ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

POSTGRADUATE PROGRAM

PREVALENCE OF HYPERTENSION, BLOOD PRESSURE CONTROL PRACTICE AND ITS DETERMINANTS AMONG HEALTHCARE PROFESSIONALS AT TIKUR ANBESA SPECIALIZED HOSPITAL

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A THESIS SUBMITTED TO SCHOOL OF GRADUATE STUDIES OF Addis Ababa UNIVERSITY, COLLEGE OF HEALTH, SCHOOL OF NURSING AND MIDWIFERY, DEPARTMENT OF NURSING IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR DEGREE OF MASTERS IN ADULT HEALTH NURSING.

June /2020

Addis Ababa, Ethiopia

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A thesis submitted to School of Graduate Studies of Addis Ababa University, College of Health, School of Nursing and Midwifery, Department of Nursing in partial fulfillment of the requirements for the Degree of Masters in Adult Health Nursing.

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Declaration

I hereby declare that the work embodied in this thesis was carried out by me (Meseret Ageghehu Demeke) under the direct supervision of Dr Amsale Cherie and S/r Emebet Birhane at Department of nursing, school of Nursing and Midwifery, Addis Ababa University. This is my original work and not been submitted in part or full to any other University or Institute for award of any degree.

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This Thesis prepared by Meseret Agegnehu Demeke is accepted in its present form by the board of examiners as satisfying the thesis requirement for the degree of masters in **Adult Health Nursing.**

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ACRONYMS AND ABBREVIATIONS

AoR	Adjusted Odds ratio
BP	Blood Pressure
CoR	Crude Odds Ratio
CVD	Cardiovascular Disease/disorder
DBP	Diastolic Blood Pressure
FH	Family History
HCP	Health Care Professional
PSS-4	Perceived Stress scale 4
SBP	Systolic Blood Pressure
SD	Standard Deviation
TASH	Tikur Anbesa Specialized Hospital

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ABSTRACT

Background: Hypertension prevalence is increasing in Ethiopia at an alarming rate (> 30%). More importantly, healthcare professionals (HCPs) are often busy with a huge patient burden and they do not check their BP on a regular base and there is no study on hypertension prevalence among HCPs in Ethiopia. **Objective:** this study aimed to determine the prevalence of hypertension among HCPs and identify potential associated factors. Method: This study was conducted at Tikur Anbesa specialized hospital. **Methods:** a cross-sectional study conducted among HCPs that selected using simple random sampling. Data collected with self-administered questioners. To assess potential determinants for having hypertension binary logistic regression was used and statistical significant was declared at P-value of less than 0.05. **Result:** a total of 332 HCPs participated in this study. The mean age of the participants has fall on mean (SD) 32(8). Most of the study participants were nurses 164 (50%) followed by physician 102 (32%). Over half of them were females 191 (58%) and married 173 (52). Of the 332 HCPs, 89% knew their BP measure. From these who knew their BP, 142 (48%) had uncontrolled. On multivariate logistic regression analysis, age was statistically significant (AoR 1.14 at 95CI [1.04, 1.24]). A one year increased in age may increase the likelihood of having uncontrolled BP. **Conclusion:** a high proportion of HCPs had uncontrolled BP. Only half of the HCPs knew the exact date when their BP was measured. Nearly two-thirds of HCPs check their BP only once a year, once in two years, or do not have a regular BP checking schedule. In this study age and longer time service in HCPs were identified as important risk factor and require intervention such as awareness creation regarding the new BP target (≥ 130/80).

Key Words: Hypertension, Blood Pressure, Healthcare professionals

CHAPTER 1: INTRODUCTION

1.1. Background

According to WHO report, an estimated 1.13 billion people worldwide have hypertension, most (two-thirds) living in low- and middle-income countries (1). Overall hypertension prevalence ranges from 25% to 46% and the highest (46%) was reported in Africa (2). The prevalence in Ethiopia is reported to be up to 30% (3–5).

Globally hypertension prevalence on healthcare professionals (HCPs) was in range 20 to 32% and HCPS awareness on hypertension was in the range of 85 to 67% (6). BP control practice among HCPs was also reported wide globally: 0.81% of nurses in China and 79% in Australia nurses (6). In Africa, the prevalence of HCPs was reported to between 17.5 to 37.5% (7). In West Africa, HCPs awareness was reported to be 65.84% of hospital workers and 75% of medical doctors (7).

HCPs are very crucial for providing healthcare services. However, there is a shortage of HCPs particularly in developing countries (8,9). This is partly due to aging, prevalence of a chronic disease among HCPs (10). In developing countries, there is epidemiologic transition and lifestyle change and that resulted in healthcare-seeking behavior of the society (5). As a result, this causes huge burden and work stress on the available limited number of HCPs working in developing countries (8,9). In Ethiopia, population size is increasing and also public awareness on healthcare-seeking has increased drastically. However, the number of HCPs to population size is still at one to 10, 000 ratio (11) against WHO recommendation (23 for 10, 0000) . This is expected to cause huge patient burden on HCPs and work stress that may result in hypertension. The problem is pronounced on tertiary hospitals including Tikur Anbesa Specialized Hospital (TASH). TASH provides a number of unique clinical services for all Ethiopian populations. However, there is no single study conducted on prevalence of hypertension on HCPs in Ethiopia. Therefore, this study aims to investigate prevalence of hypertension, BP control practice, and its determinant among HCPs working at TASH.

1.2. Statement of the problem

Nearly 33% of annual global mortality rate occurs due to cardiovascular disease where hypertension complication accounts for 18.4% of death and developing countries carry the major burden (5). Almost 75% of people with hypertension live in developing countries (7). According to WHO, 80% of cardiovascular disease-related deaths are reported from low- and middle-income countries, and African countries have the highest death rate (4). In the same report it was indicated that prevalence of hypertension in adults was highest in the African region (46%) compared with other regions in the world (4). Prevalence of hypertension is predicted to grow by 60% by 2025 (2). Nearly 33% of annual global mortality rate occurs due to cardiovascular disease where hypertension complication accounts for 18.4% of death and developing countries carry the major burden (4). Almost 75% of people with hypertension live in developing countries (2). Prevalence of hypertension in Ethiopia is estimated to be up to 30 % and the magnitude of BP control practice is reported to be ranging from 20 to 40% among patients who know their BP status and are on medication (5,12,13).

Several reasons attributed for the highest prevalence of hypertension in Africa including Ethiopia. The first reason is the African genetic makeup. African population has high vascular contractility and extreme salt sensitivity, and that makes them vulnerable to develop hypertension (14). Moreover, environmental factors including urbanization and lifestyle change associated with economic development have shown significant epidemiological transition such as hypertension in the African region. On the other hand, there are number of factors related to poor treatment practice. In most cases, hypertension is initially asymptomatic and this delays early prevention, diagnosis, and treatment. After starting treatment of antihypertensive medications, patients may not experience immediate benefits of antihypertensive treatment but may be affected by side effects of medication. This is expected to have a negative impact on treatment outcomes (5).

