AFRICA UNIVERSITY

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ASSESSMENT OF PREVALENCE, KNOWLEDGE, AND ASSOCIATED RISK FACTORS FOR HYPERTENSION AMONG EMPLOYEES IN HARARE, HARARE METROPOLITAN PROVINCE, ZIMBABWE, 2025

BY

GODKNOWS MADZIVA

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Abstract

Hypertension is a pervasive global health issue, affecting an estimated 1.28 billion people worldwide, with approximately one-third of the global population residing in low-to-middle-income countries. In Zimbabwe, a staggering 50% of the population aged 15-64 years is affected by hypertension. Uncontrolled and undiagnosed hypertension among employees results in significant economic losses due to absenteeism, reduced productivity, and disability retirement. This study aimed to investigate the prevalence, awareness, knowledge, and associated factors of hypertension among employees in Zimbabwe, with a view to identifying areas for targeted interventions to alleviate the burden of hypertension. A quantitative approach was employed, combining secondary data analysis of medical records with primary data collection through an online Hypertension Knowledge Level Scale survey. Data was analyzed using Stata statistical software v 13.0 to generate frequencies, means, proportions, relative risk and multivariate analysis to determine independent factors associated with knowledge of hypertension. The study found a hypertension prevalence of 7% (n=14) among 207 employees, with 40% having high-normal blood pressure. The mean body mass index was 23.8 (SD=4.1), and 56% had a normal BMI. Correlation analysis revealed a moderate positive correlation between BMI and age ($r=0.401$, $p<0.001$), and weak positive correlations between BMI and systolic ($r=0.146$, $p=0.038$) and diastolic ($r=0.145$, $p=0.041$) blood pressure. The online survey revealed that 65% (n=111) of participants had high knowledge levels about hypertension. Multivariate analysis showed that participants aged 30-39 years had 3.92 times higher odds of having high knowledge about hypertension (95% CI: 1.49-10.31, $p=0.006$), while those with incomes ≥USD 600 had 2.43 times higher odds (95% CI: 1.02-5.79, $p=0.045$), however, the association disappeared after adjusting for age, sex and family history of hypertension. A family history of hypertension was associated with 2.6 times higher odds of knowledge about hypertension, aOR=2.63 (1.23-5.59). These findings highlight the importance of workplace-based health promotion initiatives targeting hypertension prevention and management, particularly among younger employees and those with lower incomes. The findings suggest that employees have good knowledge about hypertension, but there is a need for ongoing education and awareness programs to improve knowledge among specific subgroups. The study's results have implications for the development of evidence-based interventions aimed at reducing the burden of hypertension and promoting cardiovascular health among working populations.

Key words: Hypertension, Hypertension knowledge, Occupational health, Employee wellness, Non-communicable diseases.

Declaration Page

I declare that this dissertation is my original work except where sources have been cited and acknowledged. The work has never been submitted, nor will it ever be submitted to another university for the award of a degree.

Godknows Madziva

Student's Full Name

Student's Signature (26/03/2025)

Dr Sibongile Chituku

Full Name

Main supervisor's Signature (26/03/2025)

Copyright

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Thank you all for being an integral part of this journey. I am forever grateful.

Ad Deum gloria esse.

Dedication

I dedicate this dissertation to all employees, family members, friends and colleagues being managed for Hypertension, may they be strengthened in knowing that hypertension can be controlled.

List of Acronyms and Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
BMI	Body Mass Index
BP	Blood Pressure
CDC	Centre for Disease Control and Prevention
CVD	Cardiovascular Diseases
DBP	Diastolic Blood Pressure
Hba1c	Glycated Haemoglobin
HIV	Human Immune-deficiency Virus
NCD	Non-Communicable Diseases
NSSA	National Social Security Authority
POR	Prevalence Odds Ratio
SBP	Systolic Blood Pressure
WHO	World Health Organization

Operations Definitions

Hypertension

Hypertension was defined as systolic blood pressure (SBP) of 140 mmHg or higher and/or diastolic blood pressure (DBP) of 90 mmHg or higher in a patient not taking or taking anti-hypertension medications (Williams et al 2004).

Awareness of Hypertension Diagnosis

Knowing or remembering (self-reporting) that the individual had previously been diagnosed with hypertension or had been told that their blood pressure was raised by a healthcare worker (even without remembering the actual values of systolic and diastolic blood pressure) as observed and reported in India by Mohannty et al (2021).

Treatment of hypertension

Treatment of hypertension was defined as having received prescribed antihypertensive medication within the past two weeks from the time of the online survey as done in Sweden by Malkon et al (2023)

Measurement of blood pressure

The blood pressure was measured on the left upper arm positioned at the same level as the level of the heart. To minimize measurement and inter-observer variability, a digital BP machine was used, and all blood pressure measurements were done by trained healthcare personnel at the clinic (Sharman et al, 2023). Blood pressure measurements were extracted from the medical records of employees who presented at the clinic.

Body Mass Index

Body mass index (BMI) was used as a measure of obesity and calculated as follows: weight in kg/height in square meters. Height was measured to the nearest 0.1 metres in the standing position using a portable height board, and weight was determined to the nearest 0.01 kg on a digital scale (WHO 2010).

Table of Contents

List of Tables

List of Figures

List of Appendices

CHAPTER 1 INTRODUCTION

1.1 Introduction

Hypertension, also known as high blood pressure, is a growing global public health concern. Hypertension affects individuals, communities, workplaces, and economies worldwide. The global burden of hypertension is staggering, with an estimated 1.28 billion people affected worldwide (WHO, 2023c). This represents approximately one-third of the global population, with the majority residing in low-to-middle-income countries (LMICs) (WHO, 2023b, 2023c, 2023a). According to the World Health Organization (WHO), one in three adults is affected by hypertension with more than half unaware of their condition and the most affected age group is 30-79 years (2023). This condition, often referred to as the "silent killer" due to its lack of noticeable symptoms in its early stages, is a major risk factor for heart disease, stroke, kidney failure, and other debilitating health problems (Brahmankar & Prabhu, 2017; Gaziano et al., 2009; Lee et al., 2022; WHO, 2023a)).

The burden of hypertension is particularly heavy for populations living in LMICs like Zimbabwe with more than 50% of the population in the age category of 15-64 years affected by hypertension (Zhou, Perel, et al., 2021; ZimStat, 2022). The age group 15 – 64 years is the most productive economically and constitutes the majority of the employees in both the formal and informal sectors. Uncontrolled hypertension among employees leads to absenteeism due to illness, reduced productivity while at work, and even disability retirement (Chantarat et al., 2023; Kang, 2022; Li et al., 2023; MacLeod et al., 2022). This translates into economic losses for employers due to decreased output, increased healthcare costs for employee plans, and the need for recruitment and training of new staff (Hird et al., 2019; MacLeod et al., 2022; Sorato et al., 2022; Unmuessig et al., 2016). Furthermore, a

hypertensive workforce is more susceptible to cardiovascular events, placing a strain on company resources for employee medical emergencies and potential long-term care needs.

Improving employee awareness and promoting early detection can potentially reduce the need for expensive downstream treatments and contribute to a more sustainable healthcare system in Zimbabwe in line with the National Health Strategy (GoZ, 2020). Self-management practices can potentially reduce the need for expensive interventions and hospitalizations, offering a cost-effective approach to alleviating the economic burden of hypertension in Zimbabwe (Hu et al., 2023). By investing in employee health, employers can reduce the economic burden of hypertension, improve productivity, and enhance overall well-being.

Despite the high risk, there is a significant gap in the literature regarding understanding hypertension among employees in Zimbabwe. This research intends to bridge this gap by exploring the level of awareness, knowledge, and understanding of hypertension among different groups of employees in Zimbabwe. The study will investigate the employees' knowledge about the causes, symptoms, complications, and management of hypertension.

1.2 Background of Study

Studies done in Low-middle income countries (LMICs) showed that hypertension is common across multiple countries in Asia, South America, Asia and Africa; with prevalence ranging from 11.9% to 51.7% in African countries (Akpa et al., 2020; Schutte et al., 2021; Zhou, Carrillo-Larco, et al., 2021). Risk factors associated with high blood pressure include older age, genetics, being overweight or obese, not being physically active, a high-salt diet, smoking, and alcohol intake (Mancia et al., 2023; Mundagowa et al., 2024; WHO, 2023c).

This common, deadly condition leads to stroke, heart attack, heart failure, kidney damage, and many other health problems as highlighted above (WHO, 2023a). The WHO report on hypertension shows approximately 4 out of every 5 people with hypertension are not adequately treated, but if countries can scale up coverage, 76 million deaths could be averted between 2023 and 2050 (WHO, 2023b; 2023a). Preventing, early detection, and effectively managing hypertension are highly cost-effective and should be prioritized in national health plans. Offering these services at the primary care level maximizes benefits and WHO data shows that improved hypertension treatment programs yield an 18:1 return on investment. (Chantarat et al., 2023; Hu et al., 2023; Parati et al., 2022; WHO, 2023a).

There is a shortage of national data on hypertension prevalence studies in Zimbabwe, however, the Zimbabwe STEPwise survey demonstrated that in 2005, the national hypertension prevalence was 27% (23,2% among males and 29% among females) (Chimberengwa & Naidoo, 2018). Another survey done on young adults in Zimbabwe showed a hypertension prevalence of 6.6% and 8.7% in women and men respectively of the age group between 18 – 24 years (Sabapathy et al., 2024). The high prevalence of hypertension among a young population is concerning as the prevalence of hypertension increases with age and the population forms the base of employees for the country.

The prevalence of hypertension among employees varies depending on the job specification and industry. Studies from China showed a prevalence of 15.9% - 29.1% among coal workers (Wang et al., 2016; Wu et al., 2019). In Nigeria, India, and Ethiopia the hypertension prevalence among bankers was 12.4%, 30.4%, and 52.4% respectively (Diwe et al., 2015; Momin et al., 2012; Shitu & Kassie, 2021). In Zimbabwe, a study by Chimberegwa showed a prevalence of 27.2% among employees at a gold mine (2013). These

studies highlight the high prevalence of hypertension among employees from different sectors.

