

UNIVERSITY OF GHANA  
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**ASSOCIATION OF WORK RELATED STRESS, SHIFT WORK AND  
HYPERTENSION AMONG NURSES IN KORLE-BU TEACHING HOSPITAL**

**BY**  
**EMMA CLOTTEY**  
**(10754741)**

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## DECLARATION

I hereby declare that I completely undertook this study which does not contain any material hitherto published by another person which has been accepted for the award of any other degree or qualification, except portions where references have been cited accordingly.



11-01-2022

.....  
**Emma Clottey**  
(Student)

.....  
**Date**



.....  
**Dr. Reginald Quansah**  
(Supervisor)

11-01-2022

.....  
**Date**



## DEDICATION

This work is dedicated to the Almighty God, who gave me understanding, strength, and grace for this project. I also dedicate this work to my husband and parents who have always been supportive and very understanding in my academic endeavors.



## ACKNOWLEDGEMENT

First and foremost, my sincere gratitude goes to the Almighty God without whom there is nothing called life and strength and who has also favoured me with blessings.

Secondly to my mum, a trader from James Town Madam Hannah Addy. My husband is next, Mr. Damon Tetteh who had to take care of my baby while I attend lectures, go to work and do all I have to do. He is God-given. My supervisor did not give up on me. Former DDNS Korlebu, Department of public health, Crystal Clottey, and last but not the least, Dr. Gloria Magretta Chandi, Director of Health Services, Ga West Municipal.

Finally, I would like to thank my family and friends for all their prayers, love, and support.



## ABSTRACT

### **Background:**

Nurses play a crucial role in healthcare delivery globally. Most nurses are extensively engaged in extended work shifts in the clinical environment which may have a significant impact on their health by causing interference in the relationship between the body's internal clock and the environment. This may result in cardiovascular and emotional complications to nurses. Undocumented evidence suggests that most nurses work for longer hours with few breaks and often little time for recovery between shifts. Little is, however, known about the effects of work-related stress and shift work on hypertension among nurses in Korle-Bu Teaching Hospital (KBTH).

### **General Aim:**

To assess the effects of long working hours and shift system on hypertension among nurses in Korle-Bu Teaching Hospital.

### **Methods:**

This is a cross-sectional study of the effects of long working hours and shift systems on hypertension among nurses in Korle-Bu Teaching Hospital. Socio-demographic factors such as age, marital status, education, income, family history of hypertension, sex, etc. of study participants were analyzed using STATA Version 15 and presented as Mean and Standard deviation (SD) and categorical data as percentages. Chi-square and multiple logistic regression analyses were used in measuring the association and relationship between variables. The confidence interval of 95% and odds ratio were calculated. Significance was set at  $\alpha=0.05$ .

### **Results:**

A total of 294 nurses participated in this study. Females were 233 (72.8%) and males were 87 (27.2%). The overall mean age for the nurses was 32.83 years with a standard deviation of 6.72 years. More than half run shift at work (n=265, 82.8%). The nurses work for an average of 39.3 hours of shift work per week. All the nurses knew hypertension. Risk factors associated with

hypertension in this study were obesity, family history of hypertension, excessive intake of salt and alcohol. The prevalence of hypertension among nurses who are engaged in shift work and long working hours in this study was 55%. Work-related stress and shift work were found to be significantly associated with hypertension ( $p = 0.021$ ;  $p = 0.001$ ). The long working hours and shift system among nurses at the Korle Bu Teaching Hospital drains the energy level of nurses on each day of work and makes them dread waking up to go to work.

**Conclusion:**

All the nurses knew hypertension. Risk factors associated with hypertension were obesity, family history of hypertension, excessive intake of salt and alcohol. Shift work and work-related stress were also found to be risk factors associated with hypertension. The prevalence of hypertension among nurses who are engaged in shift work and long working hours in this study was 55%.



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LIST OF ABBREVIATIONS

A & E:	-	Accident and Emergency
AFL-CIO	-	American Federation of Labor and Congress of Industrial Organizations
BMI	-	Body mass index
BP	-	Blood Pressure
CDC	-	Center for Disease Control
CI	-	Confidence Interval
CVD	-	Cardiovascular Diseases
DBP	-	Diastolic Blood Pressure
DDNS	-	Deputy Director of Nursing Service.
DM	-	Diabetes Mellitus
ERC	-	Ethical Review Committee
ERI	-	Effort Reward Imbalance
FRS	-	Framingham risk score
GHS	-	Ghana Health Service
GOPD	-	General Out-Patient Department
GSA	-	Ghana Standards Authority
IRB	-	Institutional Review Board
KBTH	-	Korle Bu Teaching Hospital
MH	-	Masked hypertension
OR	-	Odds ratios
OSA	-	Obstructive Sleep Apnea
OSAQ	-	Occupational Stress Assessment Questionnaire
SSA	-	sub-Saharan Africa
SDB	-	Sleep Disordered Breathing
SD	-	Standard deviation
WAIQ	-	Work Ability Index Questionnaire
WC	-	Waist circumference (WC)
WHR	-	Waist-hip Ratio

- WHO - World Health Organization
- WSR - Waist-stature ratio



## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background

Globally, the workforce has been identified as the most vulnerable group of people who experience stress due to their work shifts. These work groups due to the workload undertake more tasks than they are required to do within a normal routine. Thus, the long work hours and the sacrifice of a healthy work-life balance are putting a strain on the concept of professional success (Manderscheid, 2008). As a result, workplace sacrifices have resulted in lives marked by sleep deprivation, disruption of circadian rhythms, and strain on one's physical and psychological well-being (Jansen, Kant, VanAmelsvoort, Nijhuis & VandenBrandt, 2003).