HCPs have number of factors that make them at risk of developing hypertension. Some of the factors are night shift work, carrying patient suffering, high patient load, and job strain related sedentary lifestyle. There are few studies on prevalence of hypertension on HCPs that range

from 17 to 37.5% with poor BP control practice (7,15) and most of them were conducted on nurses on developed countries.

There is no study on prevalence and /or intervention of hypertension on healthcare professionals in Ethiopia. Therefore, the primary aim of this study is to determine prevalence of hypertension among healthcare professionals working at Tikur Anbesa Specialized Hospital and the secondary objective is to determine potential associated factors with a level of blood pressure (Controlled or uncontrolled).

1.3. Significance of the study

HCPs are the core components of healthcare service in Ethiopia, and they are expected to have a better understanding of diseases and their management; however, huge patient burden and perception towards blood pressure monitoring may affect their blood pressure controlling practice. Knowing the prevalence of hypertension, blood pressure control practice and determinants will help to understand the magnitude of the problem and help policymakers to design interventional strategies. This is the first type of study in its kind to estimate prevalence of hypertension and BP control practice in Ethiopia in particularly at Tikur Anbesa Specialized Hospital. The finding will help the hospital and by large to the Federal Ministry of Health to give due attention to the wellbeing of healthcare professionals. More specifically, the finding will help the hospital and policymakers to design interventional strategies to improve healthcare professionals' self BP monitoring practice on a regular base.

CHAPTER 2: LITERATURE REVIEW

2.1. Hypertension overview

Hypertension is a major global public health challenge. It has a great role in pathogens and the burden of other cardiovascular diseases including kidney failure, stroke, and heart disease, and that is associated with premature mortality and disability (4,16). Because of weak healthcare systems, hypertension affects populations mainly in low- and middle-income countries (4,16,17). On the early stage, hypertension is usually asymptomatic and left undetected in particular in society with low healthcare access and limited awareness (4). Even those who know their BP may not have appropriate health care access to treatment and may not be able to control their illness over the long term.

There are two major types of hypertension namely primary (essential) hypertension and secondary hypertension. More than 90% of hypertension cases are the primary type without specific cause (idiopathic nature) (17). Some of the possible factors that cause primary hypertension could be genetic, environmental, diet, or combined effects. However, it is very difficult to know the exact cause as the name idiopathic indicates. Secondary hypertension accounts for about 10-15% of cases with a known defined cause or risk factor. Comorbid illness including cardiac or renal diseases may increase blood pressure persistently. Some drugs such as adrenaline can increase BP if used for long time. Lifestyle such as high salt intake, stressful life, regular alcohol intake, regular fatty meal are some of the risk factors for secondary hypertension. When poor lifestyle combined with other un unknown factors then it becomes primary hypertension (18).

Low and middle-income countries including Ethiopia have recently shown significant change to provide healthcare access and awareness for the society. This causes an increase in the healthcare-seeking behavior of society. However, the increased healthcare-seeking behavior of the society together with the increasing population growth is not balanced with number of HCPs available (19). In Africa including Ethiopia, proportion healthcare professional to population size is more than 10, 000. For example, one physician serves more than 10, 000 patients (9).

2.2. Hypertension prevalence on healthcare professionals

A study in China on 92 815 registered nurses from 512 medical institutions in 13 cities reported 29% (n = 26875) nursing staff were diagnosed as having hypertension (6). A report from Australia with 5,041 study participants, 89.4% provided their current blood pressure (10). In this study, 1009 respondents classified as hypertensive because either they reported diagnosis of hypertension (17.1%, n = 867) or they were not hypertensive but reported ayo high blood pressure (2.6%, n = 133).According to a study in the United State of America, nurses (*n* = 1,345) were found to have lower prevalence of hypertension (17%) than in similar age cohorts of the general population (20).

A study in seven French university hospitals that involves 3837 hospital nurses (2307) and 1530 nursing assistants reported high systolic and diastolic BP significantly more frequently in nursing assistants than in nurses (21). However, in this study, there was no report with the the proportion of study participants who had hypertension. Mean SBP/DBP of nurses was reported to be 110.9/74.3, and for nurse assistant, it was 112.2/75.2 (21). A study in Spain involved 930,404 workers of which 3688 were HCPs (2200 nurses and 1448 physicians) reported no significant difference in prevalence of hypertension between the general population and HCPs (22). However, the study did not provide prevalence of hypertension in the absolute number or percentage. According to a multicenter Japan Medical School cohort study, prevalence of hypertension was 25.1% (n=790) for men and 18.6% (n=631) for women.

A systematic review in West Africa on prevalence, awareness, and control of hypertension among workers including healthcare professionals included 45 articles and five were on HCPs (7).In this review, overall hypertension prevalence was reported in the ranges of 12.9% to 37.5%. According to this review, prevalence of hypertension on HCPs was reported to be 17.5 to 37.5% (7). A study in Nigeria about hypertension prevalence and awareness on 324 health workforce reported 20.1% hypertension prevalence. In this study, a third of the health workers were, however, unaware of their hypertensive status (8). However, there is no such kind of study conducted in Ethiopia.

2.3. Healthcare professionals' awareness of hypertension

Globally, the major challenge for better BP control practice is lack of awareness of the the general population (4). There are also reports showing HCPs lack of sufficient knowledge of hypertension and control practice. A multicenter study from Pakistan on 475 medical students and junior doctors reported that only 127 (26.74%) participants had the basic definitions of hypertension including the cut-off levels for BP among the general population, in diabetics, in those with chronic kidney disease and pre-hypertension (23). Of the same study, only 40 (8.42%) participants correctly responded to drug selection questions for different types of hypertensive patients. From the study conducted in China on 92 815 registered nurses from 512 medical institutions in 13 cities, awareness about hypertension was 13.50% and BP control practice rate was 0.81% (6). The study from Australia reported most of the study participants (n = 4,508; 89.4%) were aware of blood pressure at the time of the study (10).

From the systematic review conducted in West Africa, the overall level of awareness on 45 articles was 20 to 84% and HCPs' level of awareness was reported to be the highest: 65.84% of hospital workers and 75% of medical doctors (7). A qualitative study on primary health care workers (n=31) and clients (n=30) in Nigeria reported that most HCPs describe hypertension in terms of biomedical definitions of the disease (24).

2.4. Healthcare professionals' blood pressure control practice

According to a recent WHO report, only one in five people with hypertension has controlled blood pressure (1). HCPs play a crucial role to have controlled BP; however, there is limited literature on blood pressure control practice among HCPs themselves. From the study conducted in China on 92 815 registered nurses, BP control practice was 0.81% (6). The study from Australia reported, 675 study participants diagnosed with hypertension and receiving treatment, 144 (21.3%) reported an uncontrolled blood pressure (≥140/90 mmHg) (10). On similar study, significant determinant to have uncontrolled BP were being smokers (OR 0.26, 95% CI 0.14, 0.48), worked in metropolitan area (versus all other areas) (OR 0.55, 95% CI 0.34, 0.90) or were aged 45 to 54 years (OR 0.46, 95% CI 0.28, 0.76) (10). According to this study mid-life nurses and smokers diagnosed with hypertension are at a significant risk of suboptimal treatment with antihypertensive medication and require targeted interventions.