1.3 Statement of Problem

The occupational health clinic where the study was conducted is in Harare, where screening medicals were done for different employees from all sectors. The clinic screened an average of 100 clients per month with varying numbers of between 5-15 being diagnosed with hypertension or are on treatment for hypertension. Some of the employees who come for renewal of their annual or periodic medical examinations had poorly controlled hypertension due to defaulting on their treatment, which is a big concern as the workers have access to occupational health services throughout the year. The number of employees with poorly controlled hypertension varied from 3 - 10 per month from the monthly occupational medical reports and from one of the onsite clinic visits done by the researcher.

Any employee diagnosed with hypertension must be put on treatment before they can start or resume their duties. The companies were losing shift time due to hypertension which is not expected. An employee can lose 2 to 3 shift – hours translating to 2-3 days' work whilst addressing the elevated blood pressure. There appeared to be a lack of understanding of what is hypertension, its effects, and how it can be controlled among employees.

1.4 Research Objectives

1.4.1 Broad Objective

The main objective was to determine the prevalence of hypertension among employees attending the occupational health clinic in Harare and to determine the hypertension knowledge, and associated factors among employees.

1.4.2 Specific objectives

This study sought:

- To determine the prevalence of hypertension and its association with age and BMI among employees, using secondary data from medical records of employees attending an occupational health clinic in Harare from January 2024 to December 2024.
- To determine employees' knowledge of hypertension, its complications, and management, through an online survey administered to employees from January 2025 to February 2025.
- To determine the relationship between employees' knowledge of hypertension and their self-reported health-seeking behavior and adherence to treatment recommendations, using data from the online survey administered from January 2025 to February 2025.

1.4.3 Research Questions

The research findings responded to the following questions:

- What is the prevalence of hypertension among employees attending an occupational health clinic in Harare from January 2024 to December 2024, and what is its association with age and BMI?
- What is the level of knowledge about hypertension, its complications, and management among employees, as assessed through an online survey from January 2025 to February 2025?

- What is the relationship between employees' knowledge of hypertension and their self-reported health-seeking behavior and adherence to treatment recommendations from January 2025 to February 2025?

1.5 Justification of the Study

The research study aimed to address the critical gap in knowledge and practices regarding hypertension among Zimbabwean employees. By providing comprehensive data on hypertension prevalence, risk factors, and management practices, this research will inform the development of effective prevention and control strategies. The findings will empower policymakers, healthcare providers, and employers to implement targeted interventions, ultimately improving employee health and productivity. Furthermore, this study will contribute to the global body of knowledge on hypertension, particularly in underrepresented populations. In giving a voice to this often-overlooked segment of the population and overlooked condition, I sought to create a healthier work environment and enhance the overall well-being of Zimbabwean employees.

1.6 Delimitation of the Study

The study was limited to records of formally employed workers who are screened at the occupational health clinic in Harare and by the organization outside of Harare. The study targeted employees coming in for the first time (pre-placement), renewals (annual) and exit medical examinations with or without hypertension. The study was limited to employees who responded to the online survey during the data collection period including those not seen at the clinic.

1.7 Limitations of the Study

The study has some limitations due to time constraints. The study was conducted on employees who came to the occupational health clinic during the study period, with records at the clinic. The study used existing standards developed by the occupational health clinic for screening workers which excluded measuring glucose levels and waist measurements.

1.8 Summary

This chapter provided a comprehensive overview of hypertension as a significant global health challenge, with a specific focus on its impact on the economically active population in low and middle-income countries like Zimbabwe. By delineating the problem, justifying the need for research, and outlining the study's objectives, this chapter layed the groundwork for investigating the prevalence and determinants of hypertension among employees in Zimbabwe.

CHAPTER 2 REVIEW OF RELATED LITERATURE

2.1 Introduction

Hypertension, a global health concern, is influenced by a complex interplay of factors. The literature review will explore a conceptual framework encompassing socio-demographic, lifestyle, occupational, and environmental determinants of hypertension. Additionally, the role of co-morbid conditions, and individual knowledge, attitudes, and practices (KAP) will be examined. Understanding these factors is crucial for developing effective hypertension prevention and management strategies. By investigating the intricate relationships among these variables, this review aims to contribute to a comprehensive understanding of hypertension and its potential interventions. Search engines utilized included Google Scholar, PubMed, PLOS Global Public Health, and BMC Public Health.

2.2 Conceptual Framework

The conceptual framework looked at the factors associated with hypertension diagnosis and management. The framework included sociodemographic factors, lifestyle, environmental factors, comorbidity conditions, knowledge, and education. These factors have an impact on how a person perceives high blood pressure, understanding what it is, and how it is diagnosed and managed.

The conceptual framework for this research combined the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB). HBM framework explored the factors that influence an individual's health-seeking behaviors to identify employees' perceptions of susceptibility to hypertension, the severity of the disease, and the benefits of preventive measures. Theory of Planned Behavior framework focused on the intention to perform a specific behavior and assesses employees' attitudes towards learning about hypertension, their perceived

behavioral control over managing their blood pressure, and the social pressure to control hypertension (Shamsuddin et al., 2023; Shitu & Kassie, 2021).

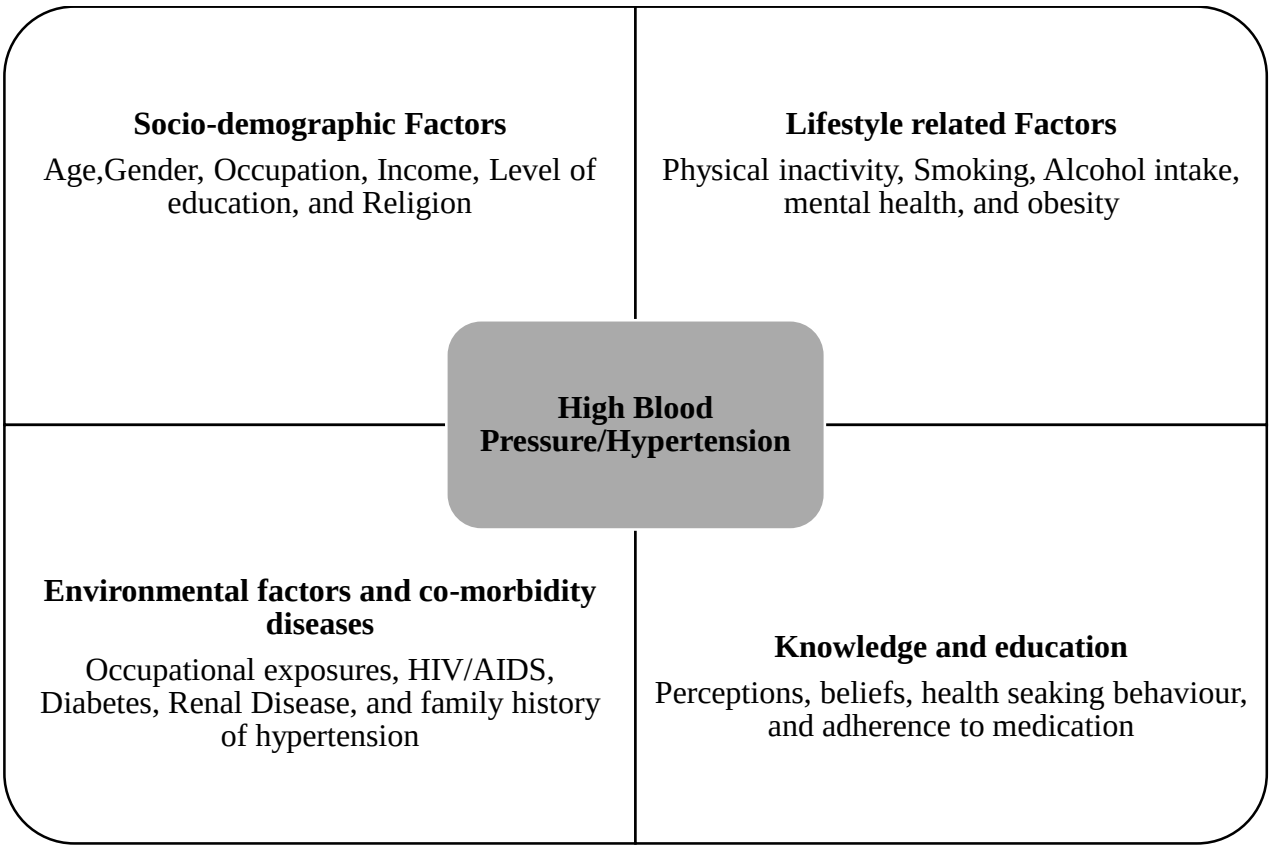

Figure 1*: Conceptual framework of high blood pressure*

2.3 Global Burden of Hypertension

The global economic burden of hypertension is staggering, with estimated annual losses due to absenteeism from work alone estimated to cost more than USD 11 billion in United States of America Dollars (MacLeod et al., 2022; Wierzejska et al., 2020). Hypertension casts a long shadow globally, ranking as a leading cause of death accounting for over 8.5 million deaths in 2015 (Mills et al., 2020; Zhou, Perel, et al., 2021). This represents approximately 17% of all deaths globally, with the majority occurring in LMICs (WHO, 2023b; Zhou, Perel, et al., 2021). While the exact figures can vary, estimates suggest that over 80% of

deaths attributable to hypertension occur within LMICs (Mills et al., 2020; WHO, 2023b; Zhou, Perel, et al., 2021). The astounding statistics highlight the critical need for interventions and health education to address the preventable risk factors for developing hypertension.

The burden of hypertension disproportionately falls on LMICs. LMICs often face a double challenge: limited healthcare resources and a rising prevalence of hypertension (Lee et al., 2022; Schutte et al., 2021). The rising burden of hypertension translates into higher out-of-pocket expenses for medications and treatments for individual patients, straining household finances (Gaziano et al., 2009; Gheorghe et al., 2018; Wierzejska et al., 2020). Additionally, under-developed healthcare systems struggle to manage the surge in hypertension cases, leading to increased hospital admissions and long-term care costs (Gheorghe et al., 2018; Schutte et al., 2021; Wierzejska et al., 2020). While early detection and lifestyle modifications can be cost-effective, limited access to healthcare professionals and medications in LMICs often leads to delayed diagnosis and reliance on expensive reactive care for complications like heart disease and stroke. The vicious cycle creates a financial burden not only for healthcare systems but also for individual employees and their families.