It is now obvious, that fatigue, shift work, and the number of hours worked are frequently blamed for the negative health impact. Aside from concerns about shift work, the length of recuperation time required for peak performance is unknown (Manderscheid, 2008). Furthermore, in the healthcare industry, staff nurse retention is critical, particularly when it comes to nurses at the bedside (Jansen, et al, 2003). The workforce has adapted to various work hours as a result of social, economic, and technical changes over the last ten years. This has become the regular routine for most work force groups who work long hours despite the negative impacts these workload does have on their health.

In several industries, work schedules have altered to incorporate flexible hours, irregular shifts, and even elongated shifts (Jansen et al., 2003). A job schedule other than the typical hours of 8 a.m. to 5 p.m. is known as shift work (Costa, 2003). Although many sources define shift work as time spent working outside of normal working hours, certain "shifts" do include daytime hours, particularly in healthcare and hospital environments. In these contexts, shift work is typically defined as 8 to 12 hours for full-time personnel and focuses around 24-hour coverage (Manderscheid, 2008).

Also, it is important to note that shifts determine working hours, especially in the nursing sector. Globally, nursing shifts can last anywhere from four to twenty hours, with varying durations of recuperation time in between. Working different shifts or elongated shifts in an irregular pattern is the conventional pattern of shift work in the nursing profession (Winwood, Winefield & Lushington, 2006). Nursing work hours, on the other hand, may have a number of effects on workers' health. They often contribute to the disruption of circadian rhythms and the length of time it takes for a nurse to return to work. They also lead to workplace tiredness, reducing nurses' alertness and critical thinking (Tabone, 2004).

On the other hand, nearly one out of every four workers work shifts that are normally not between the hours of 7 a.m. and 6 p.m. Workers' exposure to natural and artificial light, sleep habits, and food patterns are all disrupted by shift employment. Shift workers, in comparison to the rest of the workforce, are more likely to have metabolic issues, which can contribute to high blood pressure over time (Aisbett, Condo, Zacharewicz, & Lamon, 2017). The Globe Health Organization (WHO) estimates that Africa has the highest prevalence of hypertension, with about 46 percent of persons aged 25 and up having it, compared to 35 percent to 40 percent elsewhere in the world (WHO, 2013).

Several hypertensive Africans, on the other hand, are unaware of their condition and may not obtain therapy or management, placing them at risk for heart attacks and stroke. According to reports, West Africa's workforce has a high prevalence of hypertension, with considerable proportions of untreated, severe, or difficult cases. The combination of risk factors, co-morbidities, and general lack of knowledge places a significant medical and economic burden on West African countries' limited resources (Bosu, 2015). Thus, the West African faces a severe health crisis amongst its workforce in relation to the prevalence of hypertension cases. In order to reduce the number of hypertension cases amongst health

workers would require regional stakeholders addressing the issue of work-related stress in order to curb its spread.

This would require health reforms across most health sectors of the West African region in order to reduce the number of hypertension cases. It is therefore worth noting that nurses who work shifts or have lengthy shifts are at risk for stress-related health problems. These cases must be diagnosed before modifications may be taken to reduce stress and improve patient safety. The creation of a low-cost, simple-to-use technology for detecting chronic stress accumulation in individual nurses would allow for the early detection of possible harm to the nurse and the patients they serve. The documentation of negative health impacts associated with nurse shift work and lengthy working hours may also inspire individuals and businesses to take steps to prevent negative health effects.

## **1.2 Statement of the Problem**

Globally, healthcare employees are particularly prone to high levels of work-related pressures in the workplace (Abd El-Aal & Hassan, 2014). It is therefore worth noting that long working hours and an unfavorable shift arrangement have been linked to mortality and morbidity from hypertension in nurses (de Gaudemaris et al., 2011). There has been a lot of study done to determine the health concerns connected with shift work stress in different occupations (Parikh et al., 2010; Rogers, 2008; Manderscheid, 2008). Nursing shift work is quite common, and it may have gone unnoticed thus far due to societal expectations and perceptions of nursing shift work as the norm (Manderscheid, 2008).

Shift work has been identified as a significant source of stress for nurses in previous studies. Furthermore, studies have discovered that the stress associated with shift work might result in up to a 3% likelihood of medical error (Parikh et al., 2010; Rogers, 2008). According to Barger et al., (2017), working the night shift is associated with a 40% increased risk of

cardiovascular disease. According to the author, 30 percent of working adults in the United States and 44 percent of night-shift employees sleep for six hours or less on work nights.

It's also been indicated that sleep deprivation is linked to a higher risk of coronary artery calcification, coronary heart disease, stroke, and death (Barger et al., 2017). Several studies have found that health care professionals at medical facilities suffer hypertension and other chronic disorders (Egungwu, 2015; Barger et al., 2017; Manderscheid, 2008). However, no research has been done to investigate the relationship between shift work, long working hours, and hypertension (a health problem) among nurses at the Korle-Bu Teaching Hospital (KBTH), despite the fact that KBTH is one of Ghana's largest hospitals and a key referral center. Therefore, the problem statement has been clearly identified within the study.

### **1.3 Rationale of the Study**

Globally, health care workers spend more time at work due to the workload they would have to undertake in order to attend to patients who visit health centres. It is worth noting that the workload of an average nurse can sometimes be overwhelming due to the amount of task each nurse must complete and the number of hours spent at the health facility. The nature of work of health workers particularly nurses involve routines that often leaves the nurses drained and exhausted due to the work load they would often undertake at the health facility. Gradually, some nurses overtime due to work overload developed stress which leads to various hypertensive cases amongst these group of population. In addition, the nature of shift work and its demands have continued to exacerbate the plights of nurses as they usually complain of work overload and burn out. Despite their plights, much has not done been to provide a much more supportive environment where tasks are adequately assigned to nurses based on flexible hours and healthy lifestyles. The study thus seeks to examine the nature of impacts of work-related stress and shift work amongst nurses leading to an increase in hypertensive cases.

