PREVALENCE OF HYPERTENSION AMONG HEALTHCARE WORKERS IN KORLE BU TEACHING HOSPITAL: AN ASSESSMENT OF WORK AND LIFESTYLE RELATED FACTORS

BY

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JULY, 2019
DECLARATION

I, Sefakor Juliet Kpormegbe, assert that this work is the outcome of my own research, and has not been submitted either in part or in whole elsewhere for any other degree. References to other people’s work have been properly acknowledged.

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SEFAKOR JULIET KPORMEGBE DATE

(STUDENT)

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DR. JOHN ARKO – MENSAH DATE

(ACADEMIC SUPERVISOR)
DEDICATION

I dedicate this dissertation is to my Heavenly Father who has given me strength, knowledge and understanding. Also, to my husband and two boys especially the new ‘MPH’ baby, who have been supportive and very understanding. Not forgetting my loyal friends. I really appreciate your help in diverse ways.

Thank you so much.
ACKNOWLEDGEMENT

Thanks be to God who has given me so much fortitude throughout this course. I am sincerely grateful to my academic supervisor Dr. John Arko-Mensah for his unwavering direction and guidance through this work in spite of his very busy schedule. He’s more than a father. God bless you opulently for your support. I am also very appreciative to all staff and lecturers of the School of Public Health, particularly Department of Biological, Environmental Occupational Health Sciences. Thank you for all your concerns.

I wholeheartedly thank my lovely husband and two cute sons for being supportive.

To all my colleagues and friends, I sincerely appreciate every one of you. This couldn’t have been successful without you.

I wish to specially thank the Institutional review board of Korle Bu Teaching Hospital for the permission granted me to carry out this research. I really appreciate all the respondents who took part in this work. In fact, without your involvement, this work would not have been completed.

I finally want to thank all who helped in different ways to complete this project.
ABSTRACT

Background: Hypertension or high blood pressure is a major cause of cardiovascular diseases and premature death among adults in the world. In Ghana, it is common knowledge that most people do not consider hypertension a serious health condition, and therefore do not constantly monitor it. Hypertension is commonly known as the “silent killer”.

Objective: The aim of this study was to determine the prevalence and risk factors associated with hypertension among health workers in Korle Bu Teaching Hospital (KBTH).

Methods: The study was a cross-sectional, hospital-based study of health care workers in Korle Bu Teaching Hospital. Convenient sampling was used to recruit health care workers for the study, and a structured questionnaire was administered to collect data on socio-demographic profile, dietary habits, physical activities, work schedule and alcohol consumption. Weight, height and blood pressure (SBP and DBP) were measured using standard methods and body mass index (BMI) calculated and categorized by WHO classification. The study also looked at the relationship between socio-demographic factors, dietary habits, lifestyle factors, work schedule, physical inactivity and hypertension among the healthcare workers. To determine associations between hypertension and independent variables, logistic regression analysis was used.

Results: The results of the study showed overall prevalence of hypertension to be 26.7%, and prevalence among doctors and nurses as 24.4% and 27.6%. There was a significant association (p<0.05) between years of employment, department of work, levels of physical activity, family history of hypertension and prevalence of hypertension. Of the 300 respondents, 38.7% had normal weight, 33.3% were overweight and 28% were obese. There was no relationship (p>0.05) between alcohol consumption, work schedule, dietary habits, age and sex and hypertension.
Conclusion: Hypertension prevalence rate is high among health workers who are important stakeholders in health delivery in Ghana, and Ghana health Service and Korle Bu Teaching Hospital should develop policies to help educate staff on preventive measures.

Keywords: Hypertension, Healthcare workers, prevalence
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LIST OF ACRONYMS

BMI - Body Mass Index

BP - Blood Pressure

CVD – Cardiovascular disease

DBP - Diastolic Blood Pressure

HPTN - Hypertension

JNC - Joint National Committee

KBTH – Korle Bu Teaching Hospital

SBP - Systolic Blood Pressure

WHO - World Health Organization
### DEFINITION OF TERMS

<table>
<thead>
<tr>
<th><strong>Healthcare workers</strong></th>
<th>Doctors and Nurses.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypertension</strong></td>
<td>Systolic blood pressure $\geq 140$mm Hg and/or diastolic blood pressure $\geq 90$mm Hg.</td>
</tr>
<tr>
<td><strong>Normal work schedule</strong></td>
<td>Participants who work 8 hours per day.</td>
</tr>
<tr>
<td><strong>Extra work schedule</strong></td>
<td>Participants who work more than 8 hours per day.</td>
</tr>
<tr>
<td><strong>Alcohol consumers</strong></td>
<td>These are participants who are currently consuming drinks which contain alcohol at least on an occasional basis.</td>
</tr>
</tbody>
</table>
CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Hypertension is a leading risk factor for cardiovascular diseases (CVDs), and could lead to morbidity and death [Bromfield & Muntner, 2013]. Some decades ago, it was generally thought that hypertension and its associated complications were only a burden in advanced countries [Shridhar et al., 2015]. However, due to changing lifestyles in many developing countries, CVDs are becoming quite prevalent among both older and relatively younger age groups [Sandhu et al., 2015]. The global burden of hypertension among adult population is estimated to rise from 26% (972million) in the year 2000 to 29% (1.56 billion) by 2025 with linked cardiovascular issues [Mensah & Bakris, 2011].

In order to curtail the increasing burden of hypertension, the prevalence, origins and associated risk factors must be fully understood so as to implement programs and policies for prevention, early detection and management [Mendez-Chacon, 2008]. The main risk factors connected with hypertension include age, family history, educational background, obesity, socioeconomic status, salt intake, physical inactivity as well as tobacco and alcohol consumption [Mendez-Chacon, 2008; Singh et al., 2017; Soubeiga et al., 2017]. These predisposing factors may however vary from region to region and country to country [Singh et al., 2017]. Quaicoe-Duho, (2015) estimated that 25 percent of public servants in Ghana are hypertensive while most adults in Ghana are on medication for diabetes, hypertension and other chronic illnesses. This situation affects the productivity of the workforce. In Angola for instance, a study conducted among workers in a tertiary health care centre showed prevalence of hypertension to be 17.93% and 54.03% for pre-hypertension which was associated with age, overweight and obesity (Paquissi et al., 2016).
1.2 Problem statement

Globally, non-communicable diseases (NCDs) like hypertension, diabetes, and cancers have become the chief cause of morbidity and death over last few decades. [Agyei-Mensah, 2010]. The burden and rise of NCDs is higher in low and medium income countries particularly with rising affluence and westernized lifestyles [WHO, 2012].

Healthcare workers serve as the mentors of health and healthy lifestyles to the average citizen as they educate and create awareness in communities. Apart from been exposed to myriad of occupational hazards in the workplace, they are also known to work under stressful conditions and tight schedules and often tend to give less attention and care to themselves. These factors expose health workers to factors that predispose them to developing non-communicable diseases.

Generally, the risks appear to increase when an individual continues to work longer at nights as it tends to disrupts biological rhythms, sleep and social life. Shift work has been connected to metabolic syndrome which is a mixture of health issues like hypertension (HPTN), diabetes, obesity, and undesirable cholesterol levels.

The prevalence of HPTN and triggers amongst health professionals in Ghana must therefore be evaluated in order to appreciate prevalence and risk factors so as to formulate relevant programs to control or manage it.

1.3 Conceptual framework

The conceptual framework indicates an association between the dependent variable, hypertension and independent variables such as lifestyle factors (dietary habits, alcohol consumption, smoking, level of physical activity, work schedule and stress), obesity, socio
– demographic factors (age, sex, residence, occupation, marital status), family history of hypertension (Figure 1.1).

Figure 1.1: Conceptual framework
1.4 Justification

Considering the work schedule and lifestyle of a healthcare worker in the major referral centre in Ghana, it is obvious that much work input is needed. This does not give the healthcare worker the opportunity to eat properly (since most accessible foods around workplace are fast foods) and have inadequate level of physical activity.

In Ghana, there are inadequate studies on the prevalence of hypertension and its related triggers amongst health care workforces. Therefore, the outcome from this research will add to literature on the prevalence of HPTN and its related triggers amongst healthcare workers. Also, adequate data on the prevalence of hypertension will be able to direct policy makers to put effective measures in place to manage and control the condition.

The findings from this study would assist in identifying health care professionals in Korle Bu Teaching Hospital having or not having hypertension. By virtue of this study, epidemiological data which can support planning, prevention, diagnosis and management of hypertension would be provided.

1.5 Objectives

1.5.1 General Objectives

To determine the prevalence and risk factors associated with hypertension among health workers in Korle Bu Teaching Hospital (KBTH).

1.5.2 Specific Objectives

1. To determine the prevalence of hypertension among health workers in KBTH.

2. To determine lifestyle or behavioural factors associated with hypertension among health workers.
3. To determine work-related factors associated with hypertension among health workers.