2.4 Definition of Hypertension

Hypertension, also known as high blood pressure or raised blood pressure (BP), is a chronic medical condition characterized by a persistent elevation in arterial pressure. The current definition of hypertension is systolic blood pressure (SBP) values of 140 mm Hg or more and/or diastolic blood pressure (DBP) of more than 90 mm Hg according to the WHO and British Hypertension Society guidelines (Alshammari et al., 2023; Diwe et al., 2015; Williams et al., 2004; WHO, 2023b). The BP measurement must be an average of two

readings that are five minutes apart and taken when a client is rested. Blood pressure that is in the range of SBP 130-139 mm Hg and DPB 80-89 mm Hg is considered prehypertension, and the client will be at an increased risk of developing hypertension in the future (Diwe et al., 2015; Momin et al., 2012; Shitu & Kassie, 2021). Below is the classification of hypertension according to British Hypertension Society.

Table 1; *Classification of hypertension by diastolic and systolic measurements*

Classification	**Systolic blood pressure SBP (mmHg)**	**Diastolic blood pressure DBP (mmHg)**
Optimal	<120	<80
Normal	<130	<85
High normal	130-139	85-89
Hypertension		
Grade 1 Hypertension (mild)	140-159	90-99
Grade 2 Hypertension (moderate)	160-179	100-109
Grade 3 Hypertension (severe)	≥180	≥110
Isolated systolic/diastolic hypertension		
Grade 1	140-159	≥90
Grade 2	≥160	≥100

Adopted from the British Hypertension Society guidelines. (Williams et al., 2004)

The etiology of hypertension is multifactorial, often attributed to unhealthy lifestyles such as high salt intake, high alcohol intake, and physical inactivity (Momin et al., 2012; WHO, 2023a). However, other determinants that increase the prevalence of hypertension, include

age, psychological tensions such as stress, education, socioeconomic status, tobacco use, and gender (Diwe et al., 2015; Kohler et al., 2022; Lu et al., 2019; Momin et al., 2012).

Hypertension ranks among the most common chronic medical conditions and has been one of the most significant comorbidities contributing to the development of stroke, myocardial infarction, heart failure, and renal failure (WHO, 2023a; 2023). The definition and categories of hypertension have been evolving over the years, with various treatment options available for managing the condition, both pharmacological and lifestyle modification strategies (WHO, 2023a).

Hypertension affects an estimated 1.28 billion adults globally, with two-thirds residing in low and middle-income countries according to WHO (2023). Alarmingly, 46% of these individuals are unaware of their condition with only 42% of adults with hypertension diagnosed and receiving treatment, and a mere 21% have their condition under control (WHO, 2023). Hypertension is a significant contributor to premature deaths worldwide. A global target for noncommunicable diseases aims to decrease hypertension prevalence by 33% from 2010 to 2030 (WHO, 2023a).

In a study conducted in Zimbabwe on hypertension, knowledge of hypertension was poor, over 30% had defaulted treatment for hypertension and 25% did not know the control of their hypertension (Chimberengwa & Naidoo, 2018). The study points out that there is a challenge when it comes to diagnosis, management and complication of non-communicable diseases with hypertension being one of the most miss understood diseases.

Studies done on bankers showed a prevalence of 12% in Nigeria (Diwe et al., 2015) and 54% in Ethiopia(Shitu & Kassie, 2021). The study in Nigeria showed poor knowledge on the risk

factors for hypertension of 80.4% which is alarming for a population that is educated. Most companies have employees with varying degrees of level of education spanning from general hands to managers who have degrees. Few studies have been done to address hypertension among employees in Zimbabwe.

2.5 Risk Factors for Hypertension

Hypertension is one of the most common non-communicable diseases affecting more than 1 billion people in the world, and a leading cause of cardiovascular diseases (WHO, 2023c). Among employees, several risk factors can contribute to the development of hypertension. Firstly, a sedentary lifestyle and lack of physical activity are major risk factors especially bankers and managers (Diwe et al., 2015; Momin et al., 2012; Shitu & Kassie, 2021). Many employees, especially in white-collar jobs, spend long hours sitting at desks or in front of computers, leading to a lack of exercise and increased weight gain. This sedentary behaviour can predispose to higher blood pressure levels over time. Below is the classification of body mass index (BMI) according to WHO (2010).

Table 2*; Grading of body mass index (BMI)*

Category of relative weight	**BMI**
Underweight	<18.5
Normal	18.5-24.9
Pre-obesity	25.0-29.9
Obesity Class I	30.0-34.9
Obesity Class II	35.0-39.9
Obesity Class III	>40

Adopted from WHO (WHO, 2010)

Some employees, such as miners, are exposed to unique occupational hazards that may contribute to the development of hypertension (Wu et al., 2019). Long working hours, high levels of stress, and exposure to dust and noise, with the majority staying away from families,

are some of the factors that make miners a high-risk group for hypertension. Stress has been noted to be one of the risk factors for developing hypertension (Lu et al., 2019; Rengganis et al., 2020). Despite some jobs being mostly heavy manual work, miners are still prone to developing hypertension as they age (Chimberengwa, 2013). Excessive alcohol intake, drug abuse, and smoking add to the risk of developing hypertension. Another group, bankers have stressful long working hours most of which are done sitting with little movement (Diwe et al., 2015; Momin et al., 2012). Prospective studies found a correlation between workplace discrimination and elevated hypertension risk among United States of America (USA) workers (Li et al., 2023).

In a study done in Indonesia, work-related stress was a significant risk factor for developing hypertension among industrial employees (Rengganis et al., 2020). High-pressure work environments, demanding deadlines, and long working hours can all contribute to chronic stress leading to hypertension. Certain work exposures including air pollution, may be associated with hypertension as noted among coal miners in China exposed to dust (WHO, 2023b; Wu et al., 2019). An increase in age has long been associated with hypertension despite differences in socioeconomic status (Alshammari et al., 2023; Kohler et al., 2022; Swed et al., 2023). Other risk factors are dietary, food rich in fats and high sodium content contributes to the development of hypertension (WHO, 2023b).

Employees, like other general patients, suffer from other co-morbidities that include HIV, diabetes, mental health disorders, and obesity. People living with HIV have been noted to have a high prevalence of hypertension of more than 20% though the mechanism of HIV and hypertension is now well understood (Bigna et al., 2020). Obesity has been established as a significant risk factor for hypertension, doubling the odds of developing hypertension (Akpa

et al., 2020). The association between hypertension and hypertension is particularly pronounced among individuals occupying managerial and white-collar positions (Asakura et al., 2021; Brahmankar & Prabhu, 2017; Diwe et al., 2015; Momin et al., 2012; Shitu & Kassie, 2021).

2.6 Symptoms and Complications of Hypertension

Hypertension is a chronic medical condition that often does not exhibit any symptoms (WHO, 2023c). However, when symptoms occur, they are non-specific and may include headaches, dizziness, shortness of breath, nosebleeds, severe anxiety, and a feeling of pulsations in the neck or head (WHO, 2023b).

In some cases, hypertension can present with dizziness, shortness of breath, and recurrent headaches. These symptoms are often associated with fluctuations in blood pressure or missed medication doses. It's important to note that these symptoms are not specific and usually don't occur until hypertension has reached a severe or life-threatening stage (WHO, 2023b)

Untreated hypertension can lead to serious complications. Prolonged high blood pressure can cause other cardiovascular diseases and related complications such as heart attack, stroke, and heart failure (WHO, 2023c). Other complications include fluid build-up in the lungs, vision loss, kidney failure, erectile dysfunction, and memory loss.

2.7 Management of Hypertension

Management of hypertension, particularly among employees, involves a multifaceted approach that addresses the unique risk factors identified in different work environments. Several studies have found that education and counselling on lifestyle modifications such as

promoting physical activity, promoting a healthy diet, and smoking cessation consultations could help prevent hypertension in healthy people (Momin et al., 2012; WHO, 2023b; 2023a). This approach could be particularly beneficial for employees, given the identified risk factors of long work periods, lack of physical inactivity, and smoking, especially in mining setups (Wu et al., 2019).

Interventions that combined education, counseling, and management strategies were found to be the most beneficial in reducing high blood pressure levels (Lu et al., 2019; WHO, 2023b; Wu et al., 2019). This suggests that a comprehensive approach addressing multiple risk factors simultaneously may be most effective in managing hypertension among employees.

Stress among workers has been associated with hypertension (Lu et al., 2019) with those perceiving high stress having a 61% chance of being diagnosed with hypertension. Management of stress factors may help reduce and manage hypertension in the workplace. According to WHO (2022), 15% of the global workforce suffers from mental health disorders. The result is that 12 billion working days are lost every year to depression and anxiety costing US$ 1 trillion per year in lost productivity (WHO, 2022).

In a study published in China, dust exposure, age, cigarette smoking, drinking alcohol, and work types were associated with high blood pressure (Wu et al., 2019). The association of dust exposure not only to silicosis but to hypertension shows the need to control workplace hazards for holistic management of workers' health and safety.

Hypertension medication is a life-long treatment. However, the treatment default rate remains high. In a study done in rural areas of Zimbabwe, the default rate was as high as

30.9% with 25% of the participants unaware of their blood pressure control status (Chimberengwa & Naidoo, 2018). This indicates that there is a poor understanding of the management of hypertension in Zimbabwe. Tozivepi et al (2021)in a study conducted at Mutare Provincial Hospital showed that only 5.1% of the participants reported adherence to all the recommended lifestyle behaviours.

In conclusion, managing hypertension among employees requires a comprehensive approach that includes education, counselling, management strategies, and regular screening. These strategies should be tailored to address the unique risk factors faced by employees in different sectors.

2.8 Knowledge levels of employees on Hypertension

Several studies have shown that the general population has a good to moderate understanding of hypertension and the consequences of hypertension (Alshammari et al., 2023; Princewel et al., 2019; Swed et al., 2023), however, there were poor attitudes in terms of health-seeking behavior. Knowledge on hypertension increases with age, being managed for hypertension, a positive family history of hypertension and higher education level (Alshammari et al., 2023; Chimberengwa & Naidoo, 2018; Swed et al., 2023; Wu et al., 2019).

Participants in middle-income countries showed good attitudes with more than 80% having been screened for hypertension(Swed et al., 2023). However, in a study done in a rural setting in Cameroon, more than half, 63.3 %, of the participants had never gone for a blood pressure check-up (Princewel et al., 2019) indicating poor health-seeking behavior.