#### **1.4 Significance of the Study**

Long working hours and shift systems may have a significant effect on the health of nurses acting directly as stressors. In general, being at work (versus not being at work) increases blood pressure, so that working longer hours implies more time with higher blood pressure. While there is evidence linking long work hours to fatigue, fewer sleep hours, blood pressure elevation, and cardiovascular disease, the number of studies of cardiovascular outcomes is limited, and further research is needed. Results obtained from this study will be used by policymakers and the management of the hospital in particular to either improve upon working conditions or to enforce existing ones with the objective of better improvement of the health of nurses. The outcome of this study may also support further research related to long working hours and shift systems and hypertension in Ghana.

#### **1.5 General Objectives**

To assess the association of long working hours and shift work on hypertension among nurses in Korle-Bu Teaching Hospital. Thus, the study sought to examine the effects of long working hours and shift system on hypertension among health care workers.

##### **1.5.1 Specific Objectives**

1. To examine the knowledge of nurses on the risk factors of hypertension.
2. To determine the prevalence of hypertension among nurses.
3. To determine the effect of work-related stress on hypertension among nurses at the Korle-Bu Teaching Hospital.
4. To determine the effect of long working hours and shift work on hypertension among nurses at the Korle Bu Teaching Hospital.

##### **1.5.2 Research Questions**

1. What is the knowledge of nurses on the risk factors of hypertension?
2. What is the prevalence rate of hypertension among nurses?
3. Is there an association between hypertension and work-related stress?
4. Is there an association between hypertension and the shift work of nurses?



## CHAPTER TWO

### LITERATURE REVIEW ON THEORETICAL FRAMEWORK AND ITS ASSOCIATION WITH WORK-RELATED STRESS, SHIFT WORK AND HYPERTENSION AMONGST NURSES

#### 2.0 Introduction

This chapter presents a comprehensive review of empirical studies on the association of work-related stress, shift system and the association of hypertension amongst nurses of the Korle-Bu Teaching Hospital. This chapter presents a comprehensive review of empirical studies on the relationship between job demand, control and social support and the psychological wellbeing of the worker, as well as the theoretical model of the study. Furthermore, the chapter reviews some relevant empirical literature that addresses psychological health (psychological distress, emotional exhaustion, and general wellbeing), work related factors (job demand, control, and support), work related outcomes (job satisfaction and turnover intention as well as the moderating effects of job control.

Also, it highlights specific social support between job demand and the development of psychological distress (burnout). Moreover, the chapter provides the definitions of shift work, health effects of shift work, irregular shift work, long working hours under which job stress, work organization, and workplace social support were discussed. Also, the socio-demographic factors and the prevalence of hypertension will be discussed. The chapter will again review literature under shift work and hypertension, and long working hours and hypertension, and a summary will conclude the chapter. Thus, the literature was searched and reviewed in the following databases: CINAHL, Medline, PubMed, Biomed and books related to stress work related factors and burnout.

The presentation of the literature was done under three sub-headings: theoretical review, conceptual model, and empirical review. Key words and phrases used in the online search included 'job demand', 'burnout', 'job control', 'stress', 'stress in nursing', 'occupational health', 'social support', 'nursing and burnout'. The following outline was also used to guide the review of literature:

1. Selection of theoretical framework
2. The job demand control social support theory
3. Review of the constructs in the model
4. Applicability of constructs to the research
5. Related studies using the job demand control and social support model.
6. Burnout in nurses
7. Moderating effects of social support on job demand and burnout
8. Literature gap
9. Summary of Literature

## **2.1 Theoretical Framework for the Study**

The selection of a theory to guide the research which will also help to describe the relationship between the variables under study is a very important process of the literature review (Creswell & Creswell, 2017). The theoretical framework underpinning this study is the Job Demand, Control and Support Theory developed by Karasek and Theorell 1990. The JDCS model was deemed as ideal to guide the study because it is a well-known theory that has been used to study and explain how work-related characteristics can influence the occupational health and psychological wellbeing of workers. It posits that, high job demand will lead to dire occupational health without the moderating effect of job control and social support. This would help explain the effect of job demand in the development of adverse occupational health as

well as the moderating effect of job control and social support between the relationship of job demand and burnout (Karasek & Theorell, 1990).

### **2.1.1 Job Demands-Control, Social Support (JDSCS) Model**

The Job Demands-Control, Social Support (JDSCS) model are among the most widely used theoretical frameworks that relate the characteristics of a job to health and wellbeing of workers. A review of studies using this model have found out that psychosocial work environment variables of high demand, low control, and low social support are consistently associated with worker's high strain and low wellbeing (Ada et al 2012) in 1979,

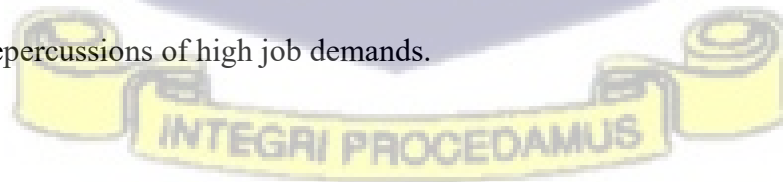
Robert Karasek introduced the job demand-control (JDC) model, which outlines the effect of work characteristics on stress, health, and occupational wellbeing. Karasek envisioned how demanding jobs are and how much control individual workers are afforded as essential to wellbeing, motivation, and productivity. The central position of the JDC model is that highly demanding jobs that gives little control over work usually reduced psychological wellbeing of worker (Karasek, 1979).