From the systematic review conducted in West Africa, hypertensive HCPs were reported to be on medication (79%) than the general population (7).

2.5. Hypertension risk factors for healthcare professionals

HCPs are reported to have number of challenges in their working condition that are considered to be major risk factors for cardiovascular disorders including hypertension (7,22)

The first one is sociodemographic factors including age, sex, marital status, body mass index, comorbid illness such as DM, life style (alcohol intake, smoking, exercise) and family history with hypertension (5). These risk factors that may cause hypertension in the general population are also to have a similar effect on HCPs (4,5). This was illustrated in a study in the United State of America. Nurses (*n*=1,345), age was reported to be significant determinant of hypertension prevalence: younger nurses had lower prevalence of hypertension, (25,26). From the study in Australia with 5,041 study participants, respondents were more likely to report their BP if being female (OR 1.69, 95% CI 1.30, 2.2), had a higher BMI (OR 1.02, 95% CI 1.00, 1.04), were in older aged groups: 45–54 years (OR 1.79, 95% CI 1.43, 2.25) or 55–64 years (OR 1.79, 95% CI 1.44, 2.24), whereas smokers were less likely to report their blood pressure (OR 0.68, 95% CI .52, .90) (10). In a multi-center community-based Jichi Medical

The second factors are professional related factors including type of profession, and service years. Most HCPs studies were on nurses; however, it is expected to have variation on level of BP among HCPs (6,10,15). The HCPs related factors also includes patient load per day night shift (7,11). Another important factors are work area or life stress, awareness of BP level and frequency of BP checking practice and shift work has also shown a significant role for prevalence of hypertension (6,20).

CONCEPTUAL FRAME WORK

Workload and work related stress among HCPs are reported common risk factors for hypertension (22). The sociodemographic characteristics (example age, and gender) are also reported risk factors. Older age and being female are reported risk factors to develop hypertension (22,27). Level of awareness and BP control practice of HCPs are also other important factors that are related with hypertension (4,5).

- Stress

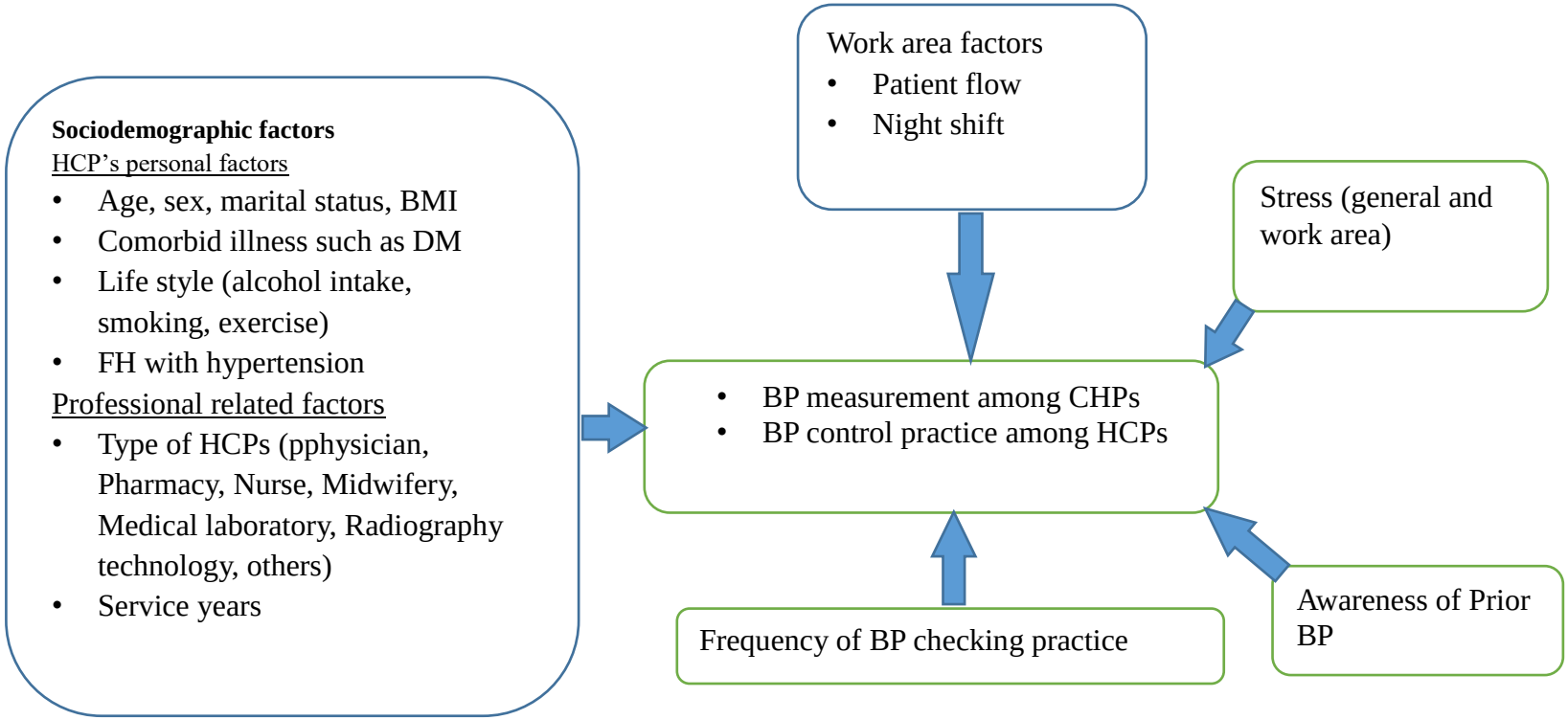

Figure 1: Diagrammatic presentation of a conceptual framework for a study on prevalence hypertension and BP control practice among HCPs working at TASH, 2020

2.6. Justification of the study

In developing countries including Ethiopia, there is extreme shortage of healthcare facilities and professionals. In Ethiopia, there are only 248 functional hospitals for more than 100 million population (11). More importantly and worrisome the number of specialized hospitals, not more than 10 in Ethiopia(11). Tikur Anbesa Specialized Hospital (TASH) is one typical example that is often crowed by huge volume of patients serving Ethiopian population with several unique services that are not available in other hospitals in the country. Most of the time HCPs at TASH have stressful working conditions with huge number of patients flow. Within this condition, HCPs working at hospitals may not check their BP on regular base due to their work nature and asymptomatic nature of hypertension. Therefore, this study is the first to explore prevalence of hypertension, BP control practice, and determinants among HCPs. Knowing prevalence of hypertension, BP control practice and determinants will help to understand magnitude of the problem on HCPs for TASH and Ethiopian ministry of health, to give due attention for well-being of HCPs, and useful to design interventional strategies to improve HCPs' self BP monitoring practice on a regular base. The finding of this study can help to design follow up study for an in-depth understanding of hypertension on HCPs.