In a study by Chimberengwa et al in Zimbabwe (2019), there was poor knowledge of hypertension among the participants who were from a rural setting. A significant proportion,

close to 60%, added salt on the table reflecting the poor understanding of risk factors associated with hypertension (Chimberengwa & Naidoo, 2018). Mutowo et al (2015) noted that there was a high prevalence of hypertension in urban areas versus rural areas.

Studies conducted among bankers in India and Ethiopia showed a high prevalence of hypertension ranging from 30.4% to 50.4% respectively (Momin et al., 2012; Shitu & Kassie, 2021). Obesity was another factor noted to be high in the studies, non-communicable diseases are an increasing burden in the workforce. Kavenga et al (2021) noted that healthcare workers had a 61% prevalence of obesity, 30% had hypertension and 10% had Hba1c above 7%.

Diwe et al (2015) in Nigeria noted that bankers had good knowledge of hypertension, however, their knowledge of risk factors, treatment, and complications was poor. The author could not find studies that assessed the knowledge of employees in Zimbabwe, however, using the study conducted in rural areas of Zimbabwe, knowledge of hypertension is poor (Chimberengwa & Naidoo, 2018).

2.9 Summary

The literature review synthesized research on the complex interplay of sociodemographic, lifestyle, occupational, and environmental factors influencing hypertension development and management among employees. It further examined the role of comorbidities and individual behaviors in hypertension outcomes. While the Hypertension Knowledge-Level Scale (HKLS) has been utilized in assessing hypertension knowledge, existing research primarily focuses on the general population. A notable gap exists in the literature regarding hypertension knowledge among employees specifically in Zimbabwe, with no studies employing the HKLS in this context within the past five years. This study aims to address

this gap by evaluating the association between hypertension knowledge and related factors among Zimbabwean employees.

CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter describes the study setting, study population, study period together with the sample size and the sampling techniques that will be used. The chapter briefly discusses the operational definitions in the context of the study. The data collection tools that will be utilized and the methods of data analysis that will be employed are detailed in this chapter. Ethical considerations will be stated.

3.2 The Research Design

The study employed a quantitative methods approach, combining a retrospective review of medical records from an occupational health (OH) clinic with a cross-sectional online survey assessing hypertension knowledge. The medical record review provided readily available, objective data on blood pressure measurements and related health metrics within the clinic's employee population. Supplementing this, the online survey efficiently gathered self-reported data on hypertension knowledge and related health behaviors from a broader workforce sample. This combined approach allowed for a more comprehensive understanding of hypertension's impact by integrating objective clinical data with subjective knowledge and behavioral information. While cross-sectional, this design offered a feasible and less resource-intensive approach for a student researcher, laying the groundwork for future, more in-depth investigations into the complex relationship between hypertension, workforce health, and related knowledge gaps.

3.3 Population and Sampling

3.3.1 Study site

The study was conducted at an occupational health clinic where the researcher is based in Harare, Harare Metropolitan Province from February to April 2025. The study utilized medical records of individuals seen both on-site at their workplaces in Harare and off-site at the occupational health (OH) clinic. The OH clinic provides occupational health services to a variety of companies, conducting both on-site and off-site medical examinations for employees located within Harare and in other regions. However, this study was limited to a review of existing medical records already in the possession of the OH clinic, regardless of whether the original examination took place on-site or off-site. This approach allowed for a broader representation of the workforce served by the clinic while maintaining a feasible scope for data collection.

3.3.2 Study population

The study population consisted of two distinct groups. The first group comprised the medical records of employees who visited the occupational health clinic in Harare, Harare Metropolitan Province, Zimbabwe, for pre-placement, periodical/annual, and exit/post-employment medical examinations. This included records from individuals seen both at the clinic itself and at various worksites within and outside of Harare Province where the clinic conducted on-site medical examinations. The second group, forming the basis for the online survey component of the study, were employees from companies served by the occupational health clinic and other companies not directly served by the clinic. This group was invited to participate in an online survey designed to assess their knowledge of hypertension. The

combined data from these two groups, the objective medical record data and the subjective survey data provided a more comprehensive picture of hypertension.

3.3.3 Inclusion Criteria

The study utilized existing medical records of all employees aged 18 years and above who underwent pre-placement, periodical/annual, or exit medical examinations at the Harare Occupational Health Clinic from January 2024 to December 2024. This includes records from examinations conducted both at the clinic itself in Harare and on-site at various company locations, both within and outside of Harare Province. The clinic serves some companies that do not have an occupational health doctor or nurse on-site, and all records from these examinations are stored at the Harare Occupational Health Clinic. In addition to the medical record review, employees aged 18 years and above from companies served by the clinic and other companies not directly served by the clinic were eligible to participate in an online survey assessing hypertension knowledge.

3.3.4 Exclusion Criteria

Medical records of general patients not formally employed and who came for general consultations for different illnesses were excluded from the study. Children and young adults below the age of 18 years coming for general consultations were excluded from the study. Informal employees were excluded from the study. Medical records outside January – December 2024 were excluded from the study.

3.3.5 Sample size

The Dobson formula was used to determine sample size $n = (z2pq)/\Delta 2$, where n = sample size, z = standard error risk, p = prevalence of hypertension (among people living with hypertension), q = 1-p (proportion of people without hypertension) and Δ = absolute

precision. Assuming 95% CI (z = 1.96), a prevalence of hypertension (p) of 27%, and using a precision of 5%, the adequate sample size would comprise the medical records of 171 employees.

Using the Cochran formula (n = (Z^2 * p * (1-p)) / E^2), a preliminary sample size calculation was performed to determine the number of participants needed for the online survey assessing hypertension knowledge. Assuming a 95% confidence level (Z = 1.96), a conservative estimate of the population proportion (p = 0.5, indicating maximum variability), and a desired margin of error of 5% (E = 0.05), the calculated sample size was 384. This initial estimate suggested that approximately 384 individuals were needed to complete the online survey to achieve the desired precision in estimating the level of hypertension knowledge within the target population.

3.3.6 Sampling techniques

For the secondary review of medical records at the occupational health clinic, a simple random sampling method was employed to select the records to be included in the study. This approach ensured that each eligible medical record (those meeting the inclusion criteria) had an equal and independent chance of being selected for review. This simple random sampling method minimized selection bias and enhanced the representativeness of the reviewed records, allowing for more generalizable conclusions about the patterns and trends observed within the clinic's patient population.

To achieve the desired sample size for the online survey assessing hypertension knowledge, the study expanded beyond employees of companies directly served by the occupational health clinic. While the clinic's patient population formed a valuable initial pool, the required sample size necessitated broadening the scope to include employees from other companies

within. This approach improved the generalizability of the survey findings beyond the specific companies associated with the OH clinic. This broader recruitment strategy was essential for ensuring the study had sufficient statistical power to detect meaningful relationships between hypertension knowledge and related factors.

3.4 Data Collection Instruments

Data collection for this study employed two distinct instruments. For the secondary data collection from medical records, a structured data extraction form (data per forma) was utilized to systematically gather relevant information, including demographics, medical history related to hypertension, and other pertinent clinical data. For the online survey component, a semi-structured questionnaire was created and hosted on a Google Form platform. This online questionnaire assessed participants' knowledge of hypertension (covering its definition, risk factors, treatment, and complications), perceived risk factors, adherence to management (if applicable), and demographic attributes. Using Google Forms facilitated efficient data collection, storage, and preliminary analysis of the survey responses.

3.5 Pretesting tools

A questionnaire was adopted from the Brazilian version of the Hypertension Knowledge-Level Scale (HKLS) to assess the level of knowledge among the employees, and it will be scored. The questionnaire had a section for demographics that included age, gender, duration of employment, and income levels. This was incorporated into Google Forms.

There were 22 questions that the participant had to indicate as ‘Correct’, ‘Incorrect’ or ‘Don’t know’ as part of the questionnaire focusing on knowledge assessment. The correct answer scored 1 point whilst an incorrect answer and don’t know scored 0. The HKLS has been used for large population surveys in different countries to assess the knowledge of hypertension

(Arthur et al., 2018; Erkoc et al., 2012; Zhang et al., 2023). Whilst the HKLS can be adopted and translated into different languages, the 22 questions remain. Most modifications are done on the demographics and other factors related to hypertension. The participants were able to see their scores after completing the survey and improve their knowledge of hypertension. A cut-off of 17 was used to create a dichotomous variable for knowledge levels (high/low).

3.6 Data Collection Procedure

Data collection for this study was conducted in two phases. The first phase involved a secondary review of medical records at Baines Occupational Health Services. The researcher used a structured data extraction form (data per forma) to collect relevant information from the records, including demographics (age, gender, job title, type of industry, blood pressure, weight, and height).

The second phase consisted of an online survey administered through Google Forms. Eligible participants completed the online questionnaire, which assessed their knowledge of hypertension using a standardized scale, a modified version of the HK-LS scale and collected the same demographic information as the medical record review. The data collection period for both the medical record review and the online survey was between February and March 2025. No direct contact with participants was required for the medical record review. For the online survey, participation was voluntary, and informed consent was obtained electronically before participants began the questionnaire.

3.7 Analysis and Organization of Data

Data analysis was performed using Stata statistical software v 13.0 (Stata Corporation, College Station, TX, USA). Data collected via the data per forma from medical records was entered and stored in Microsoft Excel, as was the data exported from the Google Forms

online survey. Both datasets were imported into Excel and Stata for cleaning and analysis. Descriptive statistics, such as frequencies, percentages, means, and standard deviations, were used to summarize the demographic characteristics of the study population and their knowledge of hypertension. Knowledge levels about hypertension were measured on a 22-scale item. A cut-off of 18 was used to create a dichotomous variable for knowledge levels (high/low). Variables with a $p<0.2$ in the bivariate analysis were included in the multivariable logistic regression model. Appropriate statistical tests, such as t-tests, chi-square tests, correlation or regression analysis, were employed to explore relationships between hypertension knowledge, risk factors, and other relevant variables, both within the medical record data and the survey data, and explored correlations between the two data sources.