1.5.3 Research questions

1. What is the prevalence of hypertension among healthcare workers in KBTH?

2. Which lifestyle factors are predominant among health workers?

3. What work-related factors affect the development of hypertension among health workers?
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Hypertension is a key risk factor for cardiovascular diseases and mortality and is significant in the Global Disease Burden [Bromfield & Muntner, 2013]. CVDs are the principal cause of mortality and morbidity worldwide, and there is an increasing level mortality especially in sub-Saharan Africa [Lozano et al., 2012, Mendis et al., 2015]. The global problem of HPTN amongst population of adult is estimated to rise from 26% (972million) in the year 2000 to 29% (1.56 billion) by 2025 with related cardiovascular problems [Mensah & Bakris, 2011]. These statistics presents an alarming public health challenge that should be urgently tackled, keeping in mind that hypertension is a leading trigger for stroke and heart failure. In a bid to curtail the increasing problem of hypertension, the prevalence, origins and associated risk factors must be fully understood so as to implement programs and policies for prevention, early detection and management [Mendez-Chacon et al., 2008]. In Africa, there is lacking adequate data both on the prevalence of the burden and triggers but work in Burkina Faso showed being male, fat intake, family history, high BMI and old age were linked to higher likelihood of high blood pressure [Soubeiga, et al., 2017]. Healthcare workers are the mentors of health to citizens, as they educate and create awareness in the communities and therefore important to have reliable data and understanding of the prevalence as well as work and lifestyle related triggers that lead to developing hypertension.
2.2 Hypertension

Hypertension is diagnosed when a persistently high blood pressure is accurately measured on at least two separate times after the patient relaxes prior to measurement. According to the 7th report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC VII), the following classifications are used:

<table>
<thead>
<tr>
<th>Systolic blood pressure (SBP) mmHg</th>
<th>diastolic blood pressure (DBP) mmHg</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;120</td>
<td>&lt;80</td>
<td>Normal</td>
</tr>
<tr>
<td>120-139</td>
<td>80-89</td>
<td>Pre-hypertension</td>
</tr>
<tr>
<td>140-159</td>
<td>90-99</td>
<td>Hypertension stage 1</td>
</tr>
<tr>
<td>≥160</td>
<td>≥100</td>
<td>Hypertension stage 2</td>
</tr>
</tbody>
</table>

Source: (Sumaila et al., 2016)

Clinically, BP equivalent to or higher than 140/90 mmHg is considered hypertensive. In determining the pathophysiology of hypertension, a small percentage (2 to 5) are ascribed to underlying adrenal or renal disease (secondary hypertension) and the remaining 95% (essential hypertension) caused by different factors acting in various ways, contributing to the progress of the ailment [Weber, et al., 2014]. Among the factors studied are salt intake, insulin resistance, obesity, genetics, endothelial dysfunction, restricted intrauterine nutrition, low birth weight and the renin-angiotensin system. These factors interact to cause vascular changes including arterial thickening, increased wall-to-lumen ratio and vasomotor character abnormalities leading to endothelial dysfunction which may either lead to reduced tissue perfusion or trigger downstream pathways that alters genetic functions and the development of concomitant cardiovascular symptoms [Yannoutsos, et al., 2014, Viola & Soehnlein, 2015]. Accurate measurement and diagnosis is very crucial to management,
treatment and prevention [Daskalopoulou et al., 2015] and this will require correct preparation of the patient, trained personnel and reliable devices [Roubsanthisuk et al., 2007]. In addition, a thorough assessment to establish cause, severity and associated risks which includes clinical history, diet history, drug usage, smoking status, existence of end organ damage and concomitant CVD should be conducted [O’Shea, 2017].

Blood pressure measurement can be done using an automated electronic device or sphygmomanometer, with the former giving values that are more reproducible and without observer biases [Delacroix et al., 2014]. In managing hypertension, the primary goal is to decrease the blood pressure and as well dealing with cardiovascular triggers such as obesity, diabetes/glucose intolerance, lipid disorders and smoking [Weber et al., 2014]. This implies not only drug therapy but as well life style changes like a healthy diet, increasing physical activity and losing weight. Pharmacologic treatment involves the usage of ACE inhibitors, Angiotensin receptor blockers, calcium channel blockers, diuretics, beta-blockers, aldosterone antagonists, vasodilators, and recently alpha blockers [Weber et al., 2014, Delacroix et al., 2014].

2.3 Prevalence and disease burden of hypertension

43 million Americans (one in four adults) are affected by hypertension [Zoorob et al., 2000]. In the Framingham Study, which was instituted as a result of the death of President Franklin D. Roosevelt due to uncontrolled hypertension and subsequently stroke and heart attack, it was observed that two-thirds of normotensives developed hypertension during follow-up within a 60-year period [Mahmood et al., 2014]. In Ghana, the prevalence of HPTN defined as BP ≥ 140/90 mmHg is from 19% to 48% [Bosu, 2010], with another study reporting 54.6% in urban and 19.3% in deprived areas [Addo et al., 2012]. These figures are considerably high compared to 25.7% in Malaysia [Hazmi et al., 2015], 13.5% for stage 1
hypertension and 16.2% for stage 2 hypertension in Kenya [Onyango et al., 2017], 25% in Costa Rica [Mendez-Chacon et al., 2008], 18.1% - 26.5% among students in Egypt [Moussa Mohamed Moussa et al., 2016], 15.37% and 24.81% in rural and urban Burkina Faso [Soubeiga et al., 2017], 28.3% in Ethiopia [Adane et al., 2012] and 20.1% among healthcare workers in Nigeria [Amole, 2015].

In spite of the high prevalence rates, the levels of diagnosis and treatment are low and as urbanisation increases, the burden and occurrence of complications like stroke will increase [Addo et al., 2012]. Another work revealed that only 32.3% of hypertensives were cognisant of their ailment and less than 50% of that number had been receiving treatment [Addo et al., 2006]. Studies however show that prevalence in developed countries are decreasing as opposed to increasing prevalence rates in developing countries with the main challenges being inability to accurately diagnose and to adequately control [Mohsen, 2018].

2.4 Risk factors associated with hypertension

The process of hypertension is known to start early in adolescent life and progresses with increasing age [Weber et al., 2014]. Hypertension affects a great number of young employees possibly due to increased prevalence of obesity and smoking [Shen et al., 2017]. Several reports show that men have an increased prevalence than women due to high incidence of dyslipidaemia, diabetes and obesity (metabolic syndrome) and prevalence increased with age in both sexes [Shen et al., 2017; Ouyang et al., 2012; Yang et al., 2015]. Many triggers are reported to cause the progression of high blood pressure, comprising of smoking habit, family history of HPTN, high glycaemic and lipid levels, unhealthy diet, inadequate physical activity, age, sex, stress and overweight/obesity [Ibhazehiebo et al., 2007; Yanai et al., 2008]. Interestingly other researches suggest that level of education and type of work maybe associated with level of hypertension [Wei et al., 2014] and adopting a
low-risk lifestyle and dietary results in lower incidence of hypertension in women [Forman et al., 2009] suggesting that hypertension can be prevented in many cases.

Systematic reviews show over-nutrition, alcohol consumption, high salt intake, high BMI, family history of hypertension and old age are the triggers that are individually connected to hypertension in Ghana. Whereas sex differences are not significant, urban populations have higher prevalence compared to rural populations [Addo et al., 2012; Bosu, 2010]. However, current study in the Hohoe Municipality in Ghana, showed rural populations had slightly higher level of prevalence than urban areas despite the fact that the difference was insignificant statistically [Solomon et al., 2017]. A study in an urban area in Accra, showed a prevalence rate of 25.4% out of which only 32.3% were aware of their state, with less than half on treatment [Addo et al., 2006]. These observations necessitate not only assessing prevalence rates but factors associated with diagnosis and treatment in Ghana. If a significant number are unaware of their ailment and less than half of those aware receiving treatment, this could be a serious public health challenge in the near future as uncontrolled hypertension is responsible for a large number of mortalities and morbidities.

2.4.1 Prehypertension

Prehypertension is not a disease category but regarded a trigger for hypertension. It is defined by Benjamin et al., (2017) as SBP of 120-139 mm Hg or DBP of 80-89 mm Hg; which are below demarcated values of hypertension; SBP > 140 mm Hg and DBP > 90-99 mm Hg. Prehypertension is used to identify persons who based on blood pressure recordings, have a greater chance of getting hypertension. This helps to alert the individual and clinician to the risk of hypertension and further inform the adoption of lifestyle changes that would reduce risk of hypertension (Benjamin et al., 2017). Patients in this category are not candidates for drug therapy, but are encourage to adopt lifestyle modifications to reduce
their risk. Wang and Wang, (2004) found the prevalence of prehypertension to be about 31% without influence of race or ethnicity. They also found that the likelihood of women having prehypertension are lower significantly than men. Prehypertension was also found to positively correlate with obesity and negatively correlate with age.

Greenland et al., (2004) disclosed that 85% of persons with prehypertension had more than one other associated risk factor for hypertension, suggesting that prehypertension alone was unlikely to trigger hypertension in a patient. Vasan et al., (2004) in a study to measure the rate of progression of prehypertension into hypertension concluded that over 4 years, the rate of advancement to hypertension was about 19%. The degree of development was found to correlate with age and severity of prehypertension. A similar 4-year research done by Ferguson et al., (2010) revealed that rate of advancement of prehypertension to hypertension was 28.7% with a 3-fold increase in risk observed, as compare to normotensive individuals.

### 2.4.2 Obesity

Obesity is defined as a body mass index of > 30 kg/m2, according to Kitahara et al., (2014). WHO in 2005, approximated 1.6 billion adults over 15 years to be overweight. Multiple works have disclosed a positive correlation between increased weight and systolic pressure in addition to diastolic pressure; a relationship that is nearly linear (Hall, 2003). It’s been publicised of obesity to be an independent trigger for hypertension (Park, 2009). Overweight and obesity are modifiable triggers of hypertension. In the Framingham heart Study, Mahmood et al., (2014) observed obesity being implicated in primary hypertension in 78% of males and 65% of females. The actual mechanism of obesity causing hypertension is not known, but possible mechanisms include increased body fat retention of sodium (Jiang et al., 2016), physical squeezing of kidneys by fat, stimulation of RAAS (Renin-Angiotensin-Aldosterone system, and high sympathetic nervous system activity (Hall et al., 2015).
2.4.3 High Sodium Diet

Sodium as commonly ingested in common salt, is an important ion required in the body for proper nervous and muscular system function, and regulation of fluid balance in the body (Ha, 2014). High dietary sodium has however been found to correlate directly to increased blood pressure levels (Institute of Medicine, 2005). Ma et al., (2015) showed also that high salt intake was connected to increasing weight gain, which is also a lone trigger of hypertension. Though conflicting studies have debated the role of reduced sodium intake in managing hypertension, the WHO and Food and Agriculture Organization of the United Nations endorsed as nutrient intake goal in the population a reduction of salt consumption lower than 5 g of salt per day (Ha, 2014).

2.4.4 Physical Inactivity

This is an important modifiable hypertension risk factor, making exercise a key component in the management of hypertension (Hedge and Solomon, 2005). Exercise has been found to decrease both SBP and DBP by up to 7mmHg independently in several studies (Diaz and Shimbo, 2013; Carlson et al., 2014). Mechanisms of blood pressure reduction have been documented to include dilatation of blood vessels, reduction in the activity sympathetic nervous system, decrease in weight, insulin sensitivity and favourable changes in oxidation stress (Diaz and Shimbo, 2013).