CHAPTER 3: OBJECTIVE

3.1. General objective

To assess prevalence of hypertension, BP control practice and its determinants among healthcare professionals working at Tikur Anbesa Specialized hospital

3.2. Specific objectives

3.2.1. Assess the prevalence of hypertension among healthcare professionals working at Tikur Anbesa Specialized hospital

3.2.2. Determine the blood pressure control practice among healthcare professionals working at Tikur Anbesa Specialized hospital

3.2.3. To identify the association between risk factors and elevated blood pressure among healthcare professionals working at Tikur Anbesa Specialized hospital

CHAPTER 4: METHODS AND MATERIALS

4.1. Study area and period

Tikur Anbesa Specialized hospital (TASH) is located in Addis Ababa, the capital city of Ethiopia. Addis Ababa population is estimated to be 3,515,679 (11). The city has total of 19,782 HCPs: physicians (n= 3,567), nurses (n= 9,249), pharmacy (n= 2,069), midwifery (n= 1,708), medical laboratory (n= 1,509), and health officers (n= 1,680). TASH has 650 beds and according to TASH human resource, currently, 1673 HCPs are working at the hospital providing clinical service and 474 of them are also academics. The highest number of HCPs working at the hospital are nurses (n=854) followed by physicians (n=474). The remaining healthcare professionals are pharmacists (n= 85), Medical Laboratory (n=63), Midwifery (n=69), anesthesia (n=39), physiotherapy (n=14), radiography technology (n=20), and others including biomedical engineers, environmental health (n=21).

The study was conducted May 04-27/2020.

4.2. Study design

Institution-based cross-sectional study was used.

4.3. Source and study population

HCPs working at TASH were the source population of the study. The study population was selected healthcare professionals (physicians, nurses, pharmacists, midwiferies, medical laboratory professionals, radiography technologists, and others) who were providing clinical services at Tikur Anbesa Specialized hospital during the data collection period.

4.4. Inclusion and exclusion criteria

4.4.1 Inclusion criteria

- Healthcare professionals employed at Tikur Anbesa specialized hospital for more than six months who provide clinical service

4.4.2 Exclusion criteria

- Students including interns, residents, and MSc students
- Healthcare professionals employed at Tikur Anbesa specialized hospital for less than six months.
- Those not willing to participate in the study
- Adminstration and other staff who were not healthcare professionals (example archive staff)
- Academics staff not who are not involved in clinical services

This study excluded academic staff not involved in clinical service for number of reasons. First, most of the available limited literature were on clinical service providing HCPs, secondly; academics staff are expected to have less patient load even though involved in teaching clinical attachment courses. In addition, this is the first study and can be used as baseline to study BP level of academic staff not involved in clinical service.

4.5. Sample size and sampling technique

4.5.1. Sample size

The sample size was calculated using the single population proportion formula

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

Where: n=Sample size

Z= standard normal value at the level of confidence which at 95% confidence level is 1.96

P= prevalence of hypertension among healthcare professionals

d= margin of error (0.05)

As there is no study conduct on prevalence of hypertension in Ethiopia, prevalence of hypertension among HCPs at TASH was taken at 50%. Accordingly, the calculated sample size was found to be 384. As the study population was defined and less than 10, 000, correction formula is used for the actual sample size

True Sample = (Sample Size X Population) / (Sample Size + Population – 1)

The final sample size to be used= (384x1673)/ (384+1673-1) = 313

With a10% contingency the final sample size (313), total sample size was calculated to be 344.

4.5.2. Sampling technique

TASH is selected for this study by purposive sampling technique as it provides number of unique clinical services in Ethiopia. Systematic random sampling technique will be used for selecting study participants. Study participant size were allocated to different sites (ward and OPDs) proportional with a total number of healthcare professionals at each ward and OPD (also presented on the table below).

Table 1: Type and number of HCPs working at TASH, and proportional number to be used for this study

SN	Type of HCPs working at TASH	The actual number of study population	Proportional distribution
1	Nurses	854	176
2	Physician	474	98
3	Pharmacists	85	17
4	Medical Laboratory	63	13
5	Midwifery	69	14
6	Anesthesia	39	8
7	Physiotherapy	14	3
8	Radiography technology	39	8
9	Others	36	7
	Total	**1673**	**344**

The ‘other’ category are biomedical engineers, environmental health. Calculation: Total number needed for this study divided by total Healthcare professionals working at TASH (344/1672 = 0.2056= 20.56%). For each profession type number of participants was calculated as 0.2056 x total number of specific healthcare professional. Example for nurses 0.2056 x854 = 176 nurses working at TASH to be included in this study.

4.6. Study variables

4.6.1. Independent variables

- Sociodemographic characteristics
  - General: age, sex, marital status
  - Profession related: type of profession and level of academic degree, length of service years, average number of patients seen pet day for a healthcare professional, night shift work, work stress
  - Lifestyle related factors (smoking status. drinking status, regular exercise. Stressful life)
- Hypertension related: knowledge on their recent level of BP, frequency of BP checking practice, family history of hypertension, co-morbid condition
- Taking medication (yes/no) for hypertension, comorbid illness and medication used

4.6.2. Outcome measures (dependent variable)

This study had one outcomes (dependent) variables:

It was defined as having uncontrolled BP (Yes/No). Uncontrolled BP was defined as BP (SBP/DBP) ≥ 130/80. The BP measure taken as claimed by study participants.

4.7. Operational definition

- Uncontrolled BP: when SBP is ≥ 130 and/or DBP ≥80. i.e. if either of them or both are above the defined target.

	Systolic BP		**Diastolic BP**
Hypertensive case	≥ 130	OR	≥ 80
Non-hypertensive case	< 130	AND	< 80

4.8. Data collection tool

A data abstraction format was used to record the necessary information from study participants. The data collection tool was modified from other studies conducted on general population and also HCPs (4,5,37).

The tool has four sections with 25 questions (annex C)

Section I: Socio-demographic variables (general) with 10 questions

Section II: Socio demographic variables (specific to HCPs related variables): eight questions

Section III: Hypertension related variables: seven questions

Section IV: Perceived Stress scale with four items (28)

Data collection technique

Data collectors were two BSc nurses. Principal investigator designed and gave a one day training for data collectors on how to facilitate self-administered questionnaires. To avoid bias, data collector nurses were assigned to clinical site where they have not been working within the last six months. Study participants were selected by systematic random sampling method and approached for consent at their working site. Those who give consent were asked to fill self-administered questionnaires (section I to IV) which took them up to 10 minutes.

