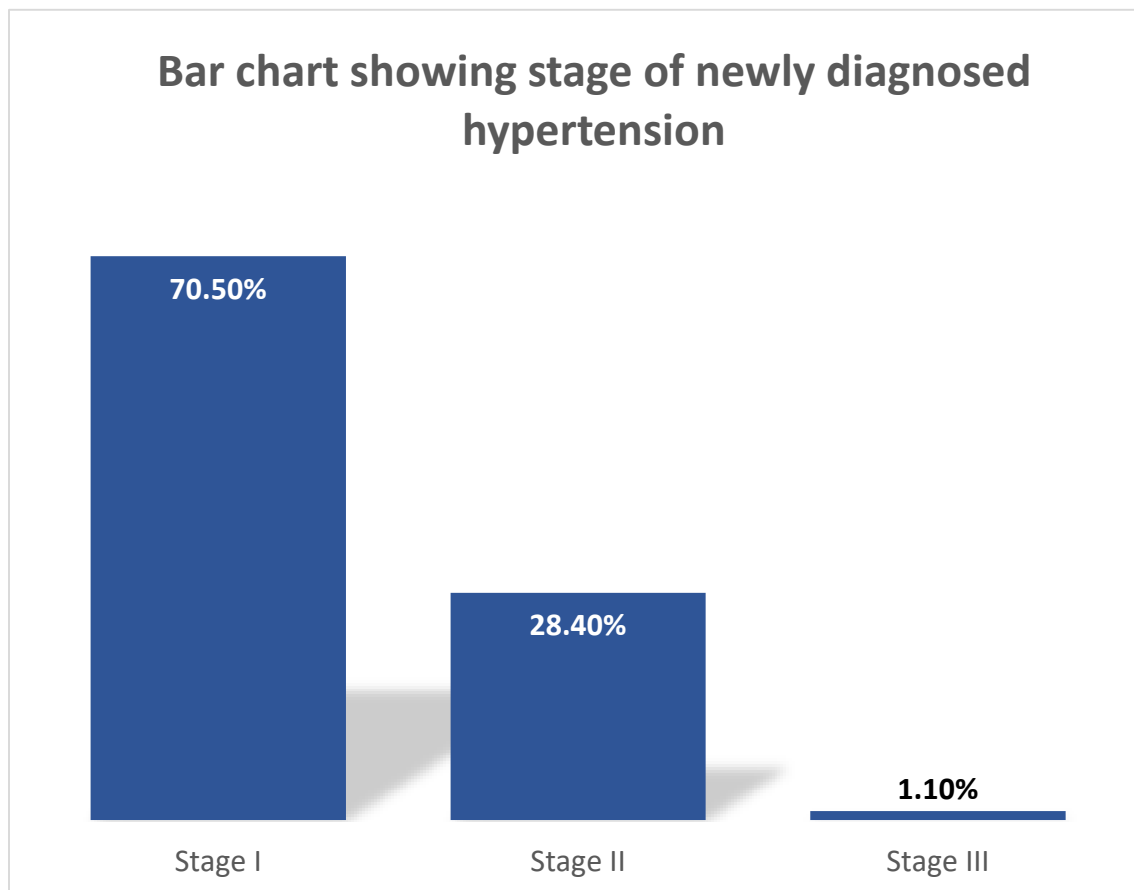


Figure 5: Frequency distribution of stages of newly diagnosed hypertension among long distance bus drivers in selected bus terminals of Addis Ababa: 2022.

5.7. Risk factors for Undiagnosed Hypertension.

On bivariable analysis, of all variables age group, monthly income, marital status, knowledge about HTN, smoking, chewing chat, alcohol intake, eating fruit regularly, eating while driving, hours of driving per day, BMI, regular physical exercise, and interruption during driving showed significant statistical association with undiagnosed HTN.

Table 6: Factors identified on binary logistic regression analysis with undiagnosed HTN among long distance bus drivers in Addis Ababa terminals, 2021.

<i>Variables</i>	<i>Categories</i>	<i>Undiagnosed HTN (n=88)</i>		<i>p-value</i>	<i>COR</i>	<i>95% CI</i>
		Yes	No			
<i>Age</i>	<29	5(27.8%)	13(72.2%)	0.001*	1	1
	30-34	12(14.6%)	70(85.4%)	0.187	2.244	(0.676,7.445)
	35-39	15(14.2%)	91(85.8%)	0.155	2.333	(0.726,7.496)
	40-44	10(21.3%)	37(78.7%)	0.579	1.423	(0.409,4.946)
	45-49	18(23.4%)	59(76.6%)	0.695	1.261	(0.396,4.016)
	50-54	16(44.4%)	20(55.6%)	0.241	0.481	(0.141,1.633)
	>55	12(48.0 %%)	13(52%)	0.185	0.417	(0.114,1.523)
<i>Monthly income</i>	<5200	55(17.8%)	254(82.2%)		1	1
	>5201	33(40.2%)	49(59.8%)	0.000*	0.322	(0.189,5.46)
<i>Marital status</i>	Single	7(10.8%)	58(89.2%)	0.014*	1	1
	Married	71(23.7%)	229(76.3%)	0.026*	0.389	(0.170,0.891)
	Divorced	10(38.5%)	16(61.5%)	0.004*	0.193	(0.063,0.588)

<i>Knowledge level</i>	Good knowledge	62(28.4%)	156(71.6%)	0.000*	1	1
	Poor knowledge	26(15.0%)	147(85.0%)	0.002*	2.247	(1.349,3.743)
<i>Regular chewing chat</i>	Yes	35(13.3%)	229(86.7%)	0.000*	4.686	(2.84,7.73)
	No	53(41.7%)	74(58.3%)		1	1
<i>Smoking</i>	Yes	42(36.8%)	72(63.2%)	0.000*	0.341	(0.208,0.560)
	No	46(16.6%)	231(83.4%)		1	1
<i>Alcohol consumption</i>	Yes	14(9.0%)	142(91.0%)	0.000*	4.662	(2.523,8.616)
	No	74(31.5%)	161(68.5%)		1	1
<i>Regular fruit eating</i>	Yes	23(33.3%)	46(66.7%)	0.019*	0.506	(0.286,0.894)
	No	65(20.2%)	257(79.8%)		1	1
<i>Eating while driving</i>	Daily	8(50.0%)	8(50.0%)	0.005*	0.216	(0.074,0.629)
	Occasionally	22(22.7%)	75(77.3%)	0.347	0.735	(0.38,1.39)
	Sometimes	33(24.1%)	104(75.9%)	0.194	0.679	(0.37,1.21)
	Never	25(17.7%)	116(82.3%)	0.044	1	1
<i>Hours of driving</i>	<9 hours	60(33.3%)	120(66.7%)	0.000*	1	1
	>9 hours	28(13.3%)	183(86.7%)	0.467	0.781	(0.401,1.521)
<i>Physical exercise</i>	Yes	59(49.2%)	61(50.8%)	0.000*	0.124	(0.073,0.210)
	No	29(10.7%)	242(89.3%)		1	1
<i>Interruption for rest while driving</i>	Yes	38(15.4%)	208(84.6%)	0.000*	0.347	(0.213,0.565)

	No	50(34.5%)	95(65.5%)		1	1
<i>BMI level</i>	Normal	60(32.3%)	126(67.7%)	0.000	1	1
	Overweight	16(12.6%)	111(87.4%)	0.000*	3.304	(1.799,6.066)
	Obese	12(15.4%)	66(84.6%)	0.006*	2.619	(1.317,5.209)

* P-Value < 0.25 was considered as statistically association OR: odds ratio; CI: Confidence interval; 1: reference.