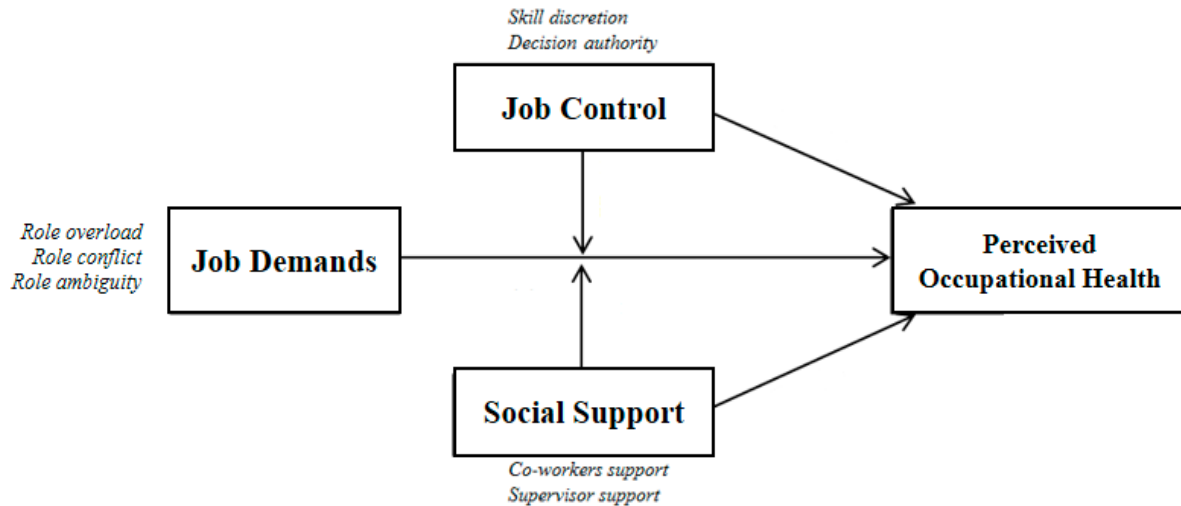
Ten years after the initial development of the JDC model, following increased attention to the role of workplace support in the stressor-strain process, the JDC model was updated by Karasek and Theorell to include workplace social support as the third predictor of wellbeing and strain (Ganster, 1989). This updated model became known as the JDSCS model. Karasek in this extended version of the JDC model believed that the effect of high strain (i.e. high job demand, low control) job would be exaggerated if work social support is ascertained to be low and that the combined effect of exposure to all three factors has a higher impact on the occupational health of the worker as compared to the risk associated with individual factor (Johnson & Hall, 1988, Karasek & Theorell, 1990).

Thus, the JDCS is a second theorization of the JDC model. This model has been a highly influential model in the study of occupational health literature for more than four decades (Karasek, 1979, Karasek & Theorell, 1990, Marcus et al 2017). The job demands-control model has been widely used to evaluate stress-moderating effects of control. This model was developed by Karasek and Theorell to explain the balance between the desires of employees and their autonomy. Thus, the model basically details how job demands and other job characteristics can influence the psychological well-being of employees.

According to Karasek and Theorell's (1990) job-demand-control-social support model, outlines three dimensions that affect the occupational health of employees or workers (employee burnout). When individuals are simultaneously exposed to high job demands and limited job control, psychological strain or physical-related health effects (e.g., cardiovascular disease) arise, according to this hypothesis (Kristensen, 1996). Increases in either the level of control or the perception of control can counteract the negative effects of high job demands on employee well-being.

As a high extreme point, high job demands combined with high controllability might result in an active job, which has some positive results for the individual, such as increased desire, learning, and healthy regeneration. A low extreme point, referred to as passive job, also puts the individual under stress. According to the JDCS model, increasing job control to get workers more involved in an active employment scenario is the preferable method for removing the repercussions of high job demands.





**Figure 1:** Job-Demand-Control-Social Support Model.

**Source:** Karasek and Theorell (1990)

### 2.1.1.1 Job Demands

Several theories and model have been developed to study the effects of job demand on burnout. The central tenet of these model proposes that burnout develops in response to excessive job demands without the modulating effects of good job control and good social support. This assertion suggests that the level of job demand is one main predictor of burnout among workers (Schaufeli & Bakker 2004). The job demand construct in the JDCS model is described as involving three dimensions, namely role overload, role conflict and role ambiguity.

Karasek stipulated that job demand refers to pressure of psychological nature be it quantitative e.g., time and speed in performing task or qualitative e.g., conflict between contradicting demands (Karasek & Theorell 1996). Work or role overload is observed to be the factor that most influences the deterioration of occupational health (Larson & Tipton, 2006). This stress is caused by taking on a high number of commitments, a limited amount of time to complete the work, or the imposition of unreasonable deadlines. When an employee's status

rises, so does demand for their services, resulting in the paradox that too much demand on actual capability might hurt job quality (Pritchard, Ferris & Jagannathan, 2003).

Job overload can also arise when deadlines are so tight that the quality of the work suffers as a result (Umar et al., 2017). The requirement to follow the law causes work peaks and concentrations, resulting in job overload and increased role conflict, which leads to emotional tiredness among employees. Role conflict which basically means that workers are expected to deliver on their job despite conflicting demands is more likely to occur at lower levels of a professional career due to the pressure from superiors (managers and partners) on these individual workers. The pressure by obedience has been used to describe this occurrence. To meet their superiors' demands, less-skilled team members may be compelled to break professional norms. (Fazli et al., 2014)

The last dimension of the job demand construct is the role ambiguity which is described as when there is a lack of understanding or adequate information to perform a given task well (Maslach et al 2001). This factor can affect the quality of the work of skilled workers like the nurse and midwife. As indicated by Guenin-Paracini, Marsch and Marche (2014), The possibility of making large faults while performing tasks instills terror in workers. This sensation can have both beneficial and bad repercussions (e.g., it can increase professional diligence) (since it can induce the adoption of defensive strategies). Undoubtedly, as Rebele and Michaels (1990) proposed, all these elements of role ambiguity have a negative influence on satisfaction and perception of performance. It is worth noting however, the scenario of combining low demand and low control is also harmful since it causes loss to the organization because of decision latitude in relation to the work process (Theorell, 2000).