4.9. Data quality control

To ensure the quality of data, pretest was conducted on 10% of the total sample which is on 34 randomly selected HCPs at Zewuditu General Hospital. The purpose of the pretest was to validate the data collection tool. The principal investigator made frequent checks on the data collection process to ensure the completeness and consistency of the collected data. All collected data were examined for completeness and consistency during data management, storage, and analysis.

4.10.Data entry and analysis

The data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 24.0. Descriptive statistics including frequency, mean and standard deviation was used to summarize the finding. Hypertension was defined as BP (SBP/DBP) ≥ 130/80 (main analysis) and BP (SBP/DBP) ≥ 140/90 as secondary analysis. Logistic regression was used to analyze the associations between different variables with being hypertensive (yes/no) by using crude odds ratio (COR) and adjusted odds ratio (AOR) at 95% confidence level. Variables with P-value less than 0.2 binary logistic regression (CoR) were included to multivariate logistic regression (AoR). A p-value of less than 0.05 was considered statistically significant.

4.11.Ethical consideration

Ethical clearance was obtained from the ethics review committee of Addis Ababa University, College of Health Sciences, School of Nursing and Midwifery. Permission was secured from Tikur Anbesa Specialized hospital medical director office and then to each unit in the hospital. The study participants were informed about the purpose of the study, anticipated benefits, how they were chosen to the study, data collection procedures and their full right to refuse, withdraw or completely reject part or all of the study. Participant information were kept confidential. Participant information was coded during data collection and entry for analysis.

4.12.Dissemination of the result

Findings from this study will be delivered to the studied area TASH and also it will be presented at scientific conferences. Manuscript will be prepared and ppublication will be attempted in peer reviewed national and international reputable journals .

CHAPTER 5: RESULTS

A total of 344 participants involved in the study and 332 respond to the questionnaire with the response rate of (96.5%).

Socio demographic characteristics (general)

The mean (SD) age of study participants was 32(8) years. Most of the study participants were females 191(58%). More than half, 173(52%) are married and the remaining includes being single (n=152), divorced (n=05) or widowed (n=02). Almost all 311(95%) of the HCPs reported for never smoking cigarettes in life and very few (n=4) are currently active smokers. Similarly, four HCPs reported they consume alcohol on a regular base and the rest 96% reported they never use alcohol or consume alcohol occasionally. Only 14% (n=46) of study participants have a regular exercise practice. The rest reported 47 (14%) never do exercise and 232 (71%) reported to practice exercise sometimes or rarely, Table 2. Nearly one-third of HCPs 105 (37%) reported having family history with hypertension and some of the HCPs 45(14%) reported to have family history with other cardiovascular disorders.

Socio demographic characteristics specific to HCPs

Almost half 164(49%) of study participants were nurses, and physicians accounted for nearly one-third of 102 (31%) the total sample size, Table 2. The majority of HCPs 257 (78%) were first degree holders. Of these, 55 out of 257 were residents. Averagely, each HCPs has eight years of service and consult 30 patients per day. Nearly three-fourth 242 (73%) of HCPs had night shift and two-third 210 (63%) had reported having stress at work (Table 2).

Table 2: Study participant (HCPs) characteristics at TASH, 2020

Characteristics	Value
Socio-demographic variables (general)	
Age (mean, SD) year	32 (8)
Gender (n, %)	332 (100)
Female	191 (58)
Male	141 (42)
Marital status (n, %)	332 (100)
Single, divorced or widowed	159 (48)
Married	173 (52)
Smoking history (n, %)	328 (100)
Never smoke	311 (95)
Ex-smoking	13 (4)
Current smoker	4 (1)
Alcohol intake (n, %)	332 (100)
Regularly	12 (4)
Rarely/sometimes	155 (46)
Never	165 (50)
Exercise (n, %)	325 (100)
Regularly	46 (14)
Rarely/sometimes	232 (71)
Never	47 (14)

Socio demographic variables (Profession related variables)	
Profession type (n, %)	332 (100)
Nurse	164 (49)
Physician	102 (31)
Pharmacy	17 (5)
Midwifery	17 (5)
Medical laboratory	11 (3)
Radiography technology	8 (2)
Anesthesia	7 (2)
Physiotherapy	3 (1)
Biomedical Engineer and Health informatics	3 (1)
Academic degree (n, %)	332 (100)
(Sub)specialist	27 (8)
Residents	55 (17)
GP	21 (6)
MSc	27 (8)
Bsc	202 (61)
Service y**ears** as HCPs (mean, SD)	8 (8)
Number of patients load per day (mean, SD)	30 (35)
HCPs with nightshift work (n, %)	242 (73)
HCPs with stress (n, %)	210 (63)

HCPs available BP measures were included in the ‘’BP control’’ column; therefore, numbers may sometimes be less than from the ‘’overall’’ column table 1. Percentages are calculated per row.

The sum for each variable may not add up to 332 because of missing (non-response) at each specific variable.

Hypertension prevalence and related variables

From 332 study participants, 38 (11%) HCPs did not know their blood pressure because they never checked their BP or do not have regular BP checking practice and could not remember it. Therefore, 294 (89%) HCPs reported their BP measure. From these who were able to remember their recent BP, only 168 (56%) were able to remember the specific date of when their recent BP level was measured. Regarding regular BP checking practice, 64 (21%) have regular BP checking practice at least monthly, and 53 (17%) at least every six months. The remaining HCPs reported checking their BP yearly even over a year, and do not have regular BP checking practice (Table 3).

According to the new definition of hypertension (SBP/DBP≥ 130/80), 142 (48%) of HCPs were hypertensive with uncontrolled BP (Fig 2). The group with controlled BP 152 (52%) had mean (SD) Systolic BP of 107 (9) and diastolic BP of 67 (8). While the 142 (48%) with uncontrolled had mean systolic (SD) BP of 123 (11) and mean diastolic BP of 83 (6). As most of HCPs related studies used the old BP target (≥140/90), we calculated proportion HCPs with uncontrolled BP with this target for comparison purpose. Accordingly, 46 (14%) HCPs in this study had uncontrolled BP with high BP target.