While, in a stepwise final multivariable logistic regression analysis; level of knowledge of HTN, regular physical exercise, body mass index, hours of driving per day, alcohol drinking, and chewing chat maintained significant association to predict undiagnosed HTN among study participants.

Concerning the level of knowledge of HTN, bus drivers who have poor knowledge were 2.00 times (AOR: 2.00; 95% CI 1.08, 3.70) more likely than drivers with good knowledge about HTN.

Bus drivers who work greater than 9 hours a day were 2.50 times (AOR: 2.50; 95% CI 1.37, 4.56) more likely than 7 hours per day. Drivers who have a habit of chewing chat were 2.61 times (AOR: 2.61; 95% CI: 1.44, 4.73) more likely to have undiagnosed HTN than those who were non-chewer.

Participants who drink alcohol regularly were 3.46 times (AOR: 3.46; 95% CI: 1.70, 7.05) riskier than those who did not drink alcohol to have undiagnosed HTN. Performing regular physical exercise decreased the likely hood of having undiagnosed HTN by 84.0% (AOR: 0.16, 95%; CI: 0.09, 0.29). Bus drivers who were overweight were 3.14 times (AOR: 3.14, 95%; CI 1.54, 6.42) more likely, and obese drivers were 3.21 times (AOR: 3.21, 95%; CI 1.35, 7.61) more likely to have undiagnosed HTN than participants with normal BMI (Table 7).

Table 7: Factors identified on multi variable logistic regression analysis with undiagnosed HTN among long distance bus drivers in Addis Ababa terminals, 2022.

Variables	Categori es	Undiagnosed HTN		COR	95% CI	AOR	95% CI	P-value
		Yes	No					
<i>Knowledg e level</i>	Good knowled ge	62(28.4%)	156(71.6%)	1	1	1	1	1
	Poor knowled ge	26(15.0%)	147(85.0%)	2.247	(1.34,3.74)	2.003	(1.08,3.70)	0.027**
<i>Alcohol consumpti on</i>	Yes	14(9.0%)	142(91.0%)	4.662	(2.52,8.61)	3.46	(1.70,7.05)	0.001**
	No	74(31.5%)	161(68.5%)	1	1	1	1	1
<i>Regular chewing chat</i>	Yes	35(13.3%)	229(86.7%)	4.686	(2.84,7.73)	2.61	(1.44,4.76)	0.001**
	No	53(41.7%)	74(58.3%)	1	1	1	1	1
<i>Hours of driving</i>	<9 hours	60(33.3%)	120(66.7%)	1	1	1	1	1
	>9 hours	28(13.3%)	183(86.7%)	0.781	(0.40,1.52)	2.50	(1.37,4.56)	0.003**
<i>Physical exercise</i>	Yes	59(49.2%)	61(50.8%)	0.124	(0.07,0.21)	0.161	(0.09,0.29)	0.000**
	No	29(10.7%)	242(89.3%)	1	1	1	1	1
<i>BMI level</i>	Normal	60(32.3%)	126(67.7%)	1	1	1	1	0.002**
	Overwei ght	16(12.6%)	111(87.4%)	3.304	(1.79,6.06)	3.14	(1.54,6.42)	0.008**
	Obese	12(15.4%)	66(84.6%)	2.619	(1.31,5.20)	3.21	(1.35,7.61)	0.003**

** P-Value < 0.05 was considered as statistically significant association OR: odds ratio; CI: Confidence interval; 1: reference.

6. DISCUSSION

This facility-based cross-sectional study was performed to assess the prevalence of undiagnosed HTN and associated factors among long-distance bus drivers. Overall, the prevalence of undiagnosed HTN was 22.5%, with a 95% CI (18.2-26.9). The prevalence of undiagnosed HTN in this study is in line with similar studies conducted in Karnataka India and Mojo terminal, which was 23.2% and 20% respectively (39, 57).

The finding of this study indicates that long distance bus drivers had found a higher prevalence of undiagnosed HTN when compared with general population in different parts of Ethiopia. Studies in Hawasa, Gulale sub-city, and Dano district indicates, 13.25%, 12.3%, 14.6 % of undiagnosed HTN respectively (18, 32, 33). This difference from general population may be due to the nature of the occupation. Long distance driving is largely sedentary, psychologically and physically stressful which could in turn cause obesity. From this study obesity was a predictor of HTN.

The result of this study showed a higher prevalence of undiagnosed HTN when compared to similar study conducted in Bangalore city, India, which was 16.0%. The discrepancy may be due to the difference in sample size used and numbers of facilities. The study in Bengaluru was performed at a single facility and used 60 bus drivers only (25).

On the other hand, the proportion of undiagnosed HTN in this study is lower when compared to similar studies conducted in Ghana, Turkey, North Kerala India, Saudi Arabia, and Nigeria which was 38.7%, 31.4% , 41.3% , 38.7%, and 33.5% respectively (37, 38, 40, 59). The difference could be owed to type of diet and genetic difference. High consumption of potassium and sodium rich foods among west African countries as in Ghana and Nigeria could result in higher prevalence (60). In addition, genetic predisposition made the greatest odds of HTN among South East Asian countries such as India (36).

In line with the hypothesis, this study identified knowledge of HTN, behavioral, overweight, and obesity as associated factors for undiagnosed HTN. In this study bus drivers with poor knowledge about HTN were twice more likely to have undiagnosed HTN when compared with those who had good knowledge. This association is plausible, as majority of long distance drivers achieved lower educational status which could have resulted in low awareness. This implies that most bus drivers are unaware that asymptomatic in nature of HTN, cause, prevention mode, treatment methods and

that it can lead to complication if untreated. Individuals with good awareness about HTN might have a better healthy lifestyle and health-seeking behavior, and less vulnerability to HTN risk behaviors. This association is supported with other numerous studies in Bahir Dar, Dano district, Hawasa and India (25, 32, 33, 45).

The result of the data showed that chewing chat was one of the predictors of undiagnosed HTN. During interview, bus drivers practiced to chew chat to prevent day time sleeping while their journey. People who chew chat were less likely to notice the early symptoms of HTN because it makes them asymptomatic and prevents them from visiting a health facility. In addition, the habit may influence them economically compromised to afford the payment for health facility visiting. This result is in line with similar study conducted in Hawasa, Ethiopia to find chewing chat as a risk factor of undiagnosed HTN (32).

Respondents who consume alcohol regularly were nearly three times more likely to have undiagnosed HTN than those who did not consume alcohol. This finding is supported by other cross-sectional study in Brazil and Ghana (35, 61). Alcohol causes HTN by inducing secretion of cortisol which further increases angiotensin II production through the RAAS and leads to elevated BP (62).

Most of our study participants responded that they work for several hours to gain additional income. Specifically, participants who work greater than 9 hours regularly per day were two times more likely, of having undiagnosed HTN than those who work less than 9 hours. The longer duration of driving hours may result in hypertension due to more hours of sitting, sedentary lifestyle, and physical inactivity (63). The prolonged driving hour also increases stress levels and constant exposure to a noisy environment. This association is in agreement with the study conducted in Mojo, Ethiopia, and Australia (47, 57).

This study is in harmony with other similar studies in Hawasa, India, Nigeria, Ghana, and elsewhere in considering increased BMI as a predictor of undiagnosed HTN (25, 35, 40, 57). Participants who are obese and overweight were shown to have higher odds undiagnosed HTN. Obesity in bus drivers could be owed to regular high calorie consumption, alcohol consumption and lack of physical exercise.