2.4.5 Alcohol Consumption

Several mechanisms may account for the hypertensive effect of alcohol. These include decrease of baroceptors action, decreased central nervous system (CNS) activity, rise in cortisol levels, stimulation of sympathetic nervous system and stimulation of RAAS (Husain et al., 2014). More than a few researches have established the relation between alcohol consumption and HPTN. For instance, in the Framingham study, it was established that
heavy alcohol users recorded a rise of 7 mmHg in mean arterial pressure when compared with all others (Mahmood et al., 2014). This alcohol-hypertension relationship was proven by Husain et al., (2014) to be alcohol dose dependent, implying that small quantities of alcohol consumption might not be detrimental to peripheral blood vessel and blood pressure health.

2.4.6 Tobacco use:

Tobacco can influence hypertension risk and is a main avoidable cause of hypertension. The extent to which smoking contributes to blood pressure is however debatable as several studies have reported little to no to decreasing effect of smoking on blood pressure (Gao et al., 2017). Proposed mechanisms by which smoking raising blood pressure include damage to blood vessel walls, arterial stiffness, inflammation, decreased endothelial function and increase in oxidation stress (Virdis e al., 2010).

2.4.7 Family History:

Family history is an essential non-modifiable trigger for hypertension. A review of the literature disclosed a positive family history of HPTN which significantly raised hypertension’s likelihood by about 1.4 to 4 times (Ranasinghe et al., 2015). He also in a survey involving 5000 adults disclosed the prevalence of hypertension to be significantly increased in individuals having a family background than individuals without a family background. In the same research and other studies, it was found that people with a family history had other possible triggers for hypertension including obesity, central obesity, higher sympathetic stimulation (Goldstein et al., 2008), and higher LDL cholesterol. The relationship of hypertension and family history was found to be demonstrated in children, siblings and parents, but less in the third generation (grandparents) (Ranasinghe et al., 2015).
2.4.8 Demographic Risk Factors:

Hypertension has classically been associated with increasing age [Weber et al., 2014]. Many studies have proven that the likelihood of getting hypertension rises significantly with age. Some authors have even proposed that blood pressure may inevitably increase with age (Gurven et al., 2012). In a cohort study, Vasan et al., (2004) concluded that greater than 90% of normotensive individuals will have hypertension in their course of life. This means that even previously healthy adults will have their blood pressure progressively increase as they age. In support, Mozaffarian et al., (2015) reported in a National Health and Nutrition Examination research that the prevalence of HPTN amongst adults older than 60 years was 70%, compared to 32% prevalence among adults aged 49-59 years. Of particular note is the fact that an increase in SBP is a primary characteristic of hypertension among older people (Mozaffarian et al., 2015).

Many studies have attempted to link hypertension to sex. Reckelhoff, (2018) stated that men have a higher HPTN prevalence than women until after menopause. Mozaffarian et al., (2015) found similar outcomes, indicating that until 45 years, a greater proportion of men have hypertension than women; the proportions are almost the same between the sexes from 45 to 64 years, and beyond 64 years, more women than men have hypertension. Curtler et al., (2008) had earlier concluded in a study involving 18-29year olds that prevalence rates of hypertension among women ranged from 1.5 to 4%, while rates among men were significantly higher at 5-10%. This means, the prevalence rates of hypertension in females and males may be related to age. These differences have been attributed to differences in immune response and RAAS activation rate between male and female (Gillis and Sullivan, 2016).

Hypertension has been found to be most prevalent in black, followed by native Americans, Caucasians, Hispanics and least of all, Asians (National Health Interview Survey, 2019).
The condition also appears to have higher occurrences of stroke (3 times), increased rates of end stage renal disease (4.2 times) and increased occurrences of fatal cardiac episodes (1.5 times) in blacks than in Caucasians (National Health Interview Survey, 2019).

2.5 Hypertension and risk factors among healthcare workers

The prevalence of hypertension and pre-hypertension amongst health workforces in Angola are 17.9% and 54% respectively, with prevalence of diabetes, overweight and obesity being 2.7%, 34.4%, 19.9% respectively [Paquissi et al., 2016]. The prevalence of smoking, family history of a cardiovascular disease, and alcoholism was 4.8%, 4.87%, and 45.33%, respectively [Paquissi et al., 2016]. In a similar research performed in Nigeria, prevalence of hypertension was 20.1%, with a high proportion (64.7%) being aware of their status, even though that leaves still a significant number of health workforces oblivious of their hypertensive status [Owolabi et al., 2015]. There seems to be lower prevalence among healthcare professionals compared to the general population with physicians showing lower prevalence among health workers supporting other findings that level of education might be allied with chances of getting hypertension [Guti et al., 2010].

Report of prevalence of 26.2% of undiagnosed hypertension among health workers in Nigeria draws grave concern and supports the relevance of studying healthcare workers who are expected to be the mentors of health to understand the factors associated with the disorder and its effect on their health [Sumaila et al., 2016]. Prevalence of hypertension in Ghana amongst healthcare workers (16.1%) is lower than that of the general public, even though there is an increased prevalence of pre-hypertension (52.7%) [Osei-Yeboah et al., 2018]. The associated risk factors overweight, obesity, dyslipidaemia and diabetes which may be modulated by age and adiposity [Osei-Yeboah et al., 2018]. Health care professionals mostly work in a shift system which has been shown to increase the odds ratio
for hypertension and as such might expose them to high risk due to the nature of their work [Yeom et al., 2017]. It is essential to acknowledge that other studies found no connection between shift work and HPTN [Alshahrani et al., 2016] even though an analysis of 9 cohort and 18 cross-sectional studies reveals that shift work does increase risk of hypertension [Manohar, S., et al., 2017].
CHAPTER THREE

3.0 METHODOLOGY

3.1 Study site

This study was conducted at the Korle Bu Teaching Hospital (KBTH), a tertiary hospital in the southern part of Ghana. It is located in Ablekuma Constituency along the Guggisberg Avenue (Figure 3.1). It was instituted to meet the tertiary health needs of all Ghanaians by making available facilities to train and educate health professionals, conduct research and provide specialist services to patients in the country.

![Figure 3.1: Map of Korle Bu Teaching Hospital](image)

The hospital has 17 clinical and diagnostic departments which include Medicine, Child Health, Obstetrics and Gynaecology, Laboratories, Radiology, Anaesthesia, Surgery, Pathology, Polyclinic, Accident Centre and the Surgical/Medical Emergency. Other Departments includes, Pharmacy, Engineering, Finance, General Administration.

It has an average day-to-day attendance of 1,500 patients and about 250 patient admissions.
The staff strength of the hospital is about 523 Doctors, 2,175 Nurses/ Midwives/ Auxiliary nurses, 139 Pharmacists/ Pharmacy Technicians/Dispensary Assistants and 125 Biomedical Scientists/ Laboratory Assistants.

### 3.2 Study design

A cross-sectional study design, involving the use of questionnaire (self-administered) to collect data on socio-demographic characteristics, medical and family history, occupational stress, level of physical activity, dietary habits, alcohol and smoking habits was used.

**Dependent variable or (Outcome variable):**

Hypertension

**Independent variable or (Explanatory variable):**

**Socio-demographic characteristics:** age, sex, occupation

**Work related factors:** work schedule, work load etc.

**Lifestyle or behavioural factors:** level of physical activity, dietary habits, alcohol and smoking habits.

**Body Mass Index**

**Others:** medical and family history, stress.

### 3.3 Study population

The study population were healthcare workers (doctors, nurses) in selected departments and units in the study area, KBTH. The participants in the study were recruited from the eight (8) clinical departments of the hospital – Internal Medicine, Surgery and Allied Surgery, Child Health, Obstetrics and Gynaecology, Anaesthesia and Intensive Care Units, Orthopaedics, Accident and Emergency and Polyclinic.
3.3.1 Inclusion criteria:
The study included only healthcare workers who satisfied the following criteria:

- Nurses and medical doctors in Korle Bu Teaching Hospital.
- Should have at least one year working experience in the hospital.

3.3.2 Exclusion criteria:

- Nurses and doctors who are absent at the time of the research.
- Pregnant doctors and nurses.

3.4 Sampling

3.4.1 Sampling size

The required minimum sample size for the study was determined with the Cochran’s sample size formula (Cochran, 1977):

\[
n = \frac{Z^2_{1-\alpha/2} \times P \times (1 - P)}{e^2}
\]

Where:

- \( n \) = minimum required sample size
- \( \alpha \) = Significance level = 5%
- \( e \) = Margin of error= 5%
- \( Z \) score = 1.96
- \( P \) = Prevalence of hypertension among health workers = 20% [Akinwumi et al., 2012]

\[
n = \frac{1.96^2 \times 0.2 \times (0.8)}{0.05^2} = 245.9 \sim 246
\]

The minimum required sample size (n) = 246
Considering non-response rate of 10% the minimum sample size was 271, however 300 respondents were involved.