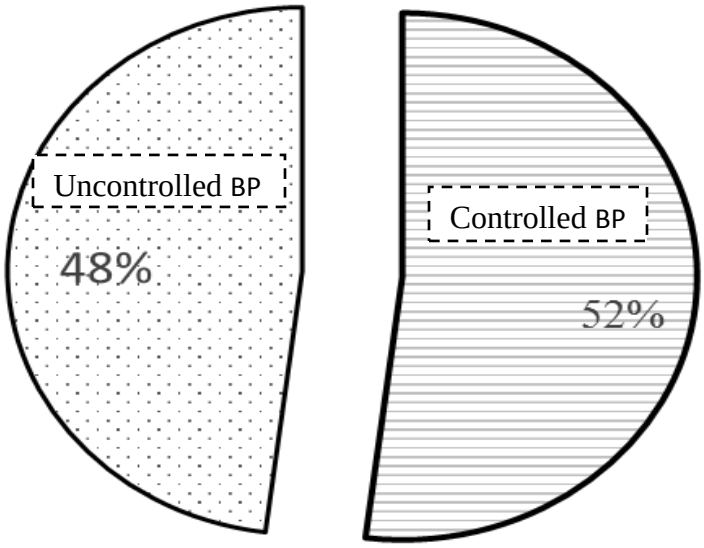

Figure 2: BP status of HCPs (n=294) with BP targets of ≥ 130/80 at TASH 2020

Of all HCPs in this study, very few reported to have other cardiovascular disorders (n=18) or other illness (n=19). Among these who reported having other cardiovascular disorders (n=18), 12 of them specifically mention the type of illness they have including eight for having type II DM, two with kidney problems and the other two cardiac cases. There was no HCP mentioning any medication for hypertension and only two participants mention for use of aspirin and warfarin for their cardiac illness, Table 3.

Table 3: HCPs blood pressure related variables and stress score at TASH 2020 (n=332)

Characteristics	Value
Hypertension related variables	
HCPs knew their BP (Yes/No) (n, %)	332 (100)
Yes	294 (89)
No	38 (11)
BP measure	
Systolic BP (mean, SD)	115 (12)
Diastolic BP (mean, SD)	75 (11)
Uncontrolled BP (SBP/DBP ≥130/80) (n, %)	142 (48)
Controlled BP (SBP/DBP <130/80) (n, %)	152 (52)
HCPs mentioned specific date when the recent BP was measured;	300 (100)
Yes	168 (56)
No	132 (44)
Regular BP checking practice (n, %)	307 (100)
At least monthly	64 (21)
At least every six months	53 (17)
Yearly/above/do not have regular schedule/ never check	190 (62)
Family history with hypertension (n, %)	332 (100)
Yes	105 (32)
No	227 (68)
Family history with other CVDs (n, %)	332 (100)
Yes	45 (14)
No	287 (86)
Having other CVDs (n, %)	332 (100)
Yes	18 (5)
No	314 (95)
Having other illness (n, %)	332 (100)
Yes	19 (6)
No	313 (94)

Characteristics	Value
Perceived Stress Scale 4 (mean, SD)	
Item 1: Unable to control important things in life	1.6 (1.1)
Item 2: Confident about your ability to handle personal problems	2.5 (1.2)
Item 3: Feeling that things were going your way	2.2 (1.1)
Item 4: Difficulties piling up so high and could not overcome them	1.5 (1.1)
PSS4-overall average score	7.8 (3.0)

The sum for each variable may not add up to 332 because of missing (non-response) at each specific variable.

HCPs perceived stress score

Regarding the HCPs perceived stress using the 4-item perceives stress scale, the overall mean (SD) stress in this study indicate 7.8 (3.0). The highest perceived stress score was on item number two 2.5 (1.2) that was about stress related with personal confidence to handle problems. The lowest stress score was for item number four 1.5 (1.1) that was about, difficulties piling up so high and could not overcome them, Table 3.

Factors associated with uncontrolled BP (hypertension)

On **multivariate logistic regression analysis**, taking controlled BP as reference age (adjusted Odd Ratio, AoR 1.14 at 95% CI [1.04, 1.24]) was the only statistically significantly associated factor for being hypertensive (having uncontrolled BP), Table 4. A one-year increase in age may increase the likelihood of having uncontrolled BP by 14%.

Table 4: Determinants of uncontrolled BP on HCPs working at TASH, 2020

Independent variables		Uncontrolled BP		Binary logistic Regression		
		Yes	**No**	**CoR (95%CI)**	**AoR (95%CI)**	**P-value**
Age (mean, SD)		34 (9)	30 (6)	**1.12 [1.08, 1.16]**	**1.14 [1.04, 1.24]**	**0.01**
Gender	Male	77 (46)	90 (54)	Reference		
	Female	65 (51)	62 (49)	0.82 [0.51, 1.30]		
Marital status	Married	80 (49)	82 (51)	Reference		
	Unmarried	62 (47)	70 (53)	0.91 [0.57, 1.44]		
Smoking history	Never smoke	131 (48)	145 (53)	Reference		
	Current /Ex-smoker	8 (57)	6 (43)	1.48 [0.50, 4.34]		
Alcohol intake	Regularly	79 (52)	72 (48)	Reference		
	Never/ rarely/sometimes	63 (44)	80 (56)	**0.72 [0.45, 1.14]**	0.72 [0.43, 1.23]	0.23
Exercise (n, %)	Regularly	22 (51)	21 (49)	Reference		
	Never/ rarely/sometimes	115 (47)	130 (53)	1.81 [0.62, 2.27]		
Family history with hypertension (n, %)	No	96 (49)	100 (51)	Reference		
	Yes	46 (49)	52 (51)	0.92 [0.57, 1.50]		
Family history with other CVDs	No	123 (49)	130 (51)	Reference		
	Yes	19 (46)	22 (54)	0.91 [0.47, 1.77]		
	No	103 (51)	98 (49)	**Reference**		

Independent variables		Uncontrolled BP		Binary logistic Regression		
		Yes	**No**	**CoR (95%CI)**	**AoR (95%CI)**	**P-value**
Physician (n, %)	Yes	39 (42)	54 (58)	**0.69 [0.42, 1.13]**	1.35 [0,72, 2.52]	0.35
	No	71 (49)	74 51)	Reference		
Nurse (n, %)	Yes	71 (47)	79 (53)	0.92 [0.59, 1.46]		
Other HCPs (n, %)	No	110 (45)	133 (55)	Reference		
(Not physician or nurses)	Yes	32 (63)	19 (37)	**2.04 [1.09, 3.79]**	2.15 [1.00, 4.58]	0.05
Service y**rs** as HCPs (mean, SD)		10 (10)	6 (6)	**1.07 [1.03, 1.10]**	0.94 [0.87, 1.03]	0.19
Number of patients per days		33 (44)	25 (24)	**1,01 [1.00, 1.02]**	1.01 [1.00, 1.02]	0.14
Current BP measured within two weeks	No	41 (45)	51 (55)	Reference		
	Yes	37 (49)	38 (51)	1.21 [0.66, 2.23]		
Regular BP checking practice	Yearly/above/ no	68 (43)	91 (57)	Reference		
	At least monthly	26 (56)	28 (44)	1.72 [0.96, 3.09]		
	At least every six	28 (53)	25 (47)	1.50 [0.80, 2.80]		
Perceived Stress Scale 4 (mean,		8 .0(2.9)	7.6 (3.0)	1.05 [0.97, 1.14]		

AoR; adjusted Odds ratio, CoR; Crude odd ratio

ORs in **bold** are these less than 0.02 and included for the multivariate logistic regression model

P-values in **bold** are these less than 0.02 and to be included for the multivariate logistic regression model

The sum for each variable may not add up to 32 because of missing (non-response) at each specific variable.