Obesity and overweight increases stroke volume and cardiac output in addition to the vasoconstriction effect and an increased pharyngeal soft tissue that causes obstructive sleep apnea during sleeping (64). Therefore, efforts to control unhealthy weight gain should be encouraged for controlling obesity to prevent HTN.

Performing regular physical exercise decreased the odds of having undiagnosed HTN. Long distance drivers lack appropriate time to perform physical activity as rush to finish their mandate, they end up sitting for long hours without activity. Apart from their long journey, during their vacation days bus drivers even use their buses rather than walking for intra city short distance travelling. This association is supported by scientific evidence that physical exercise prevents elevated BP by reducing stiffening and narrowing of the blood vessel lumen(65). Also the result is consistent with other studies conducted in Taipei, Ghana, and Nigeria (25, 46, 66).

In general, long-distance bus drivers are at a higher risk of burden from unscreened HTN. They are suffering from chronic undiagnosed hypertension. Because of lack of adequate awareness, behavioral, occupational and increased BMI. This could create a great burden from mortality and morbidity caused by undiagnosed HTN. Therefore this study highlights further research is needed to investigate other possible causes for undiagnosed HTN among long-distance bus drivers.

7. CONCLUSION

The proportion of undiagnosed HTN with this study among long-distance bus drivers is significant (22.5%). Identified factors which increased the odds of undiagnosed HTN were lack of adequate knowledge of HTN, behavioral factors such as regular alcohol and chat consumption, long duration of working hours, overweight, and obesity. On the other hand, having the habit of performing regular physical exercise decreased the odds of having undiagnosed HTN. This study also identified the major co-morbidity among this population were overweight and obesity.

8. RECOMMENDATION

The result of this study underscores the necessity and high demand for preventive strategies of HTN among long-distance bus drivers. The investigator respectfully recommends the following tips for respective responsible organizations/bodies.

Community health care providers should periodically deliver health educations that focus on awareness improvement on lifestyle modification such as having regular physical exercise, avoiding high alcohol consumption, preventing chewing chat and weight reduction mechanisms. This could be achieved by different mechanisms of which periodical health camps at each terminal is typical.

FMoH in collaboration with transportation authorities should develop guideline and policy for regular and periodic blood pressure checkups for all of the passengers carrying long-distance drivers. If possible Ministry of health in collaboration with ministry of logistic and transport should open onsite clinics at each bus terminals. Based on the results of our study, it is advisable for the ministry of transport to put into effective action of policy of banning khat.

Policymakers should enable the enactment of national physical activity recommendation among long distance bus drivers. In addition different transport unions are better educated about preventive strategies such as working by shift for longer hours drivers can decrease the likely hood of HTN.

It is also warranted from researchers specifically cardiac specialists to conduct prospective cohort study to determine cardio-metabolic profiling among obese bus drivers. Applying part III of WHO approach to NCD. Based on the identified factors by this study, cardiovascular nurses and specialists can develop predictive tool for hypertension occurrence among long distance bus drivers.

9. STRENGTH AND LIMITATION OF THE STUDY

This study is of the first of its type in Ethiopia among long distance bus drivers. In addition, it is performed at multi-facility, the study was conducted at all five bus terminals found in Addis Ababa. This will increase the representativeness of the finding.

Despite these strengths, the limitation of this study was an inability to measure the abdominal circumference due to, it is better than BMI to predict HTN. It was beyond the scope of this study to apply part III of the WHO approach to measure biochemical components such as blood glucose level, serum cholesterol, etc. by approach was also drawn backs.

10. ANNEXES

10.1. Questionnaires English version (9, 32, 45, 46, 50)

Structured questionnaires constructed from different literatures to assess the undiagnosed HTN and associated factors among professional long distance bus drivers, in Addis Ababa cross country bus terminals, Addis Ababa, Ethiopia 2021 G.C.

Annex 1. Participant's Informed Consent Form

Good morning/afternoon, my name is..... I am here on behalf of **Melkamu Getaneh** for collecting data of a study titled undiagnosed HTN and associated factors in Addis Ababa terminals, Addis Ababa, Ethiopia. I am a data collector conducting a research for the partial fulfillment of the requirements for the degree of Master in Cardiovascular nurse practitioner at St. Paul hospital millennium medical college. I guarantee that your identity will be kept confidential and your involvement is completely based on volunteer participation. I will not ask for your name or other information that directly identify about you. There are no any risks anticipated for this study and no benefit or compensation will be awarded for participating in the study but the results of your response will be essential for policy makers in regards to identify problems. You have the right to participate or not to respond to the questions and physical measurements partially or fully and you have also the right to withdraw your participation at any time during interview. The questioner will last at most 5 -10 minutes. And the blood pressure measurement, height and weight measurements require at most 15 minutes. If you agree to participate, you will start the interview. Before we start, I need you to explain that I have read you this consent and you understand and freely agree to interview the quaternary.

Are you Volunteer? 1. Yes 2. No

If yes, please continue, if not stop participation of the study.

If you have any inquiry/question please contact: Melkamu Getaneh Jebessa

Call phone + 251 925841566 [Email: melkamugetaneh11@gmail.com]

Name of data collector: _____ Signature: _____ Date: _____

Annex2: English Version Questionnaire

Dear respondents: - This questionnaire was designed on thesis titled of “Undiagnosed HTN and associated factors among long distance professional bus drivers at Addis Ababa terminals, Addis Ababa Ethiopia, 2021”. The outcome of the study will be used in order to suggest possible solutions for problems identified while conducting the study. I kindly request you to spent your precious time to tell the questionnaire and physical measurements as frank as and reasonable as possible. I inform you that, the information you provide will be consumed for research purpose only. The information you provide will also be kept confidential. Therefore, you all not expected to tell your name.

Thank you for your cooperation!

Signature -----

Instruction: - I kindly request you to answer each question as I read.		
Part I. Socio demographic characteristics		
No	Variable	Response
101	What is your age in year?	----- years old
102	Sex	1. Male 2. Female
103	What is your marital status?	1. Never married 2. Married 3. Divorced 4. Widowed
104	What is your educational level?	-----
105	How much is your family size?	-----
106	How much is your working experience?	-----Months/Years
107	How much is your monthly income?	-----Ethiopian birr
Part II. Knowledge towards HTN		
A. Knowledge towards the causation of HTN		
201	Eating diet rich in salt can cause HTN.	1. Yes 2. No 3. Don't know
202	Being overweight can cause HTN.	1. Yes 2. No 3. Don't know
204	Too much drinking of alcohol can cause HTN.	1. Yes 2. No 3. Don't know

205	Smoking cigarette can cause HTN.	1. Yes 2. No 3. Don't know
B. knowledge towards the signs and symptoms of HTN		
207	Headache is the symptoms of HTN.	1. Yes 2. No 3. Don't know
208	Dizziness is the symptoms of HTN.	1. Yes 2. No 3. Don't know
210	Palpitation is the sign and symptoms of HTN.	1. Yes 2. No 3. Don't know
C. Knowledge towards prevention of HTN		
211	Exercising regularly could prevent HTN.	1. Yes 2. No 3. Don't know
212	Monitoring of blood pressure is very important in order to prevent high blood pressure.	1. Yes 2. No 3. Don't know
213	Reducing stress level could prevent HTN.	1. Yes 2. No 3. Don't know
214	Eating fruits and vegetables could prevent HTN.	1. Yes 2. No 3. Don't know
215	Reducing the amount of salt intake could prevent HTN.	1. Yes 2. No 3. Don't know
D. Knowledge towards complication of HTN		