3.8 Ethical Consideration

Research approval was sought from the Africa University Research Ethics Committee (AUREC). Revised AUREC approval was sought in January 2025 before data collection, **APPROVAL NUMBER AUREC 3425/25.** Authority was sought from Baines Occupational Health Services to conduct the study at their clinic in August 2024 for the review of medical records. Anonymized informed consent with a Yes/No was provided on the Google Form and no identifiable personal data including emails will be collected when completing the form.

3.9 Summary

This chapter detailed the study methodology by describing the study design, study setting, population under study, sampling technique used, operational definitions, data collection tools and procedure, and data analysis together with ethical considerations that guided the study. The projected work plan and budget are illustrated.

CHAPTER 4 DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the findings from a mixed-methods approach, integrating secondary data analysis with primary data collection. The first dataset, obtained through a retrospective review of medical records, provided insight into the biometric profiles of employees who accessed healthcare services at the clinic, specifically focusing on blood pressure and body mass index (BMI) readings. The second dataset, derived from an online survey, assesses the hypertension knowledge levels of employees using a standardized hypertension knowledge level scale. By integrating these two datasets, this chapter aimed to provide a comprehensive understanding of the prevalence and awareness of hypertension among employees, thereby informing the development of targeted interventions to mitigate this pervasive health risk.

4.2 Participants' Blood Pressure and BMI

Data from the medical records consisted of 207 records. The average age of the employees was 36 years with the modal age group of 30-39 years with the majority (77%) falling under skilled trades and the remainder, 23% being in management and administration positions. Male employees consisted of 91% and females 9%.

The mean BMI was 23.8 (SD-4.1), 117 (56%) employees had normal BMI and 36.2% were overweight or obese. The prevalence of hypertension was 14/209 (6.8%), however, 40.1% had blood pressure in the high normal category. The mean (SD) systolic BP was 126.3 (27.8) mmHg, and the mean (SD) diastolic BP was 78.0 (9.5) mmHg

Table 3: *Demographic and characteristic data of employees*

Characteristic (N=207)	Number (%)
Age	
18 – 29	58 (28.0)
30 – 39	80 (38.6)
40 – 49	45 (21.7))
>50	26 (12.6)
Gender	
Females	19 (9.2)
Males	190 (91.8)
Hypertension Classification	
Normal (<130/85 mmHg)	112 (54.1)
High Normal (130-139/85-89 mmHg)	83 (40.1)
Hypertension (>140/90 mmHg)	14 (6.8)
Job Category	
Skilled Trades and General Labour	159 (76.8)
Management and Administration	50 (24.2)
BMI	
Underweight (<18.5)	17 (8.2)
Normal Weight (18.5 – 24.9)	117 (56.5)
Overweight (25.0 – 29.9)	57 (27.5)
Obesity (>30.0)	18 (8.7)

Table 4: *Correlation analysis between BMI, blood pressure, and age*

	BMI	Systolic Blood Pressure (mmHg)	Diastolic Blood Pressure (mmHg)	Age (Years)
BMI	1	0.146	0.145	0.401
Systolic Blood Pressure (mmHg)		1	0.702	0.223
Diastolic Blood Pressure (mmHg)			1	0.259
Age (Years)				1

The correlation analysis between BMI, blood pressure, and age was performed as shown in Table 4. The results showed the correlation coefficients between these variables. The correlation matrix indicated that BMI has a moderate positive correlation with age (0.401) indicating that as age increases, BMI tends to increase as well. There was a weak positive correlation between BMI and systolic (0.146) and diastolic (0.145) blood pressure respectively indicating a slight tendency for higher BMI to be associated with higher systolic and diastolic blood pressure.

There was a strong positive correlation (0.702) between systolic and diastolic blood pressure, indicating that these two measures of blood pressure tend to increase together. However, there was a weak positive correlation (0.224) between age and systolic blood pressure and (0.259) diastolic blood pressure, suggesting a slight tendency for systolic and diastolic blood pressure to increase with age.

4.3 Hypertension Knowledge Level Scale

A total of 165 participants took part in the study to assess knowledge levels about hypertension representing a positive response rate of 43% of the calculated sample size (384). Their sociodemographic characteristics are shown in Table 5. The was an almost equal proportion of men and women. Nearly 50% were within the age category 30-39 years. Close to three-quarters were married and around 70% had a family history of hypertension. The majority of participants were aged between 30-39 years (49%) and had tertiary education (99%). Alcohol consumption was reported by 48% of participants, while only 4% indicated smoking. The majority of the participants were Christians (95%) and 60% of the participants had an income equal to or greater than $600.00.

Table 5: *Sociodemographic characteristics of participants*

Characteristic (N=165)		**Number (%)**
Sex	Male	85 (51.5)
	Female	80 (48.5)
Age category	18-29	23 (13.9)
	30-39	81 (49.1)
	40-49	43 (26.1)
	50+	18 (10.9)
Education	Tertiary	163 (98.8)
	Secondary	2 (1.2)
Marital status	Single	34 (20.6)
	Married	120 (72.7)
	Divorced	8 (4.8)
	Widowed	3 (1.8)
Occupation	Skilled	159 (96.4)
	Semi-skilled	6 (3.6)
Income (USD)	<300	28 (17.0)
	300-600	38 (23.0)
	>600	99 (60.0)
Alcohol intake	Yes	79 (47.9)
	No	86 (52.1)
Smoking status	Yes	6 (3.6)
	No	159 (96.4)
Religion	Christianity	157 (95.2)
	African tradition	5 (3.0)
	Other*	3 (1.8)
Family history of HTN	Yes	114 (69.1)
	No	51 (30.9)

*USD =United States Dollar; *Other includes Tamil (1), Agnostic (1) and Apostolic religion (1)*

The knowledge levels of hypertension are shown in Table 6. Overall, 111 (67%) had high knowledge levels about hypertension. Participants within the age category 30-39 had 4 times the odds of having high knowledge about hypertension compared to those within the age category 18-29 years, odds ratio (OR) - 3.92 (1.49-10.31). The odds increased to 5 times in participants within the age category 40-49 years, OR-5.13 (95%CI: 1.72-15.36)

Participants who had incomes of at least USD 600 had almost 2.5 times higher odds of having high knowledge levels about hypertension compared to those earning less than USD 300, OR-2.43 (95%CI: 1.02-5.79). A family history of hypertension was associated with 2 times higher odds of knowledge about hypertension, OR-2.20 (95%CI: 1.10-4.38). However, the association of income disappeared after adjusting for age, sex and family history of hypertension. A family history of hypertension was associated with 2.6 times higher odds of knowledge about hypertension, aOR=2.63 (1.23-5.59) (Table 7)

Table 6: *Knowledge levels of hypertension*

Characteristic		**Knowledge levels**				**OR (95% CI)**	**p-value**
		High		Low			
		n	(%)	n	(%)		
Overall		111	(67)	54	(32)		
Age category	50+	11	(61)	7	(39)	2.44 (0.69-8.66)	0.16
	40-49	33	(77)	10	(23)	**5.13 (1.72-15.36)**	**0.003**
	30-39	58	(72)	23	(28)	**3.92 (1.49-10.31)**	**0.004**
	18-29	9	(39)	14	(61)	Ref	
Sex	Female	58	(73)	22	(27)	1.59 (0.82-3.07)	0.17

	Male	53	(62)	32	(38)	Ref	
Education	Tertiary	110	(68)	53	(32)	2.08 (0.13-33.83)	0.60
	Secondary	1	(50)	1	(50)	Ref	
Marital status	Married	84	(70)	36	(30)	1.44 (0.65-3.20)	0.36
	Divorced/widowed	4	(50)	4	(50)	0.62 (0.13-2.91)	0.54
	Single	21	(62)	13	(38)	Ref	
Occupation	Skilled	108	(68)	51	(32)	2.12 (0.41-10.86)	0.36
	Semi-skilled	3	(50)	3	(50)	Ref	
Income (USD)	>600	73	(74)	26	(26)	**2.43 (1.02-5.79)**	0.04
	300-600	23	(60)	15	(40)	1.33 (0.50-3.57)	0.57
	<300	15	(54)	13	(46)	Ref	
Alcohol intake	Yes	56	(71)	23	(29)	1.37 (0.71-2.64)	0.34
	No	55	(64)	31	(36)	Ref	
Smoking status	No	109	(69)	54	(31)	-	0.09
	Yes	2	(33)	4	(67)	Ref	
Family history of HTN	Yes	83	(73)	31	(27)	**2.20 (1.10-4.38)**	**0.02**
	No	28	(55)	23	(45)	Ref	

Table 7: *Knowledge levels of hypertension (Multivariate analysis)*

Characteristic		**Knowledge levels**				**OR (95% CI)**	**aOR (95% CI)**
		High		**Low**			
		n	(%)	n	(%)		
Overall (N=165)		111	(67)	54	(33)		
Age category	50+	11	(61)	7	(39)	2.44 (0.69-8.66)	2.66 (0.66-10.69)
	40-49	33	(77)	10	(23)	**5.13 (1.72-15.36)**	**4.95 (1.48-16.54)**
	30-39	58	(72)	23	(28)	**3.92 (1.49-10.31)**	**4.59 (1.56-13.51)**
	18-29	9	(39)	14	(61)	Ref	
Sex	Female	58	(73)	22	(27)	1.59 (0.82-3.07)	1.92 (0.90-4.07)
	Male	53	(62)	32	(38)	Ref	Ref
Education	Tertiary	110	(68)	53	(32)	2.08 (0.13-33.83)	
	Secondary	1	(50)	1	(50)	Ref	
Marital status	Married	84	(70)	36	(30)	1.44 (0.65-3.20)	
	Divorced/ widowed	4	(50)	4	(50)	0.62 (0.13-2.91)	
	Single	21	(62)	13	(38)	Ref	
Occupation	Skilled	108	(68)	51	(32)	2.12 (0.41-10.86)	
	Semi-skilled	3	(50)	3	(50)	Ref	
Income (USD)	>600	73	(74)	26	(26)	**2.43 (1.02-5.79)**	2.00 (0.76-5.30)
	300-600	23	(60)	15	(40)	1.33 (0.50-3.57)	1.46 (0.48-4.41)
	<300	15	(54)	13	(46)	Ref	Ref
Alcohol intake	Yes	56	(71)	23	(29)	1.37 (0.71-2.64)	
	No	55	(64)	31	(36)	Ref	
Smoking status	No	109	(69)	50	(31)	-	
	Yes	2	(33)	4	(67)	Ref	
Family history of HTN	Yes	83	(73)	31	(27)	**2.20 (1.10-4.38)**	**2.63 (1.23-5.59)**
	No	28	(55)	23	(45)	Ref	Ref