3.4.2 Sampling method

Due to the tight schedule of these health workers, a convenient sampling method was used for participant selection, keeping with the doctor: nurse ratio of the hospital which is approximately 1: 2.5. Data on the nurses and doctors available for recruitment into the study was obtained from the departmental staff record. A total of 300 health workers (86 doctors and 214 nurses) were involved in the study distributed across various departments of the hospital as follows; Internal medicine 40 (13.3%), Surgery and allied surgery 41(13.7%), Child health 37(12.3%), Obstetrics & Gynaecology 41(13.7%), Anaesthesia and Intensive care unit 37(12.3%), 35(11.7%) Orthopaedics, 35(11.7%) Accident and Emergency and 34(11.3%) from Polyclinic. These numbers were obtained using proportionate sampling calculation as illustrated in table 3.1 below using the formula n/N × S; where:

n = number of health workers in the department

N = Overall total of health workers in the hospital (2698)

S = sample size for the study (300)
Table 3.1: Proportionate sampling calculations

<table>
<thead>
<tr>
<th>Departments</th>
<th>Calculation</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Medicine</td>
<td>$\frac{360}{2698} \times 300$</td>
<td>40</td>
</tr>
<tr>
<td>Surgery and allied surgery</td>
<td>$\frac{369}{2698} \times 300$</td>
<td>41</td>
</tr>
<tr>
<td>Child health</td>
<td>$\frac{333}{2698} \times 300$</td>
<td>37</td>
</tr>
<tr>
<td>Obstetrics and Gynaecology</td>
<td>$\frac{369}{2698} \times 300$</td>
<td>41</td>
</tr>
<tr>
<td>Anaesthesia and ICU</td>
<td>$\frac{333}{2698} \times 300$</td>
<td>37</td>
</tr>
<tr>
<td>Orthopaedics</td>
<td>$\frac{315}{2698} \times 300$</td>
<td>35</td>
</tr>
<tr>
<td>Accident and Emergency</td>
<td>$\frac{315}{2698} \times 300$</td>
<td>35</td>
</tr>
<tr>
<td>Polyclinic</td>
<td>$\frac{306}{2698} \times 300$</td>
<td>34</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>300</strong></td>
</tr>
</tbody>
</table>

3.5 Data collection tools

Only participants who provided informed consent after a detailed explanation of the study protocol prior to participation were included in the study. Interviews using self-administered questionnaires were conducted to obtain demographic, clinical data and their family history on the health workers.

Measurement of body weight was done using calibrated electronic Charder scale (Model HM 201M). Height was measured to the nearest 0.1 cm using a wall-mounted stadiometer. The height and weight were measured by research assistants and the values used. The participants were weighed bare-footed and in light clothing with their pockets emptied and before each weighing, the digital weighing scale was checked to make sure the reading is at zero kg. BMI was computed as weight divided by height squared ($\text{kg/m}^2$) for each participant.
Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured with participants after rest in a sitting position using a well calibrated electronic sphygmomanometer (Omron HEM–7120-E. Omron Healthcare Co. Ltd, Kyoto, Japan). These were measured twice at least 10 minutes apart, and the average value used.

3.6 Quality control

Standardized procedure was used in the process of data collection to ensure uniform and high-quality data.

The electronic scale was calibrated daily and placed on a flat floor before each measurement. The weight and height were accurately measured.

The SBP and DBP for each participant were measured twice by the research assistants and the mean values used to minimize any biases. The participants were encouraged to answer the questionnaires independently. Questionnaires were checked for completeness before they were accepted. Questionnaires were numbered during data entry to ensure that the questionnaires are not doubly entered.

3.7 Data processing and analysis

3.7.1 Statistical methods

Data entry, cleaning and analysis was done using STATA version 15.0. Descriptive statistics was utilized. Blood pressure readings were classified according to American Heart Association: Pre-hypertension: Systolic 120-139 mm Hg, diastolic 80-89 mm Hg; hypertension: Systolic >/= 140mmHg, diastolic >/= 90mmHg and normotensive: Systolic <120mmHg, diastolic < 80mmhg. BMI was calculated as weight in kilograms divided by the height in metre-squared, directly by the digital machine used for the measurements.
However, in this analysis, participants whose BP readings fell within normal and pre-hypertension were considered normal while those whose values fell in the stage 1 and 2 categories were considered hypertensive. With the value of BMI measured, participants were classified as normal, overweight and obese using the WHO classification. BMI of 18.5 -24.9kg/m² is normal; overweight: 25-29.9kg/m²; Obesity: >/= 30kg/m².

The data was also analyzed for cross tabulations. Logistic regression and Chi-square test were used to assess the association between the independent and dependent variables. A p-value of less than 0.05 was considered statistically significant. The prevalence of hypertension was compared among the health workers.

### 3.8 Pretest or pilot study

Pre testing of the questionnaires was done among 6 Doctors and 14 Nurses (doctor: nurse ratio of the hospital to be approximately 1: 2.5 as per the hospital’s record) at Greater Accra Hospital, which has similar characteristics with the KBTH. This process ensured adequacy of the questions, reaction of the respondents to the research questions, estimate the approximate time for each measurement and help make the necessary corrections or adjustments to the questionnaire for the actual study. Pretesting also served as practice for data collectors.

### 3.9 Confidentiality

All study participants were assigned a unique study number and all data coded. This ensured anonymity and all collected data were under lock and key and only assessable by the researcher.
3.10 Dissemination of Results

The results of this study were presented to the school of public health, university of Ghana as requirement for an MPH program. The final work was presented at local and internal conferences and submitted for publication.

3.11 Ethical Considerations

This study was carried out in accordance with the requirements of the KBTH IRB (Institutional Review Board) and Helsinki Declaration on Human Experiments in 1964 (revised in 2000). Participants were fully informed of the nature of the study. They were also made aware that partaking in this study was voluntary and that had the liberty to withdraw from the study at any period with no consequence. Anonymity was ensured using codes and access to data was restricted to the researcher and interviewers only. Subjects who agree to get involved in the study signed an informed consent after due explanation. Invasive investigations were NOT performed, and no laboratory procedure was carried out.

3.12 Limitations

The results of this research cannot be absolute, and it has some limitations.

1. This study only looked at doctors and nurses in the clinical departments; so, studies in the future should be done to cover other health workers and involve non-clinical departments as well in the hospital.

2. Selection bias was likely to occur due to the convenient sampling method used.

3. The findings cannot imply causality because the statistical methods used and sample size only explored associations.
CHAPTER FOUR

4.0 RESULTS

4.1 Socio-Demographic Characteristics of Respondents

The study comprised of 86 (28.7%) Doctors and 214 (71.3%) Nurses (Table 4.1). The mean age of study participants was 35.5 (±8.0) years. With regards to sex, 104 (34.7%) were males; of which 64 (74.4%) were doctors and 40 (18.7%) were nurses, and 196 (65.3%) were females, of which 22 (25.6%) were doctors and 174 (81.3%) were nurses. The age ranges were as follows; The age ranges were as follows; 27.7% (20-29) years, 37.3% (30-39), 32.3% (40-49), 2.7% (50-59). The mean ages for doctors and nurses respectively were 36±8.6 and 35.3±8.3.

Majority 179 (59.7%), of the respondents were married, 91 (30.3%) single, 21 (7%) cohabiting, 4 (1.3%) divorced and 5 (1.7%) widowed. More than half of the respondents reported to have household size of 1-3; 157 (52.3%) followed by 4-6 size 112 (37.3%), and 31 (10.3) had more than 6 sizes. 171 (57%) of the workers were staying outside Korle Bu Teaching Hospital whiles 129 (43%) stayed within.

The study showed that the average number of years and standard deviation a respondent had been employed in the institution was 9.4 ± 4.6 years.
Table 4.1: Socio-Demographic Characteristics of Respondents

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total N (%)</th>
<th>Doctors N (%)</th>
<th>Nurses N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>104 (34.7)</td>
<td>64 (74.4)</td>
<td>40 (18.7)</td>
</tr>
<tr>
<td>Female</td>
<td>196 (65.3)</td>
<td>22 (25.6)</td>
<td>174 (81.3)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 29</td>
<td>83 (27.7)</td>
<td>22 (25.6)</td>
<td>61 (28.5)</td>
</tr>
<tr>
<td>30 – 39</td>
<td>112 (37.3)</td>
<td>33 (38.4)</td>
<td>79 (36.9)</td>
</tr>
<tr>
<td>40 – 49</td>
<td>97 (32.3)</td>
<td>27 (31.4)</td>
<td>70 (32.7)</td>
</tr>
<tr>
<td>50 – 59</td>
<td>8 (2.7)</td>
<td>4 (4.7)</td>
<td>4 (1.9)</td>
</tr>
<tr>
<td>60 and above</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Mean age ± SD</strong></td>
<td>35.5±8.0</td>
<td>36±8.6</td>
<td>35.3±8.3</td>
</tr>
<tr>
<td><strong>Departments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>40 (13.3)</td>
<td>12 (14.0)</td>
<td>28 (13.1)</td>
</tr>
<tr>
<td>Surgery &amp; Allied Surgery</td>
<td>41 (13.7)</td>
<td>12 (14.0)</td>
<td>29 (13.6)</td>
</tr>
<tr>
<td>Obstetrics &amp; Gynaecology</td>
<td>41 (13.7)</td>
<td>12 (14.0)</td>
<td>29 (13.6)</td>
</tr>
<tr>
<td>Anaesthesia &amp; Intensive Care Units</td>
<td>37 (12.3)</td>
<td>10 (11.6)</td>
<td>27 (12.6)</td>
</tr>
<tr>
<td>Child Health</td>
<td>37 (12.3)</td>
<td>10 (11.6)</td>
<td>27 (12.6)</td>
</tr>
<tr>
<td>Accident &amp; Emergency</td>
<td>35 (11.7)</td>
<td>10 (11.6)</td>
<td>25 (11.7)</td>
</tr>
<tr>
<td>Orthopaedics</td>
<td>35 (11.7)</td>
<td>10 (11.6)</td>
<td>25 (11.7)</td>
</tr>
<tr>
<td>Polyclinic</td>
<td>34 (11.3)</td>
<td>10 (11.6)</td>
<td>24 (11.2)</td>
</tr>
<tr>
<td><strong>Household Size</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 – 3</td>
<td>157 (52.3)</td>
<td>38 (44.2)</td>
<td>119 (55.6)</td>
</tr>
<tr>
<td>4 – 6</td>
<td>112 (37.3)</td>
<td>39 (45.3)</td>
<td>39 (45.3)</td>
</tr>
<tr>
<td>More than 6</td>
<td>31 (10.3)</td>
<td>9 (10.5)</td>
<td>9 (10.5)</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>91 (30.3)</td>
<td>26 (30.2)</td>
<td>65 (30.4)</td>
</tr>
<tr>
<td>Married</td>
<td>179 (59.7)</td>
<td>51 (59.3)</td>
<td>128 (59.8)</td>
</tr>
<tr>
<td>Co-habiting</td>
<td>21 (7.0)</td>
<td>6 (7.0)</td>
<td>15 (7.0)</td>
</tr>
<tr>
<td>Divorced</td>
<td>4 (1.3)</td>
<td>2 (2.3)</td>
<td>2 (0.9)</td>
</tr>
<tr>
<td>Widowed</td>
<td>5 (1.7)</td>
<td>1 (1.2)</td>
<td>4 (1.9)</td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inside Korle Bu</td>
<td>129 (43.0)</td>
<td>40 (46.5)</td>
<td>89 (41.6)</td>
</tr>
<tr>
<td>Outside Korle Bu</td>
<td>171 (57.0)</td>
<td>46 (53.5)</td>
<td>125 (58.4)</td>
</tr>
<tr>
<td><strong>Years of employment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 5 years</td>
<td>68 (22.7)</td>
<td>30 (34.9)</td>
<td>38 (17.8)</td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>114 (38.0)</td>
<td>28 (32.6)</td>
<td>86 (40.2)</td>
</tr>
<tr>
<td>11 - 15 years</td>
<td>87 (29.0)</td>
<td>18 (20.9)</td>
<td>69 (32.2)</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>31 (10.3)</td>
<td>10 (11.6)</td>
<td>21 (9.8)</td>
</tr>
<tr>
<td><strong>Mean ± SD</strong></td>
<td><strong>9.4 ± 4.6</strong></td>
<td><strong>8.5±5.1</strong></td>
<td><strong>9.7±4.4</strong></td>
</tr>
</tbody>
</table>
4.2 Hypertension status of respondents