216	HTN can cause heart diseases, if left untreated.	1. Yes 2. No 3. Don't know
217	HTN can cause visual impairment, if left untreated.	1. Yes 2. No 3. Don't know
218	HTN can cause Stroke, if left untreated.	1. Yes 2. No 3. Don't know
219	HTN can cause kidney failure, if left untreated.	1. Yes 2. No 3. Don't know
220	HTN can cause premature death, if left untreated.	1. Yes 2. No 3. Don't know
E. Knowledge towards HTN treatment methods		
221	Herbal medications used to control HTN.	1. Yes 2. No 3. Don't know
222	Chemical drugs used to control HTN.	1. Yes 2. No 3. Don't know
223	Taking healthy diet used to control HTN.	1. Yes 2. No 3. Don't know
225	Smoking and alcohol cessation used to control HTN.	1. Yes 2. No 3. Don't know
226	Performing regular exercise used to control HTN.	1. Yes 2. No 3. Don't know

Part III. Behavioral characteristics		
A. Cigarette smoking		
301	Do you smoke cigarettes?	1. Yes 2. No
Note: If your answer is Yes for question number 301 go to question number 302 and 303		
302	How frequently do you smoke?	1. Daily 2. Once /wk. 3. 2 -3 days/wk. 4. 4-5 days/wk. 5. Other specify-----
303	How many cigarettes do you smoke at a time?	1. 1 or less cigarette 2. 2-5 cigarettes 3. 6-10 cigarettes 4. 11 and more cigarettes
B. Khat chewing		
304	Do you have a habit of Khat chewing?	1. Yes 2. No
Note: If your answer is Yes for question number 304 go to question number 306		
305	How frequently do you chewing the khat?	1. Daily 2. Most week days 3. Weekends only 4. On occasions
C. Alcohol drinking		
306	Do you drink alcohol?	1. Yes 2. No
Note: If your answer is Yes for question number 306 go to question number 307 and 308.		
307	How often do you take alcoholic drinks?	1. Daily 2. 5-6 days per week 3. 1-4 days per week

		4. 1-3 days per week 5. Other specify-----
308	On average, how much do you usually drink alcohol? (one portion of alcohol is having at least 1 glass of wine, 1 bottle of beer, a 50g of ouzo)	1. Less than one drink 2. One to three drinks 3. Four to six drinks 4. Seven or more drinks
D. Dietary history		
309	Do you eat fruits?	1. Yes 2. No
Note: If your answer is Yes for question number 309 go to question number 310 and 311		
310	In a typical week, on how many days do you eat fruit?	1. Daily 2. 1- 4 days per week
311	How many servings of fruits do you eat on one of those days? (1 serving= one orange/ apple/banana/peach/mango/grapes etc.).	1. 4 serving of fruits 2. 5 or more servings of fruits
312	How often you have eaten under stressful condition?	1. Daily 2 .occasionally 3. Some times
313	How often you have eaten while driving?	1. Daily 2 .occasionally 1. Some times 2. Never
314	How often do you eat high calorie diet such as egg, raw meat and chicken?	1. Daily 2 .occasionally 3. Some times
315	Do you eat vegetables?	1. Yes 2. No
Note: If your answer is Yes for question number 315 go to question number 316 and 317		

316	In a typical week, on how many days do you eat vegetables?	1 Daily 2 1- 4 days per week
317	How many servings of vegetables do you eat on one of those days? (1 serving= three tablespoons of cooked vegetables)	1. 4 serving of vegetables 2. 5 or more servings of vegetables
E. Physical activity		
318	Do you perform regular physical exercise?	1. Yes 2. No
Note: If your answer is Yes for question number 318 go to question number 319 through 321		
319	What type of exercise do you perform?	1 Walking 2 Jogging 3 Cycling 4 Swimming
320	How often do you exercise?	1 < 5 days per week 2 ≥ 5 days per week
321	For how many minutes do you exercise per session?	1 <30 minutes 2 ≥30 minutes
322	For how long hours you drive per day?	
322	Do you have rest breaks interruption while driving?	A. Yes B. No
323	On average how many times do you interrupt per journey?	
	If your answer is Yes to question 322 go to question 323	
401	Do you have family history of HTN?	1 Yes 2 No 3 I don't know
Note: If your answer is Yes for question number 401 go to question number 402		

402	Whom of your family has HTN?	1 Father 2 Mother 3 Grand father 4 Grand mother
403	Have you ever been told by a doctor that you have diabetes mellitus?	1 Yes 2 No
404	Have you ever been told by a doctor that you have cardiovascular problem?	1 Yes 2 No
Part V. Blood Pressure level and Body Mass Index		
A. Blood Pressure level		
501	First blood pressure measurement	Systolic-----mmHg Diastolic----- mmHg
502	Second blood pressure measurement	Systolic-----mmHg Diastolic-----mmHg
503	Third blood pressure measurement	Systolic-----mmHg Diastolic-----mmHg

504	Average blood pressure measurement	Systolic-----mmHg
		Diastolic-----mmHg
A. Height and Weight		
505	Weight -----kg	
506	Height -----Meter	
507	BMI level -----kg/m ²	

WE THANK YOU FOR THE FULL COOPRATION!

SUPPERVISOR NAME----- SIGNATURE-----DATE-----

10.2. Questionnaires Amharic version

መጠይቆች

በአዲስ አበባ አገር አቋራጭ አውቶብስ ተርሚናሎች በረጅም ርቀት የአውቶብስ አሽከርካሪዎች መካከል ያለውን ያልተመረመረ የደም ግፊት እና ተያያዥ ምክንያቶችን ለመገምገም ከተለያዩ ጽሑፎች የተወሰዱ የተዋቀሩ መጠይቆች፣ 2021 G.C.

ጥናትና ምርምሩን የሚያካሂደው ሰው ሙሉ ስም: -----ፊርማ-----ቀን-----

አባሪ 1

የአሳታፊ መረጃ ፈቃድ ቅጽ

እኔ....., በአዲስ አበባ አገር አቋራጭ የአውቶብስ ተርሚናሎች፣ የረጅም ርቀት አውቶብስ አሽከርካሪዎች መካከል ያለውን ያልተመረመረ የደም ግፊት እና ተያያዥ ምክንያቶችን የተሳኘ ጥናት መጠይቆች ለመሰብሰብ መልካሙ ጌታነህን በመወከል የማደርግ መረጃ ሰብሳቢ ነኝ። በቅዱስ ጳውሎስ ሆስፒታል ሚሊኒየም ሜዲካል ኮሌጅ የማስተርስ ዲግሪ የልብና የደም ህክምና ነርስ ባለሙያ የሚጠበቅብኝን ከፊል ለማሟላት ጥናት ነኝ። ማንነትዎ በሚስጥር እንደሚጠበቅ እና ተሳትፎዎ ሙሉ በሙሉ በበጎ ፈቃድ ተሳትፎ ላይ የተመሰረተ መሆኑን አረጋግጣለሁ። የእርስዎን ስም ወይም ስለእርስዎ በቀጥታ የሚለይ ሌላ መረጃ አልጠይቅም። ለዚህ ጥናት የሚጠበቁ ምንም አይነት አደጋዎች የሉም እና በጥናቱ ለመሳተፍ ምንም አይነት ጥቅም ወይም ካሳ አይሰጥም ነገር ግን የምላሽዎ ውጤት ችግሮችን በመለየት ረገድ ለፖሊሲ አውጪዎች አስፈላጊ ይሆናል። ለጥያቄዎች እና አካላዊ መለኪያዎች በከፊል ወይም ሙሉ ምላሽ የመስጠት ወይም የለመስጠት መብት አልዎት እና በቃለ መጠይቁ ወቅት በማንኛውም ጊዜ ተሳትፎዎን የማቋረጥ መብት አለዎት። ጠያቂው ቢበዛ ከ5-10 ደቂቃዎች ይቆያል። እና የደም ግፊት መለኪያ፣ ቁመት እና ክብደት መለኪያዎች ቢበዛ 15 ደቂቃዎች ያስፈልጋቸዋል። ለመሳተፍ ከተስማሙ ቃለ መጠይቁን ይጀምራሉ። ከመጀመራችን በፊት፣ ይህን ፈቃድ እንዳይበብኩህ እና አንተ ተረድተሃል እና ኪተርነሪውን ቃለ መጠይቅ ለማድረግ በነጻነት መስማማቴን እንድታብራራ እፈልጋለሁ።