Table 8*: Individual questions and correct responses*

	Hypertension Knowledge-Level Scale (N = 165)	Response Options	Correct Answers (%)
1.	High systolic (maximum) or diastolic (minimum) blood pressure indicates increased blood pressure.	Correct/ Incorrect/ Don't know	71.5
2.	High diastolic (minimum) blood pressure also indicates increased blood pressure.	Correct/ Incorrect/ Don't know	63.0
3.	High blood pressure is caused by aging, so it does not require treatment.	Correct/ Incorrect/ Don't know	95.2
4.	If the medicine for high blood pressure can control blood pressure, there is no need to change lifestyle.	Correct/ Incorrect/ Don't know	95.8
5.	If people with high blood pressure change their lifestyle, there is no need for treatment.	Correct/ Incorrect/ Don't know	87.9
6.	People with high blood pressure should take their medications as they believe it is the best way.	Correct/ Incorrect/ Don't know	72.7
7.	High blood pressure medicines should be taken daily.	Correct/ Incorrect/ Don't know	89.1
8.	People with high blood pressure should take their medication only when they feel bad.	Correct/ Incorrect/ Don't know	94.5
9.	People with high blood pressure should take their medication for the rest of their lives.	Correct/ Incorrect/ Don't know	64.2
10.	For people with high blood pressure, frying is the best way to prepare food.	Correct/ Incorrect/ Don't know	93.9
11.	For people with high blood pressure, cooking only in water and or grilling are the best ways to prepare food.	Correct/ Incorrect/ Don't know	73.3
12.	People with high blood pressure can eat food without controlling the amount of salt provided they take their medications every day.	Correct/ Incorrect/ Don't know	96.4
13.	People with high blood pressure should eat fruits and vegetables often.	Correct/ Incorrect/ Don't know	98.8
14.	The best type of meat for people with high blood pressure is red meat.	Correct/ Incorrect/ Don't know	86.1

15.	The best type of meat for people with high blood pressure is white meat.	Correct/ Incorrect/ Don't know	81.8
16.	People with high blood pressure should not smoke.	Correct/ Incorrect/ Don't know	85.5
17.	People with high blood pressure can drink alcohol at will.	Correct/ Incorrect/ Don't know	84.2
18.	If high blood pressure is not treated it can cause stroke.	Correct/ Incorrect/ Don't know	96.4
19.	If high blood pressure is not treated it can cause a heart attack	Correct/ Incorrect/ Don't know	92.7
20.	If high blood pressure is not treated, it can lead to premature death.	Correct/ Incorrect/ Don't know	97.0
21.	If high blood pressure is not treated, it may cause the kidneys to stop working.	Correct/ Incorrect/ Don't know	69.1
22.	If high blood pressure is not treated, it can cause eye problems.	Correct/ Incorrect/ Don't know	75.8

Table 9: *Subsets of HKLS and scores*

	Subsets of HKLS	%
1	Definition	67.3
2	Medical Treatment	80.2
3	Drug Compliance	93.8
4	Lifestyle	87.2
5	Diet	83.9
6	Complications	86.2

The tables 8 & 9 above highlight the percentages of individual questions and subsets of the Hypertension Knowledge-Level Scale. The tables summarize the respondents' knowledge levels across various categories related to hypertension. The highest percentage, 93.8%, pertains to drug compliance, indicating a strong awareness of the importance of adhering to prescribed medications. Following closely, lifestyle and diet knowledge scored 87.2% and

83.9% respectively, underscoring the understanding of non-medical interventions in managing hypertension. The subset on complications scored 86.2%, highlighting insights into potential health risks associated with hypertension. Medical treatment knowledge was at 80.2%, and the definition subset was at 67.3% indicating poor knowledge on the definition of hypertension.

4.4 Summary

The study revealed a workforce with an average age of 36 years, predominantly male and employed in skilled trades, with a relatively healthy weight profile. However, a notable proportion had hypertension or high normal blood pressure, highlighting a potential health risk. Correlation analysis showed that body mass index (BMI) increased with age and was weakly associated with blood pressure, while systolic and diastolic blood pressure were strongly correlated. Furthermore, an assessment of hypertension knowledge among employees found that older employees, those with higher incomes, and those with a family history of hypertension tended to have better knowledge of the condition, with drug compliance, lifestyle, and diet being the most well-understood aspects.

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter presented an in-depth analysis of the findings from the study examining hypertension prevalence, knowledge, and associated factors among employees. The study's results, derived from a secondary data analysis of medical records and the primary online survey, provide valuable insights into the health profiles and awareness levels of the employees regarding hypertension. By integrating these findings with existing literature on hypertension knowledge and management, this discussion aimed to identify key themes, patterns, and areas for improvement, ultimately informing the development of targeted interventions to mitigate the burden of hypertension among employees.

5.2 Hypertension and BMI among employees: Secondary Data Analysis

The demographic profile of the employee population presented in this dataset reveals key public health concerns that warrant further investigation. The average age of 36 years, coupled with the modal age group of 30-39 years, indicates a relatively young workforce. This demographic is significant as it represents a population typically considered to be in their prime working years, where interventions aimed at promoting long-term health and well-being could yield substantial benefits. The interventions will not only be limited to hypertension, but they will also include other conditions affecting the well-being of employees.

The secondary data analysis revealed a workforce with a relatively healthy weight profile, with a mean BMI of 23.8 with 56% of employees having a normal BM. The relatively healthy BMI could be attributed to the category of employees who included mainly skilled tradesmen

and general labor which tend to be more physical. However, the standard deviation indicates variability within the population and the remaining 44% warrant further scrutiny. Obesity and being overweight, almost a third in this study, are significant risk factors for various non-communicable diseases (NCDs), including hypertension, a cardiovascular disease, diabetes, and certain cancers (Mills, 2020; WHO, 2021).

The prevalence of hypertension, at 6.8%, whilst seemingly low, but the 40% with high-normal blood pressure is concerning. This suggests a substantial portion of the workforce is at risk of developing hypertension, a major contributor to cardiovascular morbidity and mortality (WHO, 2021). The mean systolic BP of 126.3 mmHg and diastolic BP of 78.0 mmHg further underscore the need for targeted blood pressure management strategies. The finding is consistent with the results of Hu in China (2023), who reported a hypertension prevalence of 9.6% among adult employees. However, this is in contrast to Kumbu et al (2023) who observed double the prevalence of hypertension ranging from 14.3% to also 50% in Sub-Saharan Africa. The study findings on hypertension were also in contrast to what Chimberengwa (2013) reported, 27,2%.

The occupational distribution, with a significant majority (77%) in skilled trades and the remainder in management/administration, highlights the potential for varying occupational health risks. Skilled trades often involve physically demanding tasks, exposure to hazardous materials, and potential for musculoskeletal injuries. Conversely, management and administrative roles may present risks associated with sedentary behavior and chronic stress (Kumbu et al, 2023) leading to higher chances of hypertension diagnosis. Understanding the specific occupational exposures within these categories is crucial for tailored intervention strategies aimed at reducing cardiovascular diseases for employees.

The correlation analysis showed a moderate positive correlation between BMI and age, indicating that as employees age, their BMI tends to increase. This finding aligns with established epidemiological trends, where age-related physiological changes such as decreased metabolic rate and altered body composition contribute to weight gain (Speakman, 2016). This observed correlation underscores the importance of age-stratified interventions targeting weight management and healthy lifestyle promotion within this population. The weak positive correlations between BMI and both systolic and diastolic blood pressure suggest that other factors may play a more substantial role in blood pressure regulation within this cohort. It's crucial to acknowledge that correlation does not imply causation. While higher BMI may contribute to elevated blood pressure, other factors, such as genetics, dietary habits, stress, and physical activity levels, could also be influential (WHO, 2023).

The strong positive correlation between systolic and diastolic blood pressure is a well-established physiological phenomenon. Systolic and diastolic blood pressures are intrinsically linked, and changes in one often result in corresponding changes in the other. The strong correlation validates the reliability of the blood pressure measurements and highlights the importance of considering both systolic and diastolic blood pressures when assessing cardiovascular risk.

The weak positive correlations between age and systolic and diastolic blood pressure suggest a slight tendency for blood pressure to increase with age. The observation aligns with the physiological changes associated with aging, such as arterial stiffening and reduced vascular compliance, which can lead to elevated blood pressure (Lakatta, 2008). While the correlations are weak, they underscore the importance of age as a risk factor for hypertension

and highlight the need for age-appropriate blood pressure screening and management strategies.

5.3 Hypertension Knowledge among Employees: Online Survey

The study, while achieving a 43% response rate (165 participants out of 384), provides valuable insights into hypertension knowledge levels within an employee population. The near-equal gender distribution and the concentration of participants in the 30-39 age bracket align with the demographic trends observed in many working populations. The high prevalence of marriage (almost three-quarters) and a family history of hypertension (around 70%) indicate potential familial and genetic predispositions to cardiovascular risk. Notably, the high educational attainment (99% with tertiary education) suggests a population with potentially higher health literacy.

The study aimed to assess the knowledge levels of employees about hypertension and its associated factors. The findings of this study indicated that the majority of participants (67%) had high knowledge levels about hypertension. This is consistent with the findings of Alshammari (2017), who reported that 61.4% of the study participants had good knowledge about hypertension. However, the present study's findings are higher than those reported by Chimberengwa (2019), who found the study participants had poor knowledge about hypertension, and the participants were predominantly from rural areas. The discrepancy may be attributed to differences in the study populations, settings, and methodologies. However, the 35% who did not meet this threshold warrant concern, especially considering the high prevalence of family history and other risk factors.

The study also found that participants within the age category 30-39 years had four times the odds of having high knowledge about hypertension compared to those within the age category 18-29 years. This finding is consistent with the results of Diwe (2015), who reported that older adults were more likely to have better knowledge about hypertension. The association between age and hypertension knowledge, with participants in the 30-39 and 40-49 age groups having significantly higher odds of high knowledge, may reflect increased awareness due to age-related health concerns or greater exposure to health information.