Majority 154 (51.3%) had normal blood pressures, comprising of 45(52.3%) of doctors and 109 (50.9%) of nurses. Of the 66(22.0%) respondents who were pre-hypertensive, 20(23.3%) were doctors and 46(21.5%) were nurses. Similarly, of the 66(22.0%) who had stage 1 hypertension based on their blood pressure, 19(22.1%) were doctors and 47(22.0%) were nurses. Finally, 14(4.7%) participants had stage 2 hypertension, of which 2(2.3) were doctors, and 12(5.6%) were nurses.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total</th>
<th>Doctors</th>
<th>Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Hypertension Classification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>154(51.3)</td>
<td>45 (52.3)</td>
<td>109(50.9)</td>
</tr>
<tr>
<td>Pre – hypertension</td>
<td>66(22.0)</td>
<td>20(23.3)</td>
<td>46 (21.5)</td>
</tr>
<tr>
<td>Hypertension Stage 1</td>
<td>66(22.0)</td>
<td>19(22.1)</td>
<td>47(22.0)</td>
</tr>
<tr>
<td>Hypertension Stage 2</td>
<td>14(4.7)</td>
<td>2(2.3)</td>
<td>12(5.6)</td>
</tr>
</tbody>
</table>

4.3 Medical History of participants

When participants were asked if biological parents have been diagnosed of hypertension, the results showed that for hypertension, majority 54.3% of the 300 participants indicated
that one of their parents have been diagnosed followed by 11.3% indicating both parents, 29.7% indicated none of them and 4.7% did not know their parents’ status.

![Figure 4.2: Parents’ hypertensive status](image)

### 4.4 Diagnosis of hypertensive status among the health workers

As shown in Figure 4.3, 4.7% of the respondents had been diagnosed of hypertension while the 87.3(%) had not, and 8% did not know their hypertension status.

![Figure 4.3: Diagnosis of hypertension](image)
4.5 Body mass index (BMI) of respondents

Normal weight, overweight and obesity were classified based on the formula; \( \text{BMI} = \frac{\text{Weight} (\text{kg})}{\text{height} (\text{m}^2)} \) and WHO classification of 18.5-24.9kg/m\(^2\) as normal; 25-29.9kg/m\(^2\) as overweight and Obesity is \( \geq 30\text{kg/m}^2 \) (WHO, 2000). In table 4.3 below, majority 116\( (38.7\%) \) of the respondents had normal weight, followed by 100 \( (33.3\%) \) who were overweight and 84 \( (28\%) \) were obese.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total N (%)</th>
<th>Doctors N (%)</th>
<th>Nurses N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N= 300</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>BMI STATUS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>116(38.7)</td>
<td>35 (40.7)</td>
<td>81(37.9)</td>
</tr>
<tr>
<td>Overweight</td>
<td>100 (33.3)</td>
<td>32(37.2)</td>
<td>68(31.8)</td>
</tr>
<tr>
<td>Obese</td>
<td>84(28)</td>
<td>19(22.1)</td>
<td>65(30.4)</td>
</tr>
</tbody>
</table>

4.6 Relationship between Demographic profiles of participants and Hypertension

A Pearson chi square test indicated that there existed a significant relationship between occupation \( (\chi^2 = 13.5, \ p\text{-value} = <0.001) \), household size \( (\chi^2 = 11.09, \ p\text{-value}= <0.001) \), years of employment \( (\chi^2 = 24.62, \ p\text{-value} = <0.001) \), department \( (\chi^2 = 34.95, \ p\text{-value}= <0.001) \), family history of hypertension \( (\chi^2 = 44.42, \ p\text{-value}= <0.001) \), and physical activity \( (\chi^2 = 12.72, \ p\text{-value}= 0.01) \) with hypertension as the dependent variable.

However, there was no significant association between BMI \( (\chi^2 =2.54 \ p\text{-value} = 0.86) \), alcohol consumption \( (\chi^2 = 0.60, \ p\text{-value}= 0.44) \), smoking \( (\chi^2 = 0.45, \ p\text{-value}= 0.50) \), dietary habits\( (\chi^2 = 2.04 \ p\text{-value}= 0.57) \) and work schedule \( (\chi^2 = 2.67 \ p\text{-value}= 0.26) \).

Detailed results are shown in Table 4.4.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Hypertension Status</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-Hypertensive (%)</td>
<td>Hypertensive (%)</td>
<td>Pearson $\chi^2$</td>
<td>P-value</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>56(26.3)</td>
<td>23(26.4)</td>
<td>0.00</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>157(73.7)</td>
<td>64(73.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 - 29 years</td>
<td>59(27.7)</td>
<td>24(27.6)</td>
<td>1.8</td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>30 - 39 years</td>
<td>75(35.2)</td>
<td>37(42.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 - 49 years</td>
<td>73(34.3)</td>
<td>24(27.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 - 59 years</td>
<td>6(2.8)</td>
<td>2(2.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>48(22.5)</td>
<td>38(43.7)</td>
<td>13.5</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>165(77.5)</td>
<td>49(56.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>18(8.5)</td>
<td>22(25.3)</td>
<td>34.95</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Surgery &amp; Allied Surgery</td>
<td>31(14.6)</td>
<td>10(11.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstetrics &amp; Gynaecology</td>
<td>29(13.6)</td>
<td>12(13.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaesthesia &amp; Intensive Care Units</td>
<td>33(15.5)</td>
<td>4(4.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Health</td>
<td>18(8.5)</td>
<td>19(21.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accident &amp; Emergency</td>
<td>26(12.2)</td>
<td>9(10.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthopaedics</td>
<td>28(13.1)</td>
<td>7(8.0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyclinic</td>
<td>30(14.1)</td>
<td>4(4.6)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Household size</td>
<td></td>
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</tr>
<tr>
<td>1 to 3</td>
<td>123(57.7)</td>
<td>34(39.1)</td>
<td>11.09</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>4 to 6</td>
<td>74(34.7)</td>
<td>38(43.7)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>More than 6</td>
<td>16(7.5)</td>
<td>15(17.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>62(29.1)</td>
<td>29(33.3)</td>
<td>9.24</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>136(63.8)</td>
<td>43(49.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-habiting</td>
<td>11(5.2)</td>
<td>10(11.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>2(0.9)</td>
<td>2(2.3)</td>
<td></td>
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<tr>
<td>Widowed</td>
<td>2(0.9)</td>
<td>3(3.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inside Korle Bu</td>
<td>95(44.6)</td>
<td>34(39.1)</td>
<td>0.77</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>Outside Korle Bu</td>
<td>118(55.4)</td>
<td>53(60.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How long have you been employed in Korle Bu Teaching Hospital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 5 years</td>
<td>32(15.0)</td>
<td>36(41.4)</td>
<td>24.62</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>89(41.8)</td>
<td>25(28.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 - 15 years</td>
<td>67(31.5)</td>
<td>20(23.0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 15 years</td>
<td>25(11.7)</td>
<td>6(6.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.5-24.9</td>
<td>82(77.3)</td>
<td>34(71.0)</td>
<td>2.54</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>25-29.9</td>
<td>69(64.7)</td>
<td>31(79.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 and above</td>
<td>62(58.0)</td>
<td>22(49.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 to 12 hours</td>
<td>59(27.7)</td>
<td>17(19.54)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 12 hours</td>
<td>23(10.8)</td>
<td>13(14.94)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4.4 (continued): Relationship between demographic/individual profiles and hypertension