በጎ ፈቃደኞች ነህ? 1. አዎ 2. አይደለም

አዎ ከሆነ፣ እባክዎን የጥናቱ ተሳትፎ ካላቆሙ ይቀጥሉ።

ጥያቄ/ጥያቄ ካሎት መልካሙ ጌታነህ ጀበሳን ያነጋግሩ

ስልክ +251 925841566 ይደውሉ

[ኢሜል: melkamugetaneh11@gmail.com]

የመረጃ ሰብሳቢው ስም:-_____ ፊርማ: _____ ቀን:-_____

አባሪ 2፡ የአማራጭ ትርጉም መጠይቅ

ውድ ምላሽ ሰጪዎች፡ -ይህ መጠይቅ የተዘጋጀው”የልተመረመረ የደም ግፊት እና ተያያዥ ጉዳዮች በአዲስ አበባ ተርሚናሎች፣ ኢትዮጵያ፣ 2021” በሚል ርዕስ ነው። የጥናቱ ውጤት ጥናቱን በሚመራበት ወቅት ለተለዩ ችግሮች መፍትሄዎችን ለመጠቀም ጥቅም ላይ ይውላል። መጠይቁን እና አካላዊ መለኪያዎችን በተቻለ መጠን ግልጽ እና ምክንያታዊ በሆነ መልኩ ለመናገር ውድ ጊዜዎን

እንዲያሳልፉ በትህትና እጠይቃለሁ። ያቀረቡት መረጃ ለምርምር ዓላማ ብቻ ጥቅም ላይ ይውላል። ያቀረቡት መረጃ በሚስጥር ይጠበቃል። ስለዚህ ሁላችሁም ስማችሁን እንድትናገሩ አልጠብቃችሁም።

ለትብብርዎ እናመሰግናለን! ፊርማ -----

መመሪያ : ጥያቄዎቹን ሳነብ እያንዳንዱን ጥያቄ እንድትመልስ በደግነት እጠይቃለሁ ።.			
ክፍል 1. የስነ ሕዝብ እና ማህበራዊ ጉዳዮች			
ተ.ቁ	ጥያቄ	አማራጭ መልስ	
101	እድሜ	አመት	
102	ፆታ	1. ወንድ 2. ሴት	
103	የጋብቻ ሁኔታ	1. ያላገባ /ያላገባች 2. ያገባ/ያገባች 3. የፈታ/የፈታች 4. የሞተችበት/የሞተባት	
104	ሐይማኖት	1. ኦርቶዶክስ ክርስቲያን 2. ሙስሊም 3. ካቶሊክ 4. ፕሮቴስታንት 5. ሌላ ካለ ይጥቀሱ-----	
105	የትምህርት ደረጃ	-----	
106	የአገልግሎት ዘመን	-----ዓመት	
107	ወራዊ ጋቢ		
ክፍል 2. ስለደም ግፊት ያለዎት እዉቅና			
ሀ. የደም ግፊትን ስለሚያመጡ ነገሮች ያለዎት እዉቅና			
201	ጨዋ የበዛበት ምግብ መመገብ ለደምግፊት ያጋልጣል።	1. ያጋልጣል 2. አያጋልጥም 3. አላዉቅም	
202	ከልክ በላይ የሆነ ዉፍረት ለደም ግፊት ያጋልጣል።	1. ያጋልጣል 2. አያጋልጥም 3. አላዉቅም	
203	ከልክ በላይ የሆነ ጭንቀት ወይም ብስጭት ለደም ግፊት ያጋልጣል።	1. ያጋልጣል 2. አያጋልጥም 3. አላዉቅም	
204	ከልክ በላይ የሆነ አልኮል መጠጣት ለደም ግፊት ያጋልጣል።	1. ያጋልጣል 2. አያጋልጥም 3. አላዉቅም	

205	ሲፓራ ማጨስ ለደም ግፊት ያጋልጣል።	1. ያጋልጣል 2. አያጋልጥም 3. አላውቅም	
206	የደም ግፊት በዘር ይተላለፋል።	1. ይተላለፋል 2. አይተላለፍም 3. አላውቅም	
ለ. የደም ግፊት በሽታ ስለሚያሳያቸው ስሜቶች እና ምልክቶች ያለዎት እውቅና			
207	የራስ ምታት አንዱ የደም ግፊት በሽታ ስሜት ነው።	1. ነዉ 2. አይደለም 3. አላውቅም	
208	ራስ ማዞር አንዱ የደም ግፊት በሽታ ስሜት ነው።	1. ነዉ 2. አይደለም 3. አላውቅም	
209	የትንፋሽ ማጠር አንዱ የደም ግፊት በሽታ ስሜት እና ምልክት ነው።	1. ነዉ 2. አይደለም 3. አላውቅም	
210	ፈጣን የልብ ምት አንዱ የደም ግፊት በሽታ ስሜት እና ምልክት ነው።	1. ነዉ 2. አይደለም 3. አላውቅም	
ሐ. ስለ ደም ግፊት መከላከያ ዘዴዎች ያለዎት እውቅና			
211	ተከታታይ የሆነ የአካል ብቃት እንቅስቃሴ ማድረግ የደም ግፊትን ይከላከላል።	1. ይከላከላል 2. አይከላከልም 3. አላውቅም	
212	የደም ግፊት ምርመራ ማድረግ ከፍተኛ የሆነ የደም ግፊትን ለመከላከል ይጠቅማል።	1. ይጠቅማል 2. አይጠቅምም 3. አላውቅም	
213	ጭንቀትን መቀነስ የደም ግፊትን ይከላከላል።	1. ይከላከላል 2. አይከላከልም 3. አላውቅም	
214	አትክልት እና ፍራፍሬ አዘውትሮ መመገብ የደም ግፊትን ይከላከላል።	1. ይከላከላል 2. አይከላከልም 3. አላውቅም	
215	ጨዋ የበዛበት ምግብ አለመመገብ የደም ግፊትን ይከላከላል።	1. ይከላከላል 2. አይከላከልም	