The association between income and hypertension knowledge was also significant, with participants earning $600 or more having 2.43 times higher odds of high knowledge compared to those earning less than USD 300. This is consistent with Shitu (2019), who reported that higher income was associated with better knowledge about hypertension. The strong association underscores the influence of socioeconomic factors on health literacy. Higher income may facilitate access to healthcare resources, health information, and healthy lifestyles.

The study also found that a family history of hypertension was associated with two times higher odds of knowledge about hypertension. This finding is consistent with the results of Alshammari (2023), who reported that a family history of hypertension was a significant predictor of knowledge about hypertension. The observed association between family history and hypertension knowledge suggests that personal experiences with the disease can drive knowledge acquisition.

The study's findings on the subsets of the Hypertension Knowledge-Level Scale are consistent with the results of previous studies. The study found that the highest percentage

(93.8%) pertained to drug compliance, indicating a strong awareness of the importance of adhering to prescribed medications. This finding is consistent with the results of Swed (2017), who reported that medication adherence was a critical aspect of hypertension management. The WHO recommends that individuals with hypertension should have regular follow-up appointments with their healthcare providers to monitor their blood pressure and adjust their treatment plans as needed (WHO, 2019). The study's findings suggest that employees in this study had good knowledge about the importance of regular follow-up appointments, with the majority of the participants indicating that they knew the importance of adhering to prescribed medications.

The study's findings on lifestyle and diet knowledge are also consistent with the results of previous studies. For example, the study found that 87.2% of the participants had good knowledge about lifestyle modifications, and 83.9% had good knowledge about dietary changes. These findings are consistent with the results of Mills et al (2020) and WHO (2023), who reported that lifestyle and dietary changes were critical components of hypertension management.

The study's findings on the definition of hypertension are, however, inconsistent with the results of previous studies. The study found that only 67.3% of the participants had good knowledge about the definition of hypertension in contrast to the results of Princewell (2019), who reported that 77.7% of the study participants had good knowledge about what is hypertension.

The study's findings on the complications of hypertension are consistent with the results of other studies. The study found that 86.2% of the participants had good knowledge about the

complications of hypertension. This finding is consistent with the results of Zhou and Princewell (2019, 2019), who reported that the study participants had good knowledge about the complications of hypertension.

However, the moderate knowledge of medical treatment (80.2%) and the relatively lower knowledge of the definition of hypertension (67.3%) raise concerns. The lower knowledge of the definition is particularly worrying, as a clear understanding of the condition is fundamental to effective management. This knowledge gap may hinder individuals' ability to recognize symptoms, understand their risk factors, and engage in informed discussions with healthcare providers. The study's findings also highlight the need for targeted interventions to improve knowledge among specific subgroups, such as younger employees and those with lower incomes.

5.4 Conclusion

In conclusion, this study contributes meaningfully to the existing body of knowledge on hypertension prevalence, knowledge, and associated factors among employees. The findings underscore the importance of workplace-based health promotion and disease prevention initiatives, particularly those targeting modifiable risk factors such as physical inactivity, unhealthy diet, alcohol intake and smoking. The study's results also highlight the need for tailored interventions to improve hypertension knowledge and awareness among specific subgroups, including younger employees and those with lower incomes.

From a public health perspective, this study's findings have significant implications for the development of evidence-based interventions aimed at reducing the burden of hypertension and promoting cardiovascular health among working populations. The study's emphasis on the importance of comprehensive health education programs, addressing the fundamental aspects of hypertension, including its definition, risk factors, complications, and management, is particularly noteworthy.

Ultimately, this study demonstrates the critical role that public health researchers, policymakers, and practitioners can play in promoting health and well-being among working populations and reducing the socioeconomic burden of hypertension and related cardiovascular diseases. As such, the findings of this study have the potential to inform the development of effective, culturally sensitive, and sustainable workplace-based health promotion initiatives, both locally and globally.

5.6 Limitations of the Study

The study, like any other research endeavour, had its limitations. These limitations are acknowledged and discussed below to provide an understanding of the study's findings and their implications.

- The study relied on secondary data analysis, limiting the control over data quality and collection methods. The secondary data analysis did not allow additional data collection, which could compromise the validity and reliability of the findings. The secondary data was to have an unbiased estimated prevalence of hypertension with actual measurements as opposed to reported diagnosis.
- The study sample consisted of employees attending an occupational health clinic, which may not have been representative of the larger employee population. The sample may have been biased towards employees who are more health-conscious with greater access to healthcare services. Additionally, the sample may not have captured the experiences and perspectives of employees who do not attend occupational health clinics, which limited the generalizability of the findings.
- The online survey relied on self-reported data, which may be subject to biases and inaccuracies. The survey was limited to employees who had access to internet access and excluded those with limited internet access. Self-reported data can be influenced by social desirability bias, recall bias, and other biases that can compromise the validity and reliability of the findings. Self-reported data may not capture the complexities and nuances of employees' experiences and perspectives, limiting the depth and richness of the findings.

- The study used a cross-sectional design, which limited the ability to establish causality and track changes over time. Cross-sectional designs can only provide a snapshot of the relationships between variables at a single point in time. Cross-sectional designs may not capture the dynamic and complex relationships between variables, which can limit the validity and reliability of the findings.
- The study's findings may not be generalizable to other populations or settings due to the specific context and sample characteristics. This limitation is significant, as the study's findings may not be applicable to other employee populations or occupational settings, which can limit the study's external validity. Furthermore, the study's findings may not capture the unique experiences and perspectives of employees in different cultural, socioeconomic, or environmental contexts, which can limit the study's cultural validity.

5.7 Recommendations

To address the burden of hypertension among employees, a multi-faceted approach is necessary. The following recommendations are proposed to promote hypertension awareness, prevention, and management in the workplace:

1. **Workplace-Based Interventions**: Implementing workplace-based interventions plays a crucial role in promoting hypertension awareness, prevention, and management. These interventions should target high-risk employees and address modifiable risk factors such as physical inactivity, unhealthy diet, alcohol intake, and smoking. Effective interventions may include tailored wellness programs, health coaching, counselling, and behavioural change programs (Hu, 2023).

2. **Comprehensive Health Education Programs:** Developing and implementing comprehensive health education programs can significantly improve employees' knowledge about hypertension, its complications, and management. These programs should cover topics such as hypertension definition, risk factors, symptoms, diagnosis, treatment options, lifestyle modifications, and complications of untreated high blood pressure.
3. **Regular Health Screenings and Monitoring**: Conducting regular health screenings and monitoring can help identify employees with hypertension and provide timely interventions. Health screenings should include measurements of blood pressure, body mass index (BMI), waist circumference, blood glucose, and lipid profiles. Employees with hypertension should receive regular monitoring and follow-up to ensure effective management of their condition.
4. **Employee Engagement and Participation**: Encouraging employee engagement and participation in health promotion activities is essential for promoting a culture of health and wellness in the workplace. Employers should provide opportunities for employees to participate in physical activity programs, healthy eating initiatives, and stress management workshops. Employee engagement can be fostered through various strategies, including incentives, recognition, and leadership support.
5. **Policy Development and Implementation:** Developing and implementing policies to support employee health and well-being is critical for promoting a healthy work environment. Policies should include provisions for hypertension prevention and management, such as flexible work arrangements, healthy food options, and access to fitness facilities. Employers should also provide resources and support for

employees with hypertension, including access to counseling and employee assistance programs.

6. **Longitudinal Studies and Evaluation**: Conducting longitudinal studies can provide valuable insights into the effectiveness of workplace-based interventions and track changes in hypertension prevalence and management over time. Employers should evaluate the effectiveness of their interventions and make data-driven decisions to improve their health promotion programs.
7. **Intersectoral Collaboration:** Fostering intersectoral collaboration between employers, healthcare providers, and community organizations is essential for promoting a comprehensive approach to hypertension prevention and management. Collaboration can facilitate the sharing of resources, expertise, and best practices, ultimately leading to improved health outcomes for employees. Partners should include the Ministry of Health and Child Care, the Ministry of Labour and Social Development, the Ministry of Mines and Mining development, and any other ministries concerned with employee health.

5.8 Plan for dissemination of results

Upon completion of the study, the research findings will be shared with the Baines Occupational Health Services management and staff, companies that had employees who participated in the study, the Ministry of Health and Child Care, and occupational health and safety personnel to increase awareness of hypertension among employees in different sectors.

5.9 Summary

In conclusion, this study provides valuable insights into hypertension and BMI among employees, as well as their knowledge levels about hypertension. The findings suggest that employees had good knowledge about hypertension, its risk factors, complications, and management, consistent with previous studies. However, the study also highlights the need for targeted interventions to improve knowledge among specific subgroups, such as younger employees and those with lower incomes, and underscores the importance of comprehensive health education programs addressing the fundamental aspects of hypertension. Ultimately, the study emphasizes the need for ongoing education and awareness programs to further improve employees' knowledge about hypertension and its management, thereby mitigating the burden of this pervasive health risk, a silent killer.

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APPENDICES

Appendix I: Informed Consent

My name is **Godknows Madziva**, a final year (Masters of Public Health) student from Africa University. I am carrying out a study on the **Assessment of Effects of Knowledge on Hypertension Among Employees Attending Baines Occupational Health Clinic in Harare, Harare Metropolitan Province, in Zimbabwe, 2024.** Ethical clearance **- APPROVAL NUMBER: AUREC 3425/24**. I am attached to Baines Occupational Health Services, Harare. I am kindly asking you to participate in this study by answering the Hypertension Knowledge-Level Scale Questionnaire. If you have any questions regarding the form feel free to contact the researcher on the phone number or email below.

Contact Details: +263772580674 Email: madzivag@africau.edu

Procedures and duration

No procedure or measurements will be conducted on you as this will be an online survey. There are three sections on the form which will take approximately 15 minutes to complete. The first section includes informed consent, and the second section is on demographic, occupational and behavioral questions. The second section includes 22 questions to assess knowledge of hypertension.

Risks and discomforts

There are no perceived risks or discomforts as this will be an online survey.

Benefits and/or compensation

There will be no financial or material benefits to you in this study. This study is being conducted to improve awareness, treatment, and control of hypertension. Where necessary, referrals will be recommended for participants.

There will be no additional costs to you except data required to complete the form.