<table>
<thead>
<tr>
<th>Variables</th>
<th>Hypertension Status</th>
<th>Pearson $\chi^2$</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has any of your biological parents been diagnosed with Hypertension?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>8(3.8)</td>
<td>6(6.9)</td>
<td>44.42</td>
</tr>
<tr>
<td>Yes, one of them</td>
<td>41(19.2)</td>
<td>48(55.2)</td>
<td></td>
</tr>
<tr>
<td>Yes, both of them</td>
<td>139(65.3)</td>
<td>24(27.6)</td>
<td></td>
</tr>
<tr>
<td>Don't Know</td>
<td>25(11.7)</td>
<td>9(10.3)</td>
<td></td>
</tr>
<tr>
<td>During the last 7 days, on how many days did you do vigorous physical activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>19(8.9)</td>
<td>20(23.0)</td>
<td>12.72</td>
</tr>
<tr>
<td>1 to 3</td>
<td>173(81.2)</td>
<td>62(71.3)</td>
<td></td>
</tr>
<tr>
<td>4 to 6</td>
<td>15(7.0)</td>
<td>2(2.3)</td>
<td></td>
</tr>
<tr>
<td>Everyday</td>
<td>6(2.8)</td>
<td>3(3.4)</td>
<td></td>
</tr>
<tr>
<td>How much time did you usually spend doing vigorous activities on those days?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 2 hours per day</td>
<td>126(59.2)</td>
<td>52(59.8)</td>
<td>3.68</td>
</tr>
<tr>
<td>3 - 4 hour per day</td>
<td>57(26.8)</td>
<td>17(19.5)</td>
<td></td>
</tr>
<tr>
<td>1 - 30 minutes per day</td>
<td>16(7.5)</td>
<td>8(9.2)</td>
<td></td>
</tr>
<tr>
<td>31 - 59 minutes per day</td>
<td>7(3.3)</td>
<td>6(6.9)</td>
<td></td>
</tr>
<tr>
<td>Don't know</td>
<td>7(3.3)</td>
<td>4(4.6)</td>
<td></td>
</tr>
<tr>
<td>Have you ever smoked cigarette/ used tobacco?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17(8.0)</td>
<td>5(5.7)</td>
<td>0.45</td>
</tr>
<tr>
<td>No</td>
<td>196(92.0)</td>
<td>82(94.3)</td>
<td></td>
</tr>
<tr>
<td>Have you ever consumed a drink that contains alcohol such as beer, spirits, palm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>53(24.9)</td>
<td>18(20.7)</td>
<td>0.60</td>
</tr>
<tr>
<td>No</td>
<td>160(75.1)</td>
<td>69(79.3)</td>
<td></td>
</tr>
<tr>
<td>Currently, how often do you consume drinks that contain alcohol?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>3(5.7)</td>
<td>2(1.1)</td>
<td>2.35</td>
</tr>
<tr>
<td>Two to three times a week</td>
<td>8(15.1)</td>
<td>5(27.8)</td>
<td></td>
</tr>
<tr>
<td>One a week</td>
<td>7(13.2)</td>
<td>2(11.1)</td>
<td></td>
</tr>
<tr>
<td>Rarely/ Occasionally</td>
<td>35(66.0)</td>
<td>9(50.0)</td>
<td></td>
</tr>
<tr>
<td>In the last 7 days, how many times did you eat breakfast</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 3</td>
<td>126(59.2)</td>
<td>53(60.9)</td>
<td>0.14</td>
</tr>
<tr>
<td>4 to 6</td>
<td>62(29.1)</td>
<td>25(28.7)</td>
<td></td>
</tr>
<tr>
<td>Everyday</td>
<td>25(11.7)</td>
<td>9(10.3)</td>
<td></td>
</tr>
<tr>
<td>When eating, do you add salt to your already prepared meal?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>10(4.7)</td>
<td>2(2.3)</td>
<td>2.04</td>
</tr>
<tr>
<td>Sometimes</td>
<td>13(6.1)</td>
<td>3(3.4)</td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td>29(13.6)</td>
<td>11(12.6)</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>161(75.6)</td>
<td>71(81.6)</td>
<td></td>
</tr>
<tr>
<td>At what time do you usually have supper?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5pm - 6pm</td>
<td>84(39.4)</td>
<td>44(50.6)</td>
<td>3.3</td>
</tr>
<tr>
<td>7pm - 8pm</td>
<td>101(47.4)</td>
<td>35(40.2)</td>
<td></td>
</tr>
<tr>
<td>9pm - 10pm</td>
<td>28(13.1)</td>
<td>8(9.2)</td>
<td></td>
</tr>
</tbody>
</table>
How often do you eat food from fast food joint/outlet?

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>43(20.2)</td>
<td>42(19.7)</td>
<td>79(37.1)</td>
<td>49(23.0)</td>
</tr>
<tr>
<td>Mean</td>
<td>15(17.2)</td>
<td>17(19.5)</td>
<td>37(42.5)</td>
<td>18(20.7)</td>
</tr>
<tr>
<td>SD</td>
<td>0.90</td>
<td>0.83</td>
<td>0.88</td>
<td>0.90</td>
</tr>
</tbody>
</table>

How often do you have to stay beyond working hours to meet deadlines?

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>8(3.8)</td>
<td>149(70.0)</td>
<td>42(19.7)</td>
<td>14(6.6)</td>
</tr>
<tr>
<td>Mean</td>
<td>3(3.4)</td>
<td>69(79.3)</td>
<td>11(12.6)</td>
<td>4(4.6)</td>
</tr>
<tr>
<td>SD</td>
<td>2.91</td>
<td>0.40</td>
<td>0.40</td>
<td>0.40</td>
</tr>
</tbody>
</table>

How often do you have to work on weekends in a month?

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>23(10.8)</td>
<td>72(33.8)</td>
<td>80(37.6)</td>
<td>38(17.8)</td>
</tr>
<tr>
<td>Mean</td>
<td>7(8.0)</td>
<td>40(46.0)</td>
<td>31(35.6)</td>
<td>9(10.3)</td>
</tr>
<tr>
<td>SD</td>
<td>5.20</td>
<td>0.16</td>
<td>0.16</td>
<td>0.16</td>
</tr>
</tbody>
</table>

4.7 Lifestyle / Behavioural factors associated with hypertension among health workers

4.7.1 Relationship between Physical Activities of Respondents and Hypertension

The results showed that participant physical activeness had a significant relationship with hypertension ($\chi^2 = 12.72$, p-value = 0.01). This means participating in physical activity gave a direct impact on Hypertension.

4.7.2 Relationship between Alcohol Consumption among participants and Hypertension

Alcohol consumption was low as majority of the subjects 76.3% did not drink alcohol. Among the 23.7% of respondents who consumed alcohol, 62% of them were occasional drinkers while 18.3% drank alcohol two to three times a week. Most of the subjects (92.7%) were also non-smokers.
The result showed no significant relationship between participants alcohol consumption and hypertension ($\chi^2 = 0.6$, p-value = 0.44). This means that there was no direct impact of alcohol consumption on hypertension in the study as displayed in the figure below.

![Figure 4.4: Alcohol consumption and hypertension](image)

**Figure 4.4: Alcohol consumption and hypertension**

### 4.7.3 Relationship between Dietary habits among participants and Hypertension

Many 179(59.7%) of the respondents made time to take breakfast at least 3 days a week, 87(29%) for 4 to 6 days and 34(11.3%) every day.

Also (45.3%), most of the workers took supper from 7 to 8 pm followed by 42.7% from 5 to 6 pm. 12% however, took supper after 9pm.

Majority 77.3% never added salt to their already prepared meals.
The Pearson chi square showed no significant relationship between dietary habits (adding extra salt to prepared meal) and hypertension among the health care workers ($\chi^2 = 2.04, p\text{-value}= 0.57$) as in the table and figure below.

**Table 4.5: Adding extra salt to already prepared meal**

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>12</td>
<td>4.0</td>
</tr>
<tr>
<td>Sometimes</td>
<td>16</td>
<td>5.3</td>
</tr>
<tr>
<td>Rarely</td>
<td>40</td>
<td>13.3</td>
</tr>
<tr>
<td>Never</td>
<td>232</td>
<td>77.3</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Figure 4.5: Extra salt put in prepared meal**
4.8 Logistics regression of significant factors and hypertension

Binary logistic regression showed significant relationship between occupation, department of work, household size, years of employment, family history, physical activity and hypertension. When multi-variable analysis was done, occupation (nurses) and years of employment (6-15 years) were significant. However, when other factors such as occupation, department of work, household size, years of employment, family history were adjusted for, there was no significant relationship between physical activity and hypertension. Details can be seen in Table 4.6 below.
Table 4.6: Logistic regression of significant factors with hypertension

<table>
<thead>
<tr>
<th>Variables</th>
<th>COR (95% Conf Interv)</th>
<th>P-value</th>
<th>AOR (95% Conf Interv)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>0.38(0.22-0.64)</td>
<td>&lt;0.001</td>
<td>0.42(0.22-0.81)</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Department</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Medicine</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Surgery &amp; Allied Surgery</td>
<td>0.26(0.10-0.68)</td>
<td>0.01</td>
<td>0.33(0.11-0.99)</td>
<td>0.05</td>
</tr>
<tr>
<td>Obstetrics &amp; Gynaecology</td>
<td>0.34(0.14-0.85)</td>
<td>0.02</td>
<td>0.53(0.17-1.66)</td>
<td>0.28</td>
</tr>
<tr>
<td>Anaesthesia &amp; Intensive Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Units</td>
<td>0.10(0.03-0.33)</td>
<td>&lt;0.001</td>
<td>0.26(0.06-1.27)</td>
<td>0.10</td>
</tr>
<tr>
<td>Child Health</td>
<td>0.86(0.35-2.12)</td>
<td>0.75</td>
<td>0.66(0.24-1.84)</td>
<td>0.43</td>
</tr>
<tr>
<td>Accident &amp; Emergency</td>
<td>0.28(0.11-0.76)</td>
<td>0.01</td>
<td>0.49(0.16-1.52)</td>
<td>0.21</td>
</tr>
<tr>
<td>Orthopaedics</td>
<td>0.20(0.07-0.58)</td>
<td>&lt;0.001</td>
<td>0.58(0.13-2.59)</td>
<td>0.47</td>
</tr>
<tr>
<td>Polyclinic</td>
<td>0.11(0.03-0.37)</td>
<td>&lt;0.001</td>
<td>0.21(0.04-1.06)</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Household size</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 to 3</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>4 to 6</td>
<td>1.86(1.08-3.20)</td>
<td>0.03</td>
<td>1.24(0.62-2.46)</td>
<td>0.55</td>
</tr>
<tr>
<td>More than 6</td>
<td>3.39(1.52-7.55)</td>
<td>&lt;0.001</td>
<td>2.31(0.77-6.93)</td>
<td>0.14</td>
</tr>
<tr>
<td><strong>How long have you been employed in Korle Bu Teaching Hospital</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 5 years</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>6 - 10 years</td>
<td>0.25(0.13-0.48)</td>
<td>&lt;0.001</td>
<td>0.36(0.17-0.79)</td>
<td>0.01</td>
</tr>
<tr>
<td>11 - 15 years</td>
<td>0.27(0.13-0.53)</td>
<td>&lt;0.001</td>
<td>0.38(0.15-0.94)</td>
<td>0.04</td>
</tr>
<tr>
<td>More than 15 years</td>
<td>0.21(0.08-0.59)</td>
<td>&lt;0.001</td>
<td>0.41(0.11-1.48)</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Has any of your biological parents been diagnosed with Hypertension?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Yes one of them</td>
<td>1.56(0.50-4.87)</td>
<td>0.44</td>
<td>1.47(0.41-5.29)</td>
<td>0.56</td>
</tr>
<tr>
<td>Yes, both of them</td>
<td>0.23(0.07-0.72)</td>
<td>0.01</td>
<td>0.71(0.16-3.17)</td>
<td>0.65</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>0.48(0.13-1.77)</td>
<td>0.27</td>
<td>0.35(0.08-1.47)</td>
<td>0.15</td>
</tr>
<tr>
<td><strong>During the last 7 days, on how many days did you do vigorous physical activities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1.00</td>
<td></td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>1 to 3</td>
<td>0.34(0.17-0.68)</td>
<td>&lt;0.001</td>
<td>0.51(0.23-2.77)</td>
<td>0.11</td>
</tr>
<tr>
<td>4 to 6</td>
<td>0.13(0.03-0.63)</td>
<td>0.01</td>
<td>0.46(0.08-2.77)</td>
<td>0.40</td>
</tr>
<tr>
<td>Everyday</td>
<td>0.48(0.10-2.18)</td>
<td>0.34</td>
<td>0.75(0.14-3.97)</td>
<td>0.74</td>
</tr>
</tbody>
</table>