		3. አላውቅም	
መ. የደም ግፊት ስለሚያመጣው የጎንዮሽ ጉዳት ያለዎት እዉቅና			
216	የደም ግፊት ካልታከመ የልብ በሽታ ያመጣል።	1.ያመጣል 2. አያመጣም 3. አላውቅም	
217	የደም ግፊት ካልታከመ የእይታ ችግር ያመጣል።	1.ያመጣል 2. አያመጣም 3. አላውቅም	
218	የደም ግፊት ካልታከመ የአንጎል ጥቃት ያመጣል።	1.ያመጣል 2. አያመጣም 3. አላውቅም	
219	የደም ግፊት ካልታከመ የኩላሊት ስራ ማቆም ያመጣል።	1.ያመጣል 2. አያመጣም 3. አላውቅም	
220	የደም ግፊት ካልታከመ ሞት ያመጣል።	1.ያመጣል 2. አያመጣም 3. አላውቅም	
ሠ. ስለ ደም ግፊት የህክምና ዘዴዎች ያለዎት እዉቅና			
221	የባህል መድሀኒት መውሰድ የደም ግፊትን ለመቆጣጠር ይጠቅማል።	1. ይጠቅማል 2. አይጠቅምም 3. አላውቅም	
222	የኬሚካል መድሀኒት መውሰድ የደም ግፊትን ለመቆጣጠር ይጠቅማል።	1. ይጠቅማል 2. አይጠቅምም 3. አላውቅም	
223	ጤናማ የሆነ ምግብ መመገብ የደም ግፊትን ለመቆጣጠር ይጠቅማል።	1. ይጠቅማል 2. አይጠቅምም 3. አላውቅም	
224	ጭንቀትን መቀነስ የደም ግፊትን ለመቆጣጠር ይጠቅማል።	1. ይጠቅማል 2. አይጠቅምም 3. አላውቅም	
225	ሲጋራ እና አልኮል ማቆም የደም ግፊትን ለመቆጣጠር ይጠቅማል።	1. ይጠቅማል 2. አይጠቅምም 3. አላውቅም	
226	ተከታታይ የሆነ የአካል ብቃት እንቅስቃሴ ማድረግ የደም ግፊትን ለመቆጣጠር ይጠቅማል።	1. ይጠቅማል 2. አይጠቅምም 3. አላውቅም	

ክፍል 3. የአኗኗር ዘዴቤ			
ሀ. ሲጋራ ማጨስ			
301	ሲጋራ ያጨሳሉ?	1. አዎ 2. አላጨስም	
መመሪያ: ለጥያቄ ቁጥር 301 መልሰው አላጨስም ከሆነ ወደ ጥያቄ ቁጥር 304 ይቀጥሉ			
302	በየስንት ጊዜው ያጨሳሉ?	1. በየቀኑ 2. በሳምንት አንድ ጊዜ 3. በሳምንት ከ 2-3 ቀን 4. በሳምንት ከ 4-5 ቀን 5. ሌላ ካለ ይጥቀሱ-----	
303	በሚያጨሱበት ሰዓት ምን ያህል ሲጋራ ያጨሳሉ?	_____	
ለ. ጫት መቃም			
304	ጫት የመቃም ልምድ አለዎት?	1. አዎ 2. የለኝም	
መመሪያ: ለጥያቄ ቁጥር 304 መልስዎ የለኝም ከሆነ ወደ ጥያቄ ቁጥር 306 ይቀጥሉ			
305	በየስንት ጊዜው ይቅማሉ?	1. በየቀኑ 2. አብዛኛውን የሳምንት ቀናት 3. በየሳምንቱ 4. አልፎ አልፎ	
ሐ. የአልኮል መጠጥ			
306	የአልኮል መጠጥ ይጠጣሉ?	1.አዎ 2. አልጠጣም	
መመሪያ: ለጥያቄ ቁጥር 306 መልስዎ አልጠጣም ከሆነ ወደ ጥያቄ ቁጥር 309 ይቀጥሉ			
307	በየስንት ጊዜው ይጠጣሉ?		
308	በአማካይ ምን ያህል ይጠጣሉ? መገለጫ:- አንድ መጠን የሚባለው ቢያንስ 1ብርጫቆ ወይን፣ 1ጠርሙስ ቢራ፣ ወይም 50 ሲሲ ኡዞ፣ ጂን የመሳሰሉ አልኮሎች ማለት ነው።	_____	
መ. የአመጋገብ ታሪክ			
309	ፍራፍሬ ይመገባሉ?	1. አዎ 2. አልመገብም	
መመሪያ: ለጥያቄ ቁጥር 309 መልስዎ አልመገብም ከሆነ ወደ ጥያቄ ቁጥር 312 ይቀጥሉ			

310	በሳምንት ምን ያህል ቀን ይመገባሉ?	1. በየቀኑ 2. በሳምንት ከ 1-4 ቀን	
311	በሚመገቡበት ሰዓት ስንት የፍራፍሬ አይነት ይመገባሉ? (አንድ የፍራፍሬ አይነት= አንድ ብርቱካን/አፕል/ሙዝ/ ዎይን/ኮከ እና የመሳሰሉት).	_____	
312	በአስጨናቂ ሁኔታ ውስጥ ስንት ጊዜ ይበላሉ?	1. በየቀኑ 2. አልፎ አልፎ 3. አንዳንድ ጊዜ 4. በጭራሽ	
313	በሚያሽከረክሩበት ጊዜ ምን ያህል ጊዜ በልተዋል?	1. በየቀኑ 2. አልፎ አልፎ 3. አንዳንድ ጊዜ 4. በጭራሽ	
314	ከፍተኛ ሙቀት ሰጪና ገንቢ ምግቦችን (እንቀላል ጥሬ ሥጋና ዶሮ ወጥ የመሳሰሉትን) በሳምንት ለምን ያህል ጊዜ ይመገባሉ?	1. በየቀኑ 2. አልፎ አልፎ 3. አንዳንድ ጊዜ 4. በጭራሽ	
315	በቀን ለምን ያህል ሰአታት ያሽከረክራሉ?	_____	
316	በሚያሽከረክሩበት ጊዜ ለእረፍት ያቋርጣሉ?	1. አዎ 2. በጭራሽ	
317	አትክልት ይመገባሉ?	1. አዎ 2. አልመገብም	
መመሪያ: ለጥያቄ ቁጥር 312 መልስዎ አልመገብም ከሆነ ወደ ጥያቄ ቁጥር 315 ይቀጥሉ			
318	በሳምንት ምን ያህል ቀን ይመገባሉ?		
319	በሚመገቡበት ሰዓት ስንት የአትክልት አይነት ይመገባሉ? (አንድ የአትክልት አይነት=ሶስት የሾርባ ማንኪያ የተዘጋጁ አትክልቶች).	_____	
ሠ. የአካል ብቃት ዕንቅስቃሴ			
320	የአካል ብቃት እንቅስቃሴ ያደርጋሉ?	1. አዎ 2. አላደርግም	

መመሪያ፡ ለጥያቄ ቁጥር 315 መልስወ አላደረግም ከሆነ ወደ ጥያቄ ቁጥር 401 ይቀጥሉ			
321	ምን አይነት እንቅስቃሴ ያደርጋሉ?	1. እርምጃ 2. ሰምሶማ 3. ብስክሌት መንዳት 4. ሌላ ካለ ይጥቀሱ-----	
322	በየሰዓት ጊዜው እንቅስቃሴ ያደርጋሉ?	1. በሰዓት ከአምስት ቀን በታች 2. በሰዓት አምስት ቀን እና ከጊዜ በላይ	
323	በሚንቀሳቀሱበት ጊዜ ለምን ያህል ደቂቃ ይንቀሳቀሳሉ?	1. ከ30 ደቂቃ በታች 2. 30 ደቂቃ እና ከዚያ በላይ	
ክፍል 4. ካሁን በፊት የታዎቁ በሽታዎች			
401	የደም ግፋት በሽታ በቤተሰብዎ አለበወት?	1. አዎ 2. የለብኝም 3. አላውቅም	
መመሪያ፡ ለጥያቄ ቁጥር 401 መልስወ የለብኝም ወይም አላውቅም ከሆነ ወደ ጥያቄ ቁጥር 403 ይቀጥሉ			
402	እርሶዎ በህክምና የተረጋገጠ የስኳር በሽታ አለብዎት?	1. አዎ 2. የለብኝም	
403	እርሶዎ በህክምና የተረጋገጠ የልብ በሽታ አለብዎት?	1. አዎ 2. የለብኝም	
ክፍል 5. የሰውነት አቋም መጠን እና የደም ግፊት መጠን ልኬታ			
ሀ. የክብደት እና የቁመት መጠን			
501	ክብደት	-----ኪሎ ግራም	
502	ቁመት	-----ሜትር	
503	የሰውነት አቋም መጠን	-----ኪ.ግ/ሜ ²	
ለ. የደም ግፊት መጠን			
504	የመጀመሪያው የደም ግፊት መጠን	ሲስቶሊክ-----ሚሊ ሜትር ሜርኩሪ	
		ዲያስቶሊክ-----ሚሊ ሜትር ሜርኩሪ	