Confidentiality

If you indicate your willingness to participate in this study by agreeing to fill in the form, the findings of the study and any information found in this study will be disclosed to the Academic panel of the Africa University and the Ministry of Health and Child Welfare. Results may be shared at different forums but only for the purpose of improving service provision to employees and patients. No personal information will be disclosed to anyone. Names and any other identification will not be asked for in the questionnaires. The AUREC or University panel may need to review records for compliance audits hence they will be given access to the questionnaires.

Voluntary participation

Participation in this study is voluntary. If the participant decides not to participate in this study, their decision will not affect their future relationship with organization or the investigator. If they choose to participate, they are free to withdraw their consent and to discontinue participation without penalty.

Offer to answer questions

Before you agree to fill in this form, please ask any questions on any aspect of this study that is unclear to you. You may take as much time as necessary to think it over.

Authorization

If you have decided to participate in this study, please click on the Informed Consent in the space provided below as an indication that you have read and understood the information provided above and have agreed to participate.

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Name of Research Participant (please print) Date

Signature of Research Participant

If you have any questions concerning this study or consent form beyond those answered by the researcher including questions about the research, your rights as a research participant, or if you feel that you have been treated unfairly and would like to talk to someone other than the researcher, please feel free to contact the Africa University Research Ethics Committee on telephone (020) 60075 or 60026 extension 2156 email aurec@africau.edu

Name of Researcher ----------

"Investing in Africa's future"

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC)

P.O. Box 1320 Mutare, Zimbabwe, Off Nyanga Road, Old Mutare-Tel (+263-20) 60075/60026/61611 Fax: (+263 20) 61785 Website: www.africau.edu

Ref: AU 3425/25 7 February, 2025

GODKNOWS MADZIVA
C/O Africa University
Box 1320
MUTARE

RE: ***ASSESSMENT OF EFFECTS OF KNOWLEDGE ON HYPERTENSION AMONG EMPLOYEES ATTENDING OCCUPATIONAL HEALTH CLINIC IN HARARE, HARARE METROPOLITAN PROVINCE, ZIMBABWE 2024***

Thank you for the above-titled proposal you submitted to the Africa University Research Ethics Committee for review. Please be advised that AUREC has reviewed and approved your application to conduct the above research.

The approval is based on the following.

a) Research proposal

- **APPROVAL NUMBER** AUREC 3425/25
  This number should be used on all correspondences, consent forms, and appropriate document
- **AUREC MEETING DATE** NA
- **APPROVAL DATE** February 7, 2025
- **EXPIRATION DATE** February 7, 2026
- **TYPE OF MEETING**: Expedited
  After the expiration date, this research may only continue upon renewal. A progress report on a standard AUREC form should be submitted a month before the expiration date for renewal purposes.
- **SERIOUS ADVERSE EVENTS** All serious problems concerning subject safety must be reported to AUREC within 3 working days on the standard AUREC form.
- **MODIFICATIONS** Prior AUREC approval is required before implementing any changes in the proposal (including changes in the consent documents)
- **TERMINATION OF STUDY** Upon termination of the study a report has to be submitted to AUREC.

AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE (AUREC) APPROVED P.O. BOX 1320, MUTARE, ZIMBABWE

Yours Faithfully

MARY CHINZOU
FOR CHAIRPERSON
AFRICA UNIVERSITY RESEARCH ETHICS COMMITTEE

Appendix II: Hypertension Knowledge-Level Scale Questionnaire

Attached is an online Google Forms which has incorporated the HKLS Questionnaire

https://docs.google.com/forms/d/e/1FAIpQLSekCfnHTixZMn9enszg2hnvy3t_N5YsDAGMrsd6uAkeVfr7OQ/viewform?usp=sf_link

1.	Age	18-29
		30-39
		40-49
		>50
2.	Sex	Male
		Female
3.	Marital status	Single
		Married
		Divorced
		Widowed
4.	Religion	Christianity
		African Tradition
		Apostolic
		Other (*Specify)*
5.	Level of Education	Primary
		High School
		Tertiary
6.	Type of Industry	Agriculture
		Mining
		Construction
		Manufacturing and Retail
		Transportation
		Food Industry
		Other (*Specify*)
7.	Type of Occupation	Skilled
		Semi-skilled
		Unskilled
8.	Monthly Income (*equivalent to or in USD*)	< $300
		$300 - $600
		>$600
9.	Do you smoke?	Yes
		No
10.		# of cigarettes/day

	If yes, how many cigarettes per day and number of years	# of years smoking				
11.	Do you consume alcohol?	Yes				
		No				
12.	If yes, how many units per week? *(1 unit of alcohol = 1 pint of beer/ shot of whisky/ glass of wine)*					
13.	How often do you exercise? *(1 – rarely and 5 – daily)*	1	2	3	4	5
14.	What type of exercise do you do?					
15.	How often do you experience stress at work? (*Scale: 1-5, 1 – rarely and 5 - almost always)*	1	2	3	4	5
16.	What are the main sources of stress at your workplace? (*Select all that apply*)	Workload				
		Deadlines				
		Conflicts with colleagues				
		Lack of control over work				
		Poor work-life balance				
		Other (*please specify*)				
17.	Do you feel supported by your employer in managing stress and mental health? (*Scale: 1-5, 1 – strongly disagree and 5 – strongly agree)*	1	2	3	4	5
18.	Do you feel that your workplace environment supports your efforts to prevent and/or manage hypertension? (*Scale: 1-5, 1 – strongly disagree and 5 – strongly agree)*	1	2	3	4	5
19.	Are there resources available at your workplace to help prevent and manage hypertension, stress, and mental health? *(Select all that apply)*	Employee Assistance Program (EAP)				
		Mental health days				
		Wellness programs				
		Stress management training				
		Other (*please specify*)				
20.	Do you have a family history of Hypertension or High Blood Pressure?	Yes				
		No				
21.	Have you been diagnosed with hypertension or High Blood Pressure? (*If No skip 11*)	Yes				
		No				
22.	Are you currently on medication for hypertension or High Blood Pressure?	Yes				
		No				
23.	What is your current blood pressure? (*Average of two BP measurements*)	Systolic mmHg		Diastolic mmHg		

24.	What is your current BMI? *(BMI = (weight in kilograms) / (height in meters)²*			
25.				
26.	**Hypertension Knowledge-Level Scale**	**Correct**	**Incorrect**	**Don't Know**
27.	High systolic (maximum) or diastolic (minimum) blood pressure indicates increased blood pressure.			
28.	High diastolic (minimum) blood pressure also indicates increased blood pressure.			
29.	High blood pressure is caused by aging, so it does not require treatment.			
30.	If the medicine for high blood pressure can control blood pressure, there is no need to change lifestyle.			
31.	If people with high blood pressure change their lifestyle, there is no need for treatment.			
32.	People with high blood pressure should take their medications as they believe it is the best way.			
33.	High blood pressure medicines should be taken daily.			
34.	People with high blood pressure should take their medication only when they feel bad.			
35.	People with high blood pressure should take their medication for the rest of their lives.			
36.	For people with high blood pressure, frying is the best way to prepare food.			
37.	For people with high blood pressure, cooking only in water and or grilling are the best ways to prepare food.			
38.	People with high blood pressure can eat food without controlling the amount of salt provided they take their medications every day.			
39.	People with high blood pressure should eat fruits and vegetables often.			
40.	The best type of meat for people with high blood pressure is red meat.			
41.	The best type of meat for people with high blood pressure is white meat.			
42.	People with high blood pressure should not smoke.			
43.	People with high blood pressure can drink alcohol at will.			

44.	If high blood pressure is not treated it can cause stroke.			
45.	If high blood pressure is not treated it can cause a heart attack			
46.	If high blood pressure is not treated, it can lead to premature death.			
47.	If high blood pressure is not treated, it may cause the kidneys to stop working.			
48.	If high blood pressure is not treated, it can cause eye problems.			

Adopted from Brazilian version of the Hypertension Knowledge-Level Scale and usage guidelines. Curitiba, PR, Brazil, 2018 (Arthur et al., 2018)

Appendix III Study timeline

Description	Timeline
Proposal submission and re-approval	January-February 2025
Data Collection	February 2025
Data Analysis, Results, and Discussion	March 2025
Final Submission	March 2025

Appendix IV Study budget

The study has been designed to minimize direct costs. As the research relies on secondary analysis of existing medical records and an online survey platform (Google Forms), there are no expenses associated with participant recruitment, travel, or printing of questionnaires. Data from the medical records will be entered directly into Microsoft Excel, and the data from the online survey will be automatically exported to Excel, eliminating the need for separate data entry software or services. Therefore, the primary resources required for this study are the researcher's time and access to statistical software (Stata).

Appendix V Permission letter from study site.

See attached below:

BAINES OCCUPATIONAL HEALTH SERVICES

"Occupational Health and Safety Solutions"

HARARE
GWERU
Suite 2, Dutton Court
27 Baines Avenue Cnr Blakiston
Box 1008, Harare, Zimbabwe
+263 24 2250465
E Mail: bohshre@bainesohs.org

BULAWAYO
Suite 1, Glendyne Court
12th Avenue & J Tongogara
Box 833, Bulawayo, Zimbabwe
+263 29 273452
bohsbyo@bainesohs.org

Suite 1, 22A – 7th Street
Box 1924
Gweru, Zimbabwe
+26354 2230141/2
bohsgweru@bainesohs.org

16 August 2024

Dr G Madziva
27 Baines Avenue
Harare, ZIMBABWE

Dear Dr Madziva

RE: PERMISSION TO CONDUCT A RESEARCH STUDY AT BAINES OCCUPATIONAL HEALTH SERVICES

I am writing in response to your request to conduct a research study titled "Assessment of Effects of Knowledge on Hypertension Among Employees Attending Occupational Health Clinic in Harare, Harare Metropolitan Province, Zimbabwe 2024" at Baines Occupational Health Services.

Upon review of your research proposal, we are pleased to permit you to conduct your study at our facility. We believe that your research aligns with our commitment to promoting employee health and well-being.

To ensure the smooth conduct of your research, we kindly request that you adhere to the following conditions:

- Obtain informed consent from all participating employees.
- Maintain the confidentiality of all participant data.
- Share your research findings with Baines Occupational Health Services upon completion of the study.

We wish you success in your research endeavours and look forward to collaborating with you.

Yours faithfully

PROFESSOR D. MOYO
EXECUTIVE DIRECTOR