**COR: Crude Odds Ratio. AOR: Adjusted Odds ratio**
4.9 Relationship between Work schedule among participants and Hypertension

Majority 188 (62.7%) of the health workers worked for 8 hours daily, 76 (25.3%) worked for 8 to 12 hours while 36 (12%) worked more than 12 hours.

37.3% and 37% worked on weekends sometimes and rarely respectively, 15.7% never worked and 10% always worked on weekends. There was no significant relationship between work schedule and hypertension ($\chi^2 = 4.719$, p-value = 0.580). Details are illustrated in the table and figure below:

Table 4.7: Time spent daily working

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much time do you usually spend doing your daily work?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 hours</td>
<td>188</td>
<td>62.7</td>
</tr>
<tr>
<td>8 – 12 hours</td>
<td>76</td>
<td>25.3</td>
</tr>
<tr>
<td>More than 12 hours</td>
<td>36</td>
<td>12</td>
</tr>
<tr>
<td>How often do you have to work on weekends in a month?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Sometimes</td>
<td>112</td>
<td>37.3</td>
</tr>
<tr>
<td>Rarely</td>
<td>111</td>
<td>37</td>
</tr>
<tr>
<td>Never</td>
<td>47</td>
<td>15.7</td>
</tr>
</tbody>
</table>

Figure 4.6: Time spent doing daily work and hypertension
CHAPTER FIVE

5.0 DISCUSSION

5.1 Prevalence of hypertension

The present study examined the prevalence of hypertension among health workers in Korle Bu Teaching Hospital in Accra.

The findings of this study showed that of 26.7% study participants were hypertensive, 51.3% were not hypertensive and 22% were pre-hypertension. Prevalence of hypertension among Doctors (24.4%) was lower than nurses (27.6%) even though the difference is relatively small.

The overall prevalence of 26.7% found in this study fell within the range of 19% to 48% reported in a review done systematically of hypertension in Ghana among adults by Bosu (2010). This is however, higher than the prevalence of 13% retrieved from the Ghana Demographic and Health Survey (GDHS) (2014) obtained among 15-49 age group.

Van de Vijver et al., (2013) reported hypertension as the number one risk factor for cardiovascular disease in Africa and also of cerebrovascular disease that has taken over as the most important cause of death among adults Africans. In another review paper that looked at 11 studies, high prevalence of 54.6% was found in specific urban areas and (19.3%) in rural areas in Ghana (Addo et al, 2012). The prevalence of hypertension in this study is lower than the 41% found in Nigeria by Gyang et al (2018).

Previous study done in Nigeria among health workers at the Baptist Medical Centre in Ogbomoso found a prevalence of 20.1% (Akinwumi et al., 2012).

Osei-Yeboah et al (2018) did a study in Sefwi-Wiawso Municipal Hospital in Ghana and obtained prevalence of hypertension amongst health workforces in the hospital to be 16.1%,
lower than the general population, which is also lower than the rate discovered in this study. Gebreselassie and Padyab, (2015) did a study among adults (18-49 age group) and detected 42.4% and 30.7% as the prevalence of hypertension and pre-hypertension in Ghana which is higher than what was found in this study.

Persons with pre-hypertension have a propensity to become hypertensive. From this study, the relatively high prevalence (22%) of pre-hypertension indicates that a significant proportion of health workers who are otherwise categorized as non-hypertensives are actually at high risk of developing actual hypertension.

The prevalence of pre-hypertension in this study is however low in comparison to that reported by Yang et al (2015), who estimated it to be 41.5%.

A study conducted among adults in the Jilin province in north-eastern China shows prevalence of hypertension to be 30.1% (Yang et al., 2015) which is higher than the finding in this study. This could be as a result of majority of respondents in China were aged above 50.

It is thus evident in this project that the high prevalence among healthcare workers and if the trend continues, this could overburden the current health systems in Ghana, hence the need for timely intervention to curb the situation.

5.2. Relationship between socio-demographic factors and hypertension among healthcare workers

Advancing age has been reported as a risk factor for developing hypertension. In this study, there was no relationship between age and hypertension. This could be due to that majority 292(97.3%) were below 50 years.
A survey of about 5000 adults revealed a rise in hypertension among individuals with family history than those without a family history of the disease (Ranasinghe et al., 2015). This is in agreement with the result of the present study which showed a positive link between family history and hypertension where majority of respondents have at least a parent who is hypertensive.

There is also significant link between occupation, department of work, household size, years of employment and hypertension. The number of years of work had a strong positive relationship with one developing hypertension. Psychosocial stress has been found to be a predictor of future hypertension (Hamer and Steptoe, 2012) which could be linked to the departmental work.

5.3 Relationship between lifestyle factors and hypertension

We found no correlation between BMI and blood pressure. This finding is contrary to a study conducted in India which demonstrated a strong positive link between BMI and blood pressure (Dua et al., 2014).

However, observation was made in this study that, even though, most of the respondents’ weight were normal, 28% were obese. It is imperative however, to report that the result of the current study indicated some differences in BMI among hypertensive and non-hypertensive respondents. In this study, a substantial percentage 34(71%) out of 87 study participants diagnosed with hypertension had normal weight This opposes the results by Huang et al., (2014) who showed that among overweight and obese adults, the prevalence of hypertension was more than among those with normal BMI. This may be due to the fact that in this study, many other factors contributed to hypertension and also because the respondents are health workers who have knowledge about how to keep a good weight in terms of diet and exercising.
The results of this study disclosed that 81.2% of the non-hypertensive respondents’ exercise on 1 to 3 days in a week compared to 71.3% of the hypertensive respondents. This study also found a significant association between physical activity and hypertension which is similar to a number of studies reported to have significant relationship between physical activity and hypertension (Padilla et al., 2005; Muhihi et al., 2012).

Muhihi et al., (2012) indicated that physical activity and high energy expenditure had inverse relationships on systolic blood pressure, heart rate, total cholesterol, when they measured level of physical activity and its relationship with CVD risk factors among young and middle-aged men in a city in Tanzania. However, after other factors such as occupation, department of work, length of employment, family history of hypertension had been adjusted for, there was no significant relationship between physical activity and hypertension. This is contrary to the work of Muhihi et al., who showed that individuals who are more physically active are more likely to experience a lower risk of episodic hypertension compared to those who are less physically active even after the factors of race, sex, age, education, and family history of hypertension have been adjusted for.

This study shows no significant connection between dietary habits and hypertension. It is in line with a report by (Marwiro, 2010). On the contrary, Reddy et al., (2005), indicated a significant relationship between the prevalence of hypertension and dietary habit. Institute of Medicine, (2005) found high dietary sodium to have a link to increased BP, which couldn’t be established in this study as majority of the respondents never added salt to their already prepared meals. There are conflicting researches that argued the effect of reduced sodium in managing hypertension, however WHO still recommends reduction of salt consumption (Ha, 2014). Wood, (2008) however distinguished that individuals acquired most of their information about health and hypertension from doctors, family, television, and schools, a situation that is reassuring. And in this study the health workers themselves
are involved. It is obvious that dietary knowledge is essential to the continuous fight against hypertension.

Also, the present study did not show any link of alcohol consumption and smoking with hypertension significant. Husain et al., (2014) reported that alcohol and hypertension association which was recorded in the Framingham study, might not cause detrimental blood pressure since it is dose dependent. This might explain the results of this study since majority are occasional drinkers.

5.4 Relationship between work related factors and hypertension

The result of this study did not find a significant relationship between high work schedule like working for more than 8 hours in a day and hypertension, which opposes the work of Yang et al., (2006) who reported a positive association between hours worked per week and odds of getting hypertension.

In this study, non-hypertensive respondents rather have higher working schedule than hypertensive respondents, although this difference was not significant. This finding implies that even if an intervention has to be put in place then it has to involve those who do not have hypertension too. This is different from what Yang et al., (2006) discovered that those who worked 40 hours per week are 14 more likely to report hypertension and also those who worked between 41 and 50 hours per week were 17% more likely to report hypertension while those who worked 51 hours per week were 29% more likely to report hypertension after they controlled for confounding variables, such as demographic and biological risk factors and socioeconomic status.
CHAPTER SIX

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Overall, prevalence of hypertension among health workers in Korle Bu was 26.7%. The study reported hypertension prevalence and associated risk factors among health workers in Korle Bu Teaching Hospital. There was a positive relationship between department of work, household size, years of employment, family history of hypertension and physical activity with hypertension. There was no significant association between BMI, work schedule, alcohol consumption, dietary habits and hypertension.