504	ሁለተኛ የደም ግፊት መለኪያ	ሲስቶሊክ-----ሚሊ ሜትር ሜርኩሪ	
		ዲያስቶሊክ-----ሚሊ ሜትር ሜርኩሪ	
505	ሦስተኛው የደም ግፊት መጠን	ሲስቶሊክ-----ሚሊ ሜትር ሜርኩሪ	
		ዲያስቶሊክ-----ሚሊ ሜትር ሜርኩሪ	
	አማካኝ የደም ግፊት መጠን	ሲስቶሊክ-----ሚሊ ሜትር ሜርኩሪ	
		ዲያስቶሊክ-----ሚሊ ሜትር ሜርኩሪ	

11.REFERENCES

1. Hermida RC, Smolensky MH, Mojón A, Crespo JJ, Ríos MT, Domínguez-Sardiña M, et al. New perspectives on the definition, diagnosis, and treatment of true arterial hypertension. *Expert Opinion on Pharmacotherapy*. 2020;21(10):1167-78.
2. Organization. WH. Hypertension 2021 [updated 2021b, August 25]. Available from: <https://www.who.int/health>
3. He J, Whelton PK. Elevated systolic blood pressure and risk of cardiovascular and renal disease: overview of evidence from observational epidemiologic studies and randomized controlled trials. *American heart journal*. 1999;138(3):S211-S9.
4. Wang H, Tian Q, Zhang J, Liu H, Zhang J, Cao W, et al. Blood transcriptome profiling as potential biomarkers of suboptimal health status: potential utility of novel biomarkers for predictive, preventive, and personalized medicine strategy. *EPMA Journal*. 2021;12(2):103-15.
5. organization Wh. Hypertension World health organization 2021.
6. Meador M, Lewis JH, Bay RC, Wall HK, Jackson C. Who are the undiagnosed? Disparities in hypertension diagnoses in vulnerable populations. *Family & community health*. 2020;43(1):35.
7. organization WH. More than 700 million people with untreated hypertension. 2021.
8. John L, Flin R, Mearns K. Bus driver well-being review: 50 years of research. *Transportation research part F: traffic psychology and behaviour*. 2006;9(2):89-114.
9. Cheung CK, Tsang SS, Ho O, Lam N, Lam EC, Ng C, et al. Cardiovascular risk in bus drivers. *Hong Kong Med J*. 2020;26(5):451-6.
10. Chockalingam A. Impact of world hypertension day. *Canadian journal of cardiology*. 2007;23(7):517-9.
11. WHO W. A global brief on hypertension: Silent killer, global public health crisis. 2013.
12. Gu Q, Burt VL, Dillon CF, Yoon S. Trends in antihypertensive medication use and blood pressure control among United States adults with hypertension: the National Health And Nutrition Examination Survey, 2001 to 2010. *Circulation*. 2012;126(17):2105-14.
13. AlMarzooq AM. Emergency Department Nurses' Knowledge Regarding Triage. *International Journal of Nursing*. 2020;7(2):29-44.
14. Zhou B, Perel P, Mensah GA, Ezzati M. Global epidemiology, health burden and effective interventions for elevated blood pressure and hypertension. *Nature Reviews Cardiology*. 2021:1-18.
15. Mendis S, Bettcher D, Branca F. World Health Organization Global Status Report on Noncommunicable Diseases. 2014. 2014.
16. Badego B, Yoseph A, Astatkie A. Prevalence and risk factors of hypertension among civil servants in Sidama Zone, south Ethiopia. *PloS one*. 2020;15(6):e0234485.
17. Abebe S, Yallew WW. Prevalence of hypertension among adult outpatient clients in hospitals and its associated factors in Addis Ababa, Ethiopia: a hospital based cross-sectional study. *BMC research notes*. 2019;12(1):1-6.
18. Getachew F, Dirar A, Solomon D. Prevalence of undiagnosed hypertension and associated factors among residents in Gulele Sub-City, Addis Ababa, Ethiopia. *J Community Med Health Educ*. 2018;8(590):2161-0711.1000590.
19. Zeru AB, Muluneh MA. Admission and Inpatient Mortality of Hypertension Complications in Addis Ababa. *Integrated Blood Pressure Control*. 2020;13:103.

20. Bokaba M, Modjadji P, Mokwena KE, editors. Undiagnosed Hypertension in a Workplace: The Case of a Logistics Company in Gauteng, South Africa. Healthcare; 2021: Multidisciplinary Digital Publishing Institute.
21. Hedberg GE, Jacobsson KA, Janlert U, Langendoen S. Risk indicators of ischemic heart disease among male professional drivers in Sweden. *Scandinavian journal of work, environment & health*. 1993;326-33.
22. Wang PD, Lin RS. Coronary heart disease risk factors in urban bus drivers. *Public health*. 2001;115(4):261-4.
23. Krishnamoorthy Y, Sarveswaran G, Sakthivel M. Prevalence of hypertension among professional drivers: Evidence from 2000 to 2017—A systematic review and meta-analysis. *Journal of postgraduate medicine*. 2020;66(2):81.
24. Nimi BM, Bompeka FL, Mbenza BL, Vangu RV, Longo G. Prevalence of Undiagnosed Hypertension among the Hypertensives Living in the City of Boma. Republic Democratic Republic of the Congo.
25. Pushpa K, Kanchana R. Comparison of waist-hip ratio, prehypertension, and hypertension in young male bus drivers and non-drivers of Bengaluru city. *National Journal of Physiology, Pharmacy and Pharmacology*. 2019;9(1):90-4.
26. Akinremi A. A Survey of Undiagnosed Hypertension among Market Traders in Suva, Fiji Islands. *African Journal of Biomedical Research*. 2020;23(2):193-7.
27. Mbakwem AC, Akinkunmi M, Ozoh OB, Kushimo OA, Grove TP, Wood DA, et al. Prevalence of cardiometabolic risk factors among professional male long-distance bus drivers in Lagos, south-west Nigeria: a cross-sectional study. *Cardiovascular journal of Africa*. 2018;29(2):106-14.
28. Winkleby MA, Ragland DR, Fisher JM, Syme SL. Excess risk of sickness and disease in bus drivers: a review and synthesis of epidemiological studies. *International journal of epidemiology*. 1988;17(2):255-62.
29. Miao Q, Zhang Y-L, Miao Q-F, Yang X-A, Zhang F, Yu Y-G, et al. Sudden death from ischemic heart disease while driving: cardiac pathology, clinical characteristics, and countermeasures. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*. 2021;27:e929212-1.
30. Tüchsen F, Hannerz H, Roepstorff C, Krause N. Stroke among male professional drivers in Denmark, 1994–2003. *Occupational and Environmental Medicine*. 2006;63(7):456-60.
31. van de Vijver S, Akinyi H, Oti S, Olajide A, Agyemang C, Aboderin I, et al. Status report on hypertension in Africa-Consultative review for the 6th Session of the African Union Conference of Ministers of Health on NCD's. *Pan African Medical Journal*. 2014;16(1).
32. Wachamo D, Geleta D, Woldesemayat EM. Undiagnosed Hypertension and Associated Factors Among Adults in Hawela Tula Sub-City, Hawassa, Southern Ethiopia: A Community-Based Cross-Sectional Study. *Risk Management and Healthcare Policy*. 2020;13:2169.
33. Regea F. Distribution of risks and Factors Associated with Unscreened Hypertension among Adults Living in Rural of Dano District, West Shewa, Oromia, Ethiopia, 2020: Community-based cross-sectional study. 2021.
34. organization wh. Ethiopia sets to improve hypertension prevention and control at primary health care level 2020 [cited 2021 December 12]. Available from: <https://www.afro.who.int/news/ethiopia-sets-improve-hypertension-prevention-and-control-primary-health-care-level>.