CHAPTER 6: DISCUSSION

Hypertension is an important risk factor for all cardiovascular diseases. Globally prevalence of hypertension is highest in low and middle-income countries. However, little is known about hypertension on HCPs. This study finding indicated a high proportion of HCPs (48%) had uncontrolled blood pressure with a tighter BP target (SBP/DBP<130/80). Most of the study participants were nurses followed by physicians. Age was significantly associated with poor BP control. A one-year increase in age had high likelihood of having uncontrolled BP.

A study in Australia on 5041 HCPs used questionnaires to assess hypertension prevalence, awareness, treatment and control by medication. On this Australian study, the BP measure was taken as claimed by the study participants, and 89% of the HCPs provided their BP measure (26). In this study at TASH, 89% of HCPs were able to provide their latest BP measure that is similar with the study in Australia (26).

Prevalence of hypertension among HCPs on this Australian study was 20%; however, they used different BP target (≥140/90). For comparison, our data was checked for proportion of HCPs with uncontrolled BP at high target and accordingly there were a 14% HCPs with uncontrolled BP that is lower than reported with the Australian study. The difference in prevalence of hypertension could be explained by COVID19 pandemics. During this study data collection period, Ethiopia was under state of emergency and there were less clinical services and older age and HCPs with cardiovascular or other chronic illness were not at work.

A study in China used 2017 American College of Cardiology/American Heart Association High Blood Pressure Guideline and the 2010 Chinese Guideline for the Management of Hypertension that defined controlled BP to be <130/80 (6). On this Chinese study, participants measure their own BP and reported to a network. The prevalence of hypertension (29%) among the 92, 815 nurses in China was still lower than the finding at TASH with the tighter target (6). The difference could be explained due to the fact that HCPs awareness at TASH regarding the new BP target (controlled BP <130/80). Despite lack of studies, this study investigator observed most HCPs assumed BP 120/80 is considered as non-hypertensive state.

Studies in United State of America (20) that were conducted before the new BP target and they used BP ≥ 140/90 as uncontrolled BP. reported higher prevalence of hypertension among HCPs (17% and 32% respectively) compared to our finding (14%) with high BP target (≥140/90). This is possibly explained by the fact that COVID19 pandemics. Most HCPs participated in this study at TASH were younger with no comorbid illness.

A systematic review in West Africa conducted on prevalence, awareness, and control of hypertension reported prevalence of hypertension among HCPs ranges from 17.5 to 37.5% (7). Of all included studies on this review, only four were on HCPs and the review used high BP target (≥140/90) and the prevalence at TASH was lower (14%) than the prevalence on this systematic review. Another study conducted in Nigeria also reported 20% prevalence of hypertension among HCPs with old BP (< 140/90) target (8). The reason for low prevalence at TASH could be related with COVID19 pandemics as most study participants available at work place were younger HCPs with average age of 32 years old.

Globally, there is a move to have tighter BP control (<130/80). This idea started with The SPRINT trial suggesting that 'the lower is the better'(27,29). The SPRINT trail was a five-year prospective study with two groups of elderly; group 1 on intensive treatment and the other group with standard treatment. The trial terminated in three and half years because they achieved the objective. Then after, there was global debate what should be the BP target. And then American 2017 American College of Cardiology/American Heart Association High Blood Pressure Guideline suggested to use lower BP target (30) However, the Ethiopian Standard Treatment for hospitals still indicates the old BP target (<140/90). This could justify for very high proportion of HCPs in this study at TASH had uncontrolled BP.

Average stress score in this study at TASH was high 7.8 (SD 3.0) compared to an online survey 5.4 (SD 4.0) on European (28). The reason for difference can be explained in three ways. The first one is COVID19 related. HCPs on this study filled the PPS4 stress scale during the COVID19 pandemics that may have created panic among HCPs and they might consider the pandemic while filling the form. The other possible explanation could be study population type: on European study, general population was used and on this study at TASH only HCPs involved. The other possible reasons could be life style and quality of life difference among European study population and the HCPs at TASH. Sample size difference

could also bring the difference: the study in Europe has very large sample size sample size (n=37,451) compared to this study at TASH (n =332). Large sample size often represents true population representation.

Hypertension risk factors

Hypertension is an important risk factor for most of cardiovascular disease. On the other hand several factors are reported to have caused hypertension (22). There is established fact that aging has strong association with hypertension; however, there is reluctance or inconsistency on BP targets for the elderly (27).

In this study at TASH, age was significantly associated with poor BP control indicating that older age HCPs have high likelihood of to have elevated BP than younger HCPs (Table 4). This was in line with previous reports. According to studies in the United State of America (25,26) and China (6), hypertension was higher with old age nurses than youngster nurses.

Service year as HCPs and being other HCPs were statistically significant only with bivariate analysis. It is expected that service year and age has direct strong association and the finding on service year can be explained with age; a one-year increase in service year may increase the likelihood of having uncontrolled BP. There is no literature that compare HCPs among HCPs and it was not possible to explain the finding why other HCPs have high likelihood of having uncontrolled BP than physician and nurses.

CHAPTER 7: STRENGTH AND LIMITATION OF THE STUDY

7.1 Strength of the study

To the best of our knowledge, this is the first study of its kind in Ethiopia studying hypertensions prevalence and associated factors among HCPs. This study included 20% of HCPs working at TASH. However, there are some limitations.

7.2 Limitation of the study

The first limitation is validity of the BP measure used. The analysis was done based on BP measurements provided by study participants which may be subject to bias. Only 51 of the HCPs knew the exact date when they checked their BP. Of these (n=168) 30% had checked their BP within seven days, 45% within two weeks and 70% with a month. Therefore, the BP level used in this study may not reflect the current BP level of the study participants.

The other important limitation was that related with COVID19 pandemics. The pandemics may affect this study in two ways. The first one was that most included HCPs were young almost with no comorbid illness as older aged and these with comorbid-illness HCPs were given leave or absent of job. That is why the average age of study participant was 32 years old. Therefore, this condition might underestimate the proportion of HCPs with hypertensions. The other COVID19 possible impact was the stress score. When study participants filled the stress scale, they might also consider COVID19 pandemics.

CHAPTER 8: CONCLUSION AND RECOMMENDATION

8.1 Conclusion

Close to half of study participants had uncontrolled BP with tighter BP target. Only 50% of HCPs knew the exact date when their BP was measured. Nearly two-third of HCPs check their BP only once a year, once in two years or do not have regular BP checking schedule. Important risk factors that requires intervention were age, other HCPs and service years as HCPs.

8.2 Recommendations

Recommendations to federal ministry of health (FMoH) and Ethiopian Food and Drug Admisntrative Authority (EFDA):

Based on the main finding of this study, here recommendations that can addressed at individual, institute or national level, the national treatment guideline requires update on the new BP target. Both authorities (FMoH and EFDA) with other stakeholders should create awareness creation pancake to HCPs about the new BP target in the context they can apply it to themselves and also to patient care. The FMoH should also give due attention to long serving and aged HCPs.