6.2 Recommendations

Hypertension has become a vital issue of public health importance even among healthcare workers as revealed in this study. In an attempt to control the disease burden the following measures are recommended for:

Ministry of health/Ghana Health Service

- Policies and programs can be developed to inculcate periodic screening services for health workers
- Upgraded health insurance should be available to the staff so they can get check-ups and management of the disease when needed.
- More staff can be recruited in the hospital to lessen the burden on the few in the departments that need help.
- Funds should be allocated in providing resources to curb the risk.
- The outcome in this study and implement policies from ministry of health in other levels of health institutions
Korle Bu Teaching Hospital

- Periodic hypertension screening exercises should be organized for the healthcare workers and made compulsory in order to pick up undiagnosed hypertension and made the staff more conscious of their health.

- A gymnasium can be created for the staff at a reduced cost to motivate staff to exercise often.

- Awareness should be promoted among healthcare workers on the need for them to partake more in physical activity so as to reduce the impact of Hypertension.
REFERENCES


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Kitahara, CM. et al. (2014). Association between Class III Obesity (BMI of 40–59 kg/m2) and Mortality: A Pooled Analysis of 20 Prospective Studies. PLOS Medicine. 11(7)


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APPENDICES

Appendix 1: INFORMED CONSENT FOR STUDY PARTICIPANTS

**Project Title:** Prevalence of hypertension among health care workers in Korle Bu: An assessment of work and lifestyle related factors Institution of affiliation: School of Public Health, University of Ghana, Legon.

**Background of interviewer:** My name is Dr. Sefakor Juliet Kpormegbe, a staff at Korle Bu Teaching Hospital and I am here to collect data purely for academic work for a degree in Masters in Public Health.

**Procedure:** Information required from you for this study includes background and clinical characteristics. Data collection is through the administration of a structured questionnaire, measurement of weight, height and blood pressure.

**Risks and benefits:** There are the risk that you may find some questions and measurements to be sensitive.

The benefit is to help identify existing unknown risks in participants. Any research-related injuries that occur will be treated by site staff, and appropriate referrals will be made for any services that the site cannot provide. You will not bear any cost associated with the study.

Korle Bu Teaching is the major referral centre for most medical conditions in Ghana and has many healthcare workers. We hope to learn about this common problem and provide information for policy makers to make future decisions.

**Compensation:** There will be no compensation but the information you provide will help you improve on your health.

**Right to refuse:** Your consent to participate in this study is voluntary and you can withdraw from this study at any time.
Anonymity and Confidentiality: The records of this study will be kept private. In any report that we make public we will not include any information that will make it possible to identify you. Research records will be kept in a locked file; only the researcher will have access to the records.

If you have questions: You may contact the investigator, Dr. Sefakor J. Kpormegbe, on phone number: 0204600075 or email: seffydoe@gmail.com

If you want to speak with someone not directly involved in this research study, please contact the Research Ethics Committee Administrator at Korle Bu Teaching Hospital

Korle Bu Teaching Hospital IRB contact: 0302666766

You will be given a copy of this form to keep for your records.

Statement of consent: I have read the information above and I consent voluntarily to be a participant in this study.

Name of Participant: ..............................................................

Signature or Thumb print of Participant: ..............................................................

Date: ..............................................................

Thank you for agreeing to participate
Appendix 2: QUESTIONNAIRE

A. Socio-demographic data

Date of interview:

1. Name (initials) ………………..

2. Sex: (0) Male (1) Female

3. Age (as at last birthday): (0) 24-30 years (1) 31-40 years (2) 41 – 50 years (3) 51 – 60 years (4) more than 60 years

Date of Birth: …………………….

4. Occupation: (0) Doctor (1) Nurse

5. Department: ………………………

6. Household size ………………….

7. Marital status: (0) Single (1) Married (2) Co-habiting (3) Divorced (4) Widowed

8. Do you live in or outside Korle Bu (0) Inside Korle Bu (1) Outside Korle Bu

9. How long have you been employed in Korlebu Teaching Hospital? ………… years

B. Medical History

1. Has any of your biological parents been diagnosed with Hypertension?

(0) No (1) Yes one of them (2) Yes, both of them (3) Don’t know

2. Would you describe any of your parents as overweight/obese?

(0) No (1) Yes, one of them (2) Yes, both of them (3) Don’t know

3. Have you been diagnosed of having hypertension?

(0) Yes (1) No (2) Don’t know (3) Others Specify…………………………

4. If yes, are you on any medication? i)Yes ii) No
5. BP MEASUREMENTS (mmHg)

<table>
<thead>
<tr>
<th>First measurement</th>
<th>Second measurement</th>
<th>Average BP</th>
</tr>
</thead>
</table>

6. WEIGHT (kg) ...........................................

7. HEIGHT (m) ............................................

8. BODY MASS INDEX (BMI).................................

C. Physical Activities

*Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activity refers to activities that take hard physical effort and make you breath harder than normal. Think only about those activities that you did for at least 10 minutes at a time*

1. During the last 7 days, on how many days did you do vigorous physical activities such as aerobics, heavy lifting, digging, fast cycling or swimming?................................. days per week.

1b. How much time did you usually spend doing vigorous activities on those days?
(0) ................... hours per day (1) .................... minutes per day c) Don’t know

2. During the last 7 days, on how many days did you walk at least 20 minutes at a time? ............................. days per week

2b. How much time did you usually spend walking on those days?
(0) ................... hours per day (1) .................... minutes per day (2) Don’t know

3. During the last 7 days, how long did you spend sitting on a week day?
(0) less than an hour (1) one hour to 4hours (2) 4 to 8hours (3) more than 8 hours
3b. And weekend?

(0) less than an hour (1) one hour to 4hours (2) 4 to 8hours (3) more than 8 hours

D. Smoking History

1. Have you ever smoked cigarette /used tobacco?
   0) Yes (1) No

2. If yes, for how long? ............ years

2(b) if yes to Question 1, how many sticks per day? ..............

E. Alcohol Consumption

1. Have you ever consumed a drink that contains alcohol such as beer, spirits, palmwine, pito etc?  (0) Yes (1) No

2. Currently, how often do you consume drinks that contain alcohol? (0) Daily (1) Two to three times a week (2) One a week (3) Rarely/Occasionally

2(b). How many bottles of alcoholic drinks do you usually take at a sitting?

(0) 1- 2 (1) 3- 4 (2) more than 4

F. Dietary Habits

1. In the last 7 days, how many times did you eat breakfast? ......................

2. Excluding snacks, how many meals do you usually have on a weekday?......................

(snacks include pastries, nuts, soft drinks/beverages, tea, milo, coffee etc.)

2b. Excluding snacks, how many meals do you usually have on weekends?......................

(snacks include pastries, nuts, soft drinks/beverages, tea, milo, coffee etc.)

3. How often do you have snacks in a day?.................................

(snacks include pastries, nuts, soft drinks/beverages, tea, milo, coffee etc.)

4. When eating, do you add salt to your already prepared meal?

(0) Always (1) Sometimes (2) Rarely (3) Never
5. At what time do you usually have lunch?............................... 

6. At what time do usually have supper?............................... 

7. How often do you eat food from fast food joint/outlet? *(fast food meals include fried rice, burger, steak etc)* 

(0) Always (1) Sometimes (2) Rarely (3) Never 

8. In the last 7 days, on how many times have you bought/eaten fast food? *(fast food meals include fried rice, burger, steak etc.)* ................................................................. 

G. Work Schedule 

*Recall all the work that you did in the last 6 months. Work schedule refer to the duration it takes to perform your job on any given day.* 

1. How much time do you usually spend doing your daily work? 

(0) 8 hours 1) 8 to 12 hours 2) more than 12 hours 

2. How often do you have to stay beyond working hours to meet deadlines? 

(0) Always (1) Sometimes (2) Rarely (3) Never 

3. How often do you have to carry office jobs to the house to get it completed? 

(0) Always (1) Sometimes (2) Rarely (3) Never 

4. How often do you have to skip lunch time in order to get the day’s duties completed? 

(0) Always (1) Sometimes (2) Rarely (3) Never 

5. How often do you have to work on weekends in a month? 

(0) Always (1) Sometimes (2) Rarely (3) Never
Appendix 3: Ethical Clearance

23rd April, 2019

DR. SEFAKOR JULIET KPORMEGBE
SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF GHANA
LEGON

INSTITUTIONAL APPROVAL: KORLE BU TEACHING HOSPITAL-SCIENTIFIC AND TECHNICAL COMMITTEE/INSTITUTIONAL REVIEW BOARD (KBTH-STC/IRB/00026/2019)

Following approval of your study entitled “Prevalence of hypertension among health care workers in Korle Bu: An assessment of work and lifestyle related factors” by the Korle Bu Teaching Hospital-Scientific and Technical Committee/Institutional Review Board.

I am pleased to inform you that institutional approval has been granted for the conduct of your study in Korle Bu Teaching Hospital.

Please contact the Head of Department to discuss the commencement date of the study.

Please note that, this institutional approval is rendered invalid if the terms of the Institutional Reviewed Board/Scientific and Technical Committee approval are violated.

Sincere regards,

[Signature]

Dr. Ali Samba
Director of Medical Affairs
For: Chief Executive Officer

Cc: The Chief Executive
    Korle Bu
23rd April, 2019

DR. SEFAKOR JULIET KPORMEGBE
SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF GHANA
LEGON

PREVALENCE OF HYPTERTENSION AMONG HEALTH CARE WORKERS IN
KORLE BU: AN ASSESSMENT OF WORK AND LIFESTYLE RELATED FACTORS

KBTH-IRB /00026/2019

Investigator: Dr Sefakor Juliet Kpormegbe

The Korle Bu Teaching Hospital Institutional Review Board (KBTH IRB) reviewed and granted approval to the study entitled “Prevalence of hypertension among health care workers in Korle Bu: An Assessment of work and lifestyle related factors”

Please note that the Board requires you to submit a final review report on completion of this study to the KBTH-IRB.

Kindly, note that, any modification/amendment to the approved study protocol without approval from KBTH-IRB renders this certificate invalid.

Please report all serious adverse events related to this study to KBTH-IRB within seven days verbally and fourteen days in writing.

This IRB approval is valid till 30th March, 2020. You are to submit annual report for continuing review.

Sincere regards,

MR OKYERE BOATENG
CHAIR (KBTH-IRB)

Cc: The Chief Executive Officer
Korle Bu Teaching Hospital