35. Anto EO, Owiredun W, Adua E, Obirikorang C, Fondjo LA, Annani-Akollor ME, et al. Prevalence and lifestyle-related risk factors of obesity and unrecognized hypertension among bus drivers in Ghana. *Heliyon*. 2020;6(1):e03147.
36. Fei K. Racial and ethnic subgroup disparities in hypertension prevalence, New York City Health and Nutrition Examination Survey, 2013–2014. *Preventing chronic disease*. 2017;14.
37. Abdelmoneim I. Hearing impairment and hypertension among long distance bus drivers. *Journal of family & community medicine*. 2003;10(3):25.
38. Hayran O, TAŞDEMİR M, Hasan Hüseyin E. Hypertension and Obesity in Male Bus Drivers. *Türkiye Klinikleri J Med Sci*. 2009;29(4):826-32.
39. Joshi AV, Hungund BR, Katti S, Mallapur M, Viveki R. Prevalence of hypertension and its socio demographic and occupational determinants among bus drivers in North Karnataka—A Cross sectional study. *Education*. 2013;50(53):14.5.
40. Lakshman A, Manikath N, Rahim A, Anilakumari V. Prevalence and risk factors of hypertension among male occupational bus drivers in North Kerala, South India: a cross-sectional study. *International Scholarly Research Notices*. 2014;2014.
41. Erhiano E, Igbokwe V, El-Khashab M, Okolo R, Awosan K. Prevalence of hypertension among commercial bus drivers in Sokoto, Sokoto State Nigeria. *Int J Med Med Sci*. 2015;2(3):34-9.
42. Hasan MM, Tasnim F, Tariqujjaman M, Ahmed S, Cleary A, Mamun A. Examining the prevalence, correlates and inequalities of undiagnosed hypertension in Nepal: a population-based cross-sectional study. *BMJ open*. 2020;10(10):e037592.
43. Hanna DR, Walker RJ, Smalls BL, Campbell JA, Dawson AZ, Egede LE. Prevalence and correlates of diagnosed and undiagnosed hypertension in the indigenous Kuna population of Panamá. *BMC public health*. 2019;19(1):1-9.
44. Jayarajah U, Jayakody AJ, Jayaneth JM, Wijeratne S. Prevalence of hypertension and its associated factors among a group of bus drivers in Colombo, Sri Lanka. *The international journal of occupational and environmental medicine*. 2017;8(1):58.
45. Dejenie M, Kerie S, Reba K. Undiagnosed hypertension and associated factors among bank workers in Bahir Dar City, Northwest, Ethiopia, 2020. A cross-sectional study. *PloS one*. 2021;16(5):e0252298.
46. Chen M-J, Zheng C-S, Jeng H-M. Taipei Bus Drivers' Attitude and Intention to Control Hypertension.
47. Brodie A, Pavey T, Newton C, Sendall MC. Australian bus drivers' modifiable and contextual risk factors for chronic disease: A workplace study. *Plos one*. 2021;16(7):e0255225.
48. Mohsen A, Hakim S. Workplace stress and its relation to cardiovascular disease risk factors among bus drivers in Egypt. *Eastern Mediterranean Health Journal*. 2019;25(12):878-86.
49. Rosso GL, Montomoli C, Candura SM. Poor weight control, alcoholic beverage consumption and sudden sleep onset at the wheel among Italian truck drivers: A preliminary pilot study. *Int J Occup Med Environ Health*. 2016;29(3):405-16.
50. Organization WH. WHO STEPS surveillance manual: the WHO STEPwise approach to chronic disease risk factor surveillance. World Health Organization, 2005 9241593830.
51. agency Es. Addis Ababa, Ethiopia Metro Area Population 1950-2021 Addis Ababa2021 [cited 2021 Nov 10]. Available from: www.macrotrends.net.
52. map g. Distance Between Addis Ababa and Surrounding Cities 2021 [cited 2021 December 5]. Available from: <https://www.distancefromto.net/city-addis-ababa-et>.

53. Greenland P, Peterson E. The new 2017 ACC/AHA guidelines “up the pressure” on diagnosis and treatment of hypertension. *Jama*. 2017;318(21):2083-4.
54. Flack JM, Adekola B. Blood pressure and the new ACC/AHA hypertension guidelines. *Trends in cardiovascular medicine*. 2020;30(3):160-4.
55. Al Faisal W, Hussein H. Hypertension: Discrepancy between Enquiry and Measurement, Understanding Blood Pressure Readings. 2018.
56. Harris T, Seid EH. 2019/20 survey of the Ethiopian tax system. IFS Report, 2021.
57. Yosef T. Prevalence and associated factors of chronic non-communicable diseases among cross-country truck drivers in Ethiopia. *BMC public health*. 2020;20(1):1-7.
58. Consultation WE. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet (London, England)*. 2004;363(9403):157-63.
59. Vincent-Onabajo GO, Adaji JO, Umeonwuka CI. Prevalence of undiagnosed hypertension among traders at a regional market in Nigeria. *Annals of Medical and Health Sciences Research*. 2017;7(2):97-101.
60. Okello S, Muhihi A, Mohamed SF, Ameh S, Ochimana C, Oluwasanu AO, et al. Hypertension prevalence, awareness, treatment, and control and predicted 10-year CVD risk: a cross-sectional study of seven communities in East and West Africa (SevenCEWA). *BMC Public Health*. 2020;20(1):1-13.
61. Vieira MC, Sperandei S, Reis A. Physical activity overcomes the effects of cumulative work time on hypertension prevalence among Brazilian taxi drivers. *The Journal of Sports Medicine and physical fitness*. 2015.
62. Husain K, Ansari RA, Ferder L. Alcohol-induced hypertension: Mechanism and prevention. *World journal of cardiology*. 2014;6(5):245.
63. Chankaramangalam MA, Ramamoorthy V, Muthuraja D, Saravanan PAE, Rajan V. Factors associated with hypertension among truck drivers: a cross sectional study at a check post on a national highway in South India. *International Journal of Medical Research & Health Sciences*. 2017;6(5):126-9.
64. Gutiérrez-Cuevas J, Santos A, Armendariz-Borunda J. Pathophysiological molecular mechanisms of obesity: A link between MAFLD and NASH with cardiovascular diseases. *International Journal of Molecular Sciences*. 2021;22(21):11629.
65. Mosca L, Linfante AH, Benjamin EJ, Berra K, Hayes SN, Walsh BW, et al. National study of physician awareness and adherence to cardiovascular disease prevention guidelines. *Circulation*. 2005;111(4):499-510.
66. Young DR, Hivert M-F, Alhassan S, Camhi SM, Ferguson JF, Katzmarzyk PT, et al. Sedentary behavior and cardiovascular morbidity and mortality: a science advisory from the American Heart Association. *Circulation*. 2016;134(13):e262-e79.