### **2.1.1.2 Job Control**

The second construct under the JDCS is job control. It is characterized by two variables, skill discretion and decision authority (decision latitude). This construct is explained as the opportunity a worker has to employ her intellectual abilities in performing job related task as well as the degree of authority that the worker has for making decisions about how to perform a job-related task (Theorell ,1996, 2000). It has been observed that people who do not participate in decision making process in an organization seem to experience higher level of burnout (Maslach et al, 2001).

Depending on the degree of control the worker has over the activity, the negative impacts of high job demands might be mitigated or amplified. The ability to utilize one's own skills (skill discretion) and the level of autonomy over decisions that affect you are two elements that underline this control (decision authority) (Karasek, 1979). Fazli et al. (2014) report that professionals with greater competence and autonomy experienced less role ambiguity.

This is due to the fact that increased levels of competition allowed for more focus on the complexities of the profession's tasks with less stress. At the same time, these researchers discovered that having less autonomy limited access to information, resulting in more ambiguity. There is data that suggests that job autonomy in decision-making, such as the capacity to choose one's own workload, moderates various occupational health factors such as stress (Goodwin & Wu, 2015). Although work overload may have a negative impact on the quality of work, most professions, such as nursing and midwifery, are imbued with an organizational culture that accepts, supports, and imposes high standards of performance that translate into high demand levels.

Although work overload may have a negative impact on the quality of work, most professions, such as nursing and midwifery, are imbued with an organizational culture that

accepts, supports, and imposes high standards of performance that translate into high demand levels (Umar et al., 2017). Stressors are mitigated by the incentive of utilizing one's own professional competencies, because the content of the tasks corresponds to the level of professional development. As one gains experience, one's professional judgment improves. Tasks are more regimented and demand a level of minor professional judgement in the early stages of a career.

As professional nurses and midwives become more responsible for more sophisticated choices, there is increased ambiguity. In line with the principles of Social Cognitive Theory, the experience undoubtedly promotes more comfort in complex decision-making. As a result of the experience, better estimations of the danger of severe errors are made (Sayed et al., 2017), in the early phases of a career, tasks are more organized and require a level of minor professional judgement. There is more ambiguity since professional nurses and midwives are responsible for more complicated decisions. The experience clearly encourages increased comfort in complex decision-making, in line with the principles of Social Cognitive Theory. As a result of the experience, more accurate assessments of the risk of serious errors are established (Laher, 2010).

### **2.1.1.3 Social Support**

The third dimension of the JDCS was added by Johnson in 1988. This dimension is concerned with the level of social interaction between workers and their superiors and colleagues (Karasek & Theorell, 1990, Theorell, 2000). Hoeman (2008) conceptually described social support as the help and protection offered by others whether formal or informal. There are four known types of social support namely emotional, instrumental, informational, and evaluative social support. In other words, workplace social support is defined as the helpful interactions with others at work which is characterized by four (4) main components.

These components are related to direct helping, information provision, advice, and emotional support (Karasek & Theorell 1990, House, 1981). Social support is considered as a job resource that can modulate the effect of job demand causing burnout. Between the two kinds of social support namely, colleague support and supervisor support consistent and overwhelming evidence exist to show a strong correlation between lack of social support and burnout with lack of supervisory support as being more important than support from coworkers (Burke & Richardson, 1993, Maslach et al 2001, Maher, 1983)

Thus, leaders that foster a positive team culture see improved communication and cohesion among their employees (Nelson, Proell & Randel, 2016). When subordinates do not feel encouraged by their immediate supervisor, feelings go in opposite directions. Individuals' self-esteem appears to rise because of social support (Cohen & Wills, 1985; Fenlason & Beehr, 1994), making them more inclined to accept higher levels of stress at work. In the nursing profession, social support serves a similar function as it does in other professions.

Nonetheless, the most essential measure of social support in this field appears to be support from the supervisor as well as colleagues, as nursing involves teamwork. Furthermore, nurses have discovered that organizational support is a significant source of social support (Bradley & Cartwright, 2002). That is, if nurses believe their employer values and supports them, they will be more satisfied at work. Furthermore, it has been shown (Bianchi, 2004) that hospital nurses use social support as a coping technique to create their reaction to work pressures.

## **2.2 Perceived Occupational Health/Burnout**

Perceived occupational health or burnout occurs in response to occupational challenges; negatively affecting workers and service providers within a working environment and eventually leading to negative effects on service provision. Maslach's (1982) dimensions of

burnout consist of emotional exhaustion, depersonalization and reduced personal accomplishment. The sequential development and existence of these three dimensions of burnout is considered crucial in designing interventions. Burnout among workers may begin with low feelings of accomplishment and emotional exhaustion.

Depersonalization, the third component of Maslach's (1982) dimension to burnout, comes as an indirect coping strategy. Depersonalization, referred to as detachment, arises when the psychological wellbeing of an individual is damaged when one feels emotionally exhausted and inefficient. If coping strategies are inefficient, Angel et al. (2003) suggest that emotional exhaustion and low personal accomplishment are bound to set in. Reduced professional accomplishment is represented by one's inefficiency at work, feelings of lack of professional success and competency.