Recommendations to TASH:

TASH should make awareness creation package for HCPs to use the tighter BP target to apply it for themselves. HCPs should be advised to have regular BP checking practice. This can be done by TASH such as arranging free BP measurement day for all HCPS working at the Hospital. The hospital should provide special care for HCPs who served for long time and these with predisposing factor such as family history with hypertension. There should be mechanisms to minimize perceived stress among HCPs working at TASH such as arranging entertainment days, and recruit more HCPs.

Recommendations to researchers:

For in depth understanding, it would be better to conduct a follow up study by measuring HCPs' BP.

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ANNEXES

ANNEX A: RESPONDENTS INFORMATION SHEET

Dear respondents!

Good morning/Afternoon! My name is_____. I am working as data collectors with a study conducted in Addis Ababa University, College of health science, school of Nursing and midwifery, post graduated department of adult health nursing. You are selected and included in the study as a part of the sample population to interviewer administered questionnaire designed by the researcher on ‘’Hypertension prevalence and determinants among healthcare professionals working at Tikur Anbesa specialized hospital’’. You will participate if you give me verbal consent after you have understood the following information:

Objective of the study: To assess prevalence of hypertension, BP control practice and determinants among healthcare professionals working at Tikur Anbesa Specialized hospital

Risks and benefits: The result of the study will help Tikur Anbesa Specialized hospital and Ministry of Health to unhand magnitude of the problem, give due attention for healthcare professionals' well-beingness, and design interventional strategies to improve HCPs’ self BP monitoring practice on a regular base. In this way you may get benefit from the intervention policy. There is no payment and risk or discomfort as a result of participating in this study except that you spent your time during data collection and BP measurement. If you stop/not willing to participate, it not have any relation with your assigned duty by the hospital.

Confidentiality: All information given by you will be kept strictly confidential. Any of your personal information will not register. The information obtained in this study will be coded and used only for research purposes.

Autonomy: Your participation is voluntary basis and you are not obligated to answer any question that you do not willing to respond. If you feel any discomfort with the question, it is your right not to respond and you have the right to withdraw from the study at any time you need. But your honest participation will contribute a lot to generate information to come up with important findings.

If you have any question related to this study you can contact W/r. Meseret Agegnehu Demeke using his cell phone: +251 912692508

ANNEX B: CONSENT FORM

Addis Ababa University

School of nursing and midwifery

Individual Consent Form

Hello, my name is [Data Collector`s Name]. I now collecting data for the research entitled ‘’Hypertension prevalence and determinants among healthcare professionals working at Tikur Anbesa specialized hospital’’ that conducted by Meseret Agegnehu, MSc student at AAU, CHS department of nursing. You have been chosen randomly to participate in the study. The study includes self-administered questionnaire. I want to assure you that all the information that we obtained from you will be kept in strict secret. I will not keep a record of your name or address. You have the right to stop in filling the form and also deny your BP to be measured, you may skip any questions that you do not want to answer. There are no rights or wrong answers. Your participation is voluntary and your participation would be very helpful to know the problem very well and for looking a solution. Do you have any questions?

Do you agree to participate in this study?

☐ Yes, he/she agrees to participate in the study ☐ No, He/she does not want to participate in the study

I certify that I have read the above consent procedure to the participant

Name and signature of data collector ----------

Date of consent_____

Name of study cite _____

ANNEX C: DATA COLLECTION FORMAT

Instruction:

- Please write the required information in full (do not use abbreviation) and put tick mark (√) if choice is given.
- In any part of this page do not mention your name
- Please write the information clearly and legibly (Please do not erase and over write)

<table>
<tr><td colspan="3">Information code: _____, Data collection date: _____</td></tr>
<tr><td colspan="3">Section I: Socio demographic variables (general)</td></tr>
<tr><td>1a) Participant age (yr.)_____</td><td>1b) Sex
☐Male ☐Female</td><td>1c) Work place name:
_____</td></tr>
<tr><td rowspan="2">1d) Marital status
☐Single ☐Married ☐Widowed
☐Divorced</td><td colspan="2">1e) Smoking history: ☐Never smoking
☐Ex smoking ☐Current smoker</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>1f) Alcohol intake:
☐Regularly ☐Rarely/sometimes
☐Never
1g) Exercise: ☐Regularly
☐Rarely/sometimes ☐Never</td><td colspan="2">1h) Family history with hypertension:
☐Yes ☐ No

1i) Family history with other cardiovascular diseases :
☐Yes ☐ No</td></tr>
<tr><td colspan="3">Section II: Socio demographic variables (Profession related variables)</td></tr>
<tr><td colspan="3">2a) Profession type:
☐Physician ☐Nurse ☐Pharmacy ☐Midwifery ☐Anesthesia ☐Medical laboratory
☐Radiography technology ☐Other (mention)_____</td></tr>
<tr><td colspan="3">2b) Academic degree: ☐Specialist ☐Sub-specialist ☐GP ☐BSc ☐MSc ☐PhD</td></tr>
</table>

☐Other (mention)_____

2c) Service y**ears** as healthcare proffestional_____

2d) Specific specialty_____

2g) How many patients do you see per day? (write in number)_____	2h) Do you have night shift work since the last two years? ☐Yes ☐No

2i) Do you have work stress? ☐Yes ☐No

Section III: Hypertension related variables

3a) Do you know your blood pressure level? ☐Yes ☐No **3b) When did you measure your BP recently?**	**3c) How much was your recent BP (SBP/DBP)_____**

3d) How often do you check /measure your BP?

☐Every 7days ☐Every 2 weeks ☐Every month ☐Every 3 months ☐Every 6 months

☐Every year ☐Do not have regular schedule ☐Never check

3e) Do you have other cardiovascular diseases now? ☐ Yes ☐ No

3f) If yes for 3d, please mention name of CV diseases and any medication taken

_____

_____

3g) Do you have other illness? ☐ Yes ☐ No

3h) If yes to other illness (3g), mention_____

Section IV: Perceived Stress Scale 4 (PSS-4)

INSTRUCTIONS

The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, please indicate your response by placing an "X" over the square representing HOW OFTEN you felt or thought a certain way.

Item	0 Never	1 Almost never	2 Sometimes	3 Fairly often	4 Very Often
1.**In the last month**, how often have you felt that you were unable to control the important things in your life?	☐	☐	☐	☐	☐
2.**In the last month**, how often have you felt confident about your ability to handle your personal problems?	☐	☐	☐	☐	☐
3.**In the last month**, how often have you felt that things were going your way?	☐	☐	☐	☐	☐
4.**In the last month**, how often have you felt difficulties were piling up so high that you could not overcome them?	☐	☐	☐	☐	☐