According to Maslach et al. (2001), role conflict and role ambiguity, excessive workload, time pressure, lack of logistics and working resources, the number of working hours or numbers of clients and customers to attend to, physical environment and shift work, undefined job responsibilities, reduced support by supervisors and colleague workers increases the likelihood of having burnout. Lack of autonomy and control also prevents one from ably addressing the challenges and problems that they identify, feedback on performance, lack of work appraisals, meaningful rewards and insecurity are significant job characteristics directly associated with burnout (Maslach et al., 2001).

Nursing work environment involves emotions; this context may be related to emotional exhaustion outcome in burnout. This can be explained in the fact that a nurse may need to show emotions that are considered right for the interactional context and other times block out own feelings. It requires the nurse to perform emotional labor to successfully suppress or evoke of emotions during patient care which can lead to stress. A study by Rebecca and Wendy (2008)

affirms the emotional demands of nursing work. They identified in their study where high levels of burnout had positive correlation with higher amounts of surface acting or individual nurse frequency in masking emotions and pretending to have feelings that were expected but not felt (Rebecca & Wendy, 2008).

The most accepted definition of burnout is the three-component conceptualization proposed by Maslach et al. (1996). They define burnout as “a syndrome of emotional exhaustion, depersonalization and reduced personal accomplishment that can occur among individuals who work with people in some capacity.” According to Maslach (1993), emotional exhaustion reflects the stress component of burnout, whereas depersonalization captures a dimension of interpersonal relations, and reduced personal accomplishments which incorporates a dimension of self-evaluation (Schaufeli & Enzmann, 1998).

### **2.2.1 Emotional Exhaustion**

The first dimension of the manifestation of burnout is emotional exhaustion. It is usually the most visible and easily noticeable among the three dimensions. Most people experiencing burnout pinpoint exhaustion characteristic by emotional stress related symptoms such as moodiness, frustration, and agitation which may evolve into the inability to cope with the emotional and physical aspect of their job. Is characterized by a lack of energy and a feeling that one’s emotional resources are used up (Cordes & Dougherty, 1993, Shirom et al 2005, Simisola et al 2021)).

As workers realize they can no longer contribute as much or be as responsible for clients as they once could, they may experience irritation and anxiety as a result of their composition fatigue. Dread and the idea of returning to work the next day are prevalent symptoms. The emotional incompetence eventually influences physical competence causing workers to react in a manner that is contrary to line of work (Simisola et al 2021) Also, the physical fatigue

manifested in emotional exhaustion is described as an overwhelming feeling of tiredness, and impaired cognitive ability. This assertion about this dimension of burnout indicates that a burnout nurse or midwife will lack the energy required to display empathy to patients and colleagues alike (Maslach et al 2016).

### **2.2.2 Depersonalization**

Depersonalization, the second component, adds an interpersonal dimension to the definition of burnout. Depersonalization is the development of a hostile, uncaring, and cynical attitude toward the people who receive one's services (Schaufeli & Enzmann, 1998). Workers may exhibit a disconnected and emotional callousness toward their clients and service users. They may become cynical about their coworkers, clients, and the company as a whole (Cordes & Dougherty, 1939). When coping with stressful and highly arousing events, a certain degree and amount of psychological detachment may be essential and even useful. Too much detachment, on the other hand, may lead to the individual acquiring negative sentiments toward his or her clients/patients (Parker & Kulik, 1995).

### **2.2.3 Personal Accomplishment**

Feelings of diminished personal accomplishment are the third dimension of burnout. It is characterized by a negative attitude about oneself. In other words, a person with higher levels of burnout has a decrease in their perceptions of job competency and effective achievement in their work or connections with others (Cordes & Dougherty, 1993). Generally, there is a sense of stagnation or even loss of ground. Feelings of personal inadequacy can arise from causes such as feeling unappreciated or that one's efforts are unrecognized and ineffectual (Jackson, Turner, & Brief, 1987), or factors that suggest one's competence or performance is low (Burke, Shear & Deszca, 1984; Maslach et al., 2001).

#### 2.2.4 Applicability of the Constructs of the Theory to the Research Study

According to the JDCA, a job that depletes your psychological and physical energy and limits your control as well as do not allow for considerable support socially will result in high stress and perceived negative occupational health (Kain & Jex, 2010). However, it posits that with good job resources like job control and social support especially from supervisors, the linear relationship between high job demand and burnout can be abated (Demerouti et al 2001; Rotham, 2002). This theory has remained a guide of work stress literature and has been tested across continents and professions since its inception in 1979. It is applicable, because of its simplicity and the ease in which it can be tested in all settings. Furthermore, the construct of job demand, control and social support and burnout can be easily measured plus it has obvious practical implication (Griffin & Clarke, 2011). This far, pertinent literature relating work related factors and burnout among nurses and midwives will be reviewed.

A number of studies have explored the subject's occupational health, burnout and stress using Karasek and Theorell's (1990) job-demand-control-social support model. One of such studies is that of Van Vegchel et al. (2004). They hypothesized that in human services work, the effects of emotional demands on burnout are mostly stronger than the effects of job demand. In the study, high job demands, low job control and low social support were hypothesized to be detrimental to occupational health. Similarly, Haybatollahi (2009) also adopted the model to explore work stress and organizational causal attribution in the nursing profession. The study employed Karasek and Theorell's model to understand the relation of work stressors and personal resources to organizational outcomes. Based on the model, the authors predicted several moderation effects.

Yuwanich (2017) also adopted the model to examine occupational stress among Thai emergency department nurses. Using the model, Yuwanich (2017) developed and validated an

instrument to measure stress and related moderating factors among emergency nurses. The constructs of the model were used to develop an instrument considered effective enough to measure stress among the nurses. In the field of accounting, del Pozo-Antunez et al. (2018) also employed the model to examine the relationship between labour and job characteristics and perceived occupational health. The authors successfully used the model to establish the moderating effect of job characteristics on occupational health of professional accountants. Navajas-Romero et al. (2020) also analyzed the model in work-life balance among nurses within the European context.

The authors successfully established a partial confirmation of moderating effect between job control and psychological demands, supervisor support and physical demands. Muriithi (2016) equally adopted the model to explore work-related factors as determinants among nurses in Nairobi. In all these identified studies, the authors were successfully able to detail the moderating effect of job-related factors on perceived occupational health of the study subjects. Appropriate theoretical implications and recommendations were subsequently made following the observations made.

### **2.3.0 Shift System**

According to Yeom et al. (2017) the discourse of shift labor is fairly broad. It is commonly characterized as work that occurs outside of regular working hours (about 7–8 AM to 5–6 PM), as well as night shift, early morning shift, and rotational work shifts. The disruption of the endogenous circadian rhythm has been identified as the main effect of shift work on health in several publications and studies over the last few decades. Biological homeostasis is finally obliterated as a result of this (Fontana Rosa & Fisher College, 2017).

Shift work, according to Bazyar et al., (2017), is a unique working pattern in relation to the traditional weekday. In many industrial, economic, and service operations, this labor

pattern is an essential aspect of providing services. Despite the fact that many studies have linked shift work to other diseases such as type 2 diabetes, obesity, blood pressure, cholesterol, and total cholesterol as indicators of lipid metabolism and cardiovascular disease, there is very little evidence linking shift work to the Framingham risk score (FRS). According to the findings of Bazzyar et al. (2017), changes in FRS and other parameters were not significant during the course of the 5-year study.

Therefore, they conclude that the observed difference in results of multilevel modeling is not because of the shift work effect, but this difference is related to the baseline, and that showed a significant relationship between FRS and shift work. According to Aisbett, et al. (2017), night shifts typically begin at 9 p.m. and end at 8 a.m., whereas evening shifts begin at 2 p.m. and end at 12 a.m. Work starts at 4 a.m. and ends at 7 a.m. during early morning hours. As a result, early morning and night shifts significantly reduce sleep hours, but evening shift employment provides the longest sleep periods. Typically, such rosters are for healthcare employees, other factory workers, and emergency services personnel (Aisbett et al., 2017).

### **2.3.1 Health Effects of Shift Work**

Shift work is one of the most visible and noticeable aspects of the workplace. Shift work has been linked to a number of cases of acute and chronic issues on the organism, the majority of which are associated with the human body's circadian rhythmicity. The main effects are on sleep, awareness, and performance, but there is also a long-term health effect (Torbjorn, 2014). The health impact of the work shift has been thoroughly researched. Work shifts, however, have been linked to cardiovascular diseases, high serum cholesterol levels and cerebrovascular diseases.

Also, some negative health impacts include gastrointestinal disorders, reproductive system disorders, mental illnesses such as depression, and others, according to various studies (Oh et al., 2014). Another study discovered that workers who are subjected to job strain and

shift work with effort-reward imbalance (ERI) are at a high risk for masked hypertension (MH), which is defined as normal clinic blood pressure when not active but high blood pressure during normal daily activities (Landsbergis, Travis, & Schnall, 2013).

### **2.3.2 Irregular Shift Work**

The health profession is a 24 hour a day, 7 days a week job. The demand for non - periodic shift work in healthcare creates discord in healthcare workers' physiological and psychological systems. Occupational stressors identified in a study of nurses employed in four university hospitals using the Work Ability Index Questionnaire and the Occupational Stress Assessment Questionnaire included irregular shift work, public criticism, the hazard at work, poor work organization, and interpersonal conflict at the workplace (Golubic, et al., 2009). Another study on occupational stress among hospital nurses in China found that night shift work contributes to stress among hospital nurses (Wu, Chi, Chen, Wang, & Jin, 2010).

### **2.3.3 Fewer Sleep Hours**

In the pathways leading to the prediction of increased blood pressure or hypertension, sleep disturbance could be a crucial area that has been understudied. Sleep deprivation is also linked to elevated levels of inflammation and circulating monocytes, as well as an increased risk of hypertension (Floam et al., 2015). As it occurs frequently among rotating shift workers and night workers, little is known about the negative side effects of the linkage combining endogenous environments with behavioral rhythms and circadian physiological rhythms (Wang, Czeisler, & Shea, 2013). In addition, millions of people who work shifts experience a suboptimal connection between daily behaviors and endogenous circadian rhythms, and this circadian disruption may predispose them to the negative health effects of shift work, such as fatigue and lack of sleep, gastrointestinal disorders, a harmful metabolic cycle, and increased risks of obesity and hypertension (Carlota et al., 2011).

### **2.3.4 Long working hours**

#### **2.3.4.1 Job Stress**

Workers, companies, occupational safety and health authorities, advocates, and workers compensation programs are all concerned about job stress (Sarafis et al., 2016). Sarafis et al., (2016) defined occupational stress as situations in which job-related elements interact with an employee, altering their psychological and physiological state to the point where a person is forced to deviate from his or her typical functioning. The US National Institute for Occupational Health and Safety defines job stress as the harmful physical and emotional response that happens when the requirements of a job do not meet the talents, resources, or demands of the worker.

According to Nakao (2010), job stress has been linked to a variety of negative mental and physical health effects, including cardiovascular disease, anxiety, depression, and insomnia. Demanding working conditions are also likely to have an impact on an employee's health, either directly by contributing to unhealthy lifestyles or indirectly by diminishing the person's ability to make positive changes in his or her lifestyle attitude, such as sedentary behavior and smoking. Job stress can be caused by the job itself (i.e., high workload, poor decision-making input) or by the sociological and organizational characteristics of the environment in which work is performed (e.g., inadequate communication, interpersonal divergence).

#### **2.3.4.2 Work Organization**

Workplace organization includes a variety of factors such as work speed (assembly line speed, quotas), workload, number of people working on a job (staffing levels), how long they stay on the job, days off, rest breaks, job design, and skill mix of workers on the job, tasks, assignments, and responsibilities, and training for the work to be done (AFL-CIO Department of Safety and Health, 2006). The quantity of workloads, the exposure to workloads, the number

and length of actions, the form of a workstation, equipment design and tool, and ambient factors can all contribute to work-related stress (Pascale et al, 1999). Workplace organization has also been discovered to be quite important, especially in terms of predicting job satisfaction and success (Gelsema, et al., 2005). The authors go on to say that job design and improved work planning are beneficial to health outcomes, and that the availability and quality of equipment, materials, and instruments could reduce somatic complaints, which are linked to job stress.

#### **2.3.4.3 Workplace Social Support**

When it comes to work-related issues, social support at the workplace is critical. Individuals sometimes regard social support mobilization as just one of several forms of adhering attitude, according to Schwartz et al. (1996). There are also a large number of independent research organizations studying both the moderating and direct effects of social support on a variety of diseases and mortality linked to workplace social support.

It was also stated that the use of social support is influenced by the environment, which includes the presence of other factors. According to a study by Johnson and Hall (1988) into cardiovascular disease and work stress, the authors built on the work of Karasek et al. (1981) on the demand-control model and discovered that those who have little control, high demands, and little social support at work are at the highest risk of developing cardiovascular diseases (Johnson & Hall, 1988).

#### **2.3.4.4 Fatigue**

Workplaces have necessitated a higher level of vigilance, especially as technology and expectations advance (Jansen et al., 2003). With growing demands on the workforce, such as longer work hours and more duties, weariness may be a greater problem, especially because of its negative impacts on human performance. Unfavorable results involving shift employees are usually linked to extended work hours, reduced sleep hours, and poor recuperation (Tabone, 2004).

When an employee is fatigued at work, they face slowed reaction times, decreased attentiveness, weaker memory, impaired attention, impatience, and risky decision making (Tabone, 2004). An examination of the fundamental causes of this level of employee fatigue shows that work-related variables account for a considerable amount of the primary source. Work-induced weariness is exacerbated by long work hours, protracted shifts, and duty cycles. Employees have been affected by sleep deprivation and disturbed circadian rhythms as a result of these conditions (Poissonnet & Veron, 2000).

## **2.4.0 Socio-Demographic Factors**

### **2.4.1 Staff Strength**

The health-care workforce in Sub-Saharan Africa (SSA) is severely understaffed, and the number of personnel who are improperly trained is at an all-time high, preventing the effective reduction of hypertension-related morbidity and mortality rates. However, in Africa, there are about 2.7 doctors and 12.4 nurses per 10,000 people, compared to 21.5 doctors and 44.9 nursing/midwifery workers per 10,000 persons in North America. According to Gyamfi et al. (2017), the most significant barrier to delivering effective care and management of raised blood pressure in Ghana is a severe scarcity of healthcare providers. The author went on to say that in Ghana, the ratio is one physician and nine nurses for every 10,000 people. Furthermore, the scarcity of health workers is assumed to be linked to healthcare experts choosing greener pastures, higher incomes, more advanced technologies, and a more stable political environment.

### **2.4.2 Lifestyle Factors**

While the Centers for Disease Control (CDC) divides these risk factors into modifiable and non-modifiable factors, the World Health Organization (WHO) believes they can be divided into four major risk factors: behavioral risk factors, metabolic factors, social determinants, and cardiovascular diseases. Physical inactivity, a poor diet, smoking, and

excessive alcohol consumption are all behavioral risk factors linked to the development of hypertension (Onyango, Kombe, Nyamongo, & Mwangi, 2017).

### **2.4.3 Alcohol Intake**

Alcohol consumption has both beneficial and harmful impacts on cardiovascular health, according to several epidemiological research. It's also been widely stated that excessive alcohol use is a risk factor for cardiovascular disease (Rehm et al., 2017). Another piece of epidemiological evidence suggests that moderate alcohol use may help prevent people from chronic diseases. The results of these observational studies, however, have limitations since they are influenced by a number of confounding variables or reverse causation when looking at the link between alcohol consumption and the risk of chronic diseases (Shin, Cho, & Davey Smith, 2017).

According to Piano (2017), the link between alcohol consumption and cardiovascular diseases such as arterial disease, coronary heart disease, stroke, hypertension, peripheral vascular disease, and cardiomyopathy has been extensively studied, and that while many lifestyles, genetic, and biological differences influence the link between alcohol consumption and cardiovascular diseases, the pattern and dosage of alcohol consumption appear to have the greatest impact.

### **2.4.4 Physical Inactivity**

In today's environment, physical inactivity is a major public health concern. Regular exercise, according to medical study findings, is a defense mechanism against the risk factor associated with cardiovascular illnesses, thus physicians should recommend workouts to their patients (Getty et al., 2018). Physical activity, both in spare time and at work, is expected to minimize cardiovascular risk by lowering the incidence of coronary heart disease and stroke, according to another study by Kang et al., (2015).

Other risk factors for hypertension include anything from physical inactivity to bad diets, smoking, and alcohol consumption, as well as hereditary variables like obesity and the aging process. Physical inactivity and obesity are the most strongly linked to hypertension among these various risk factors (Werneck et al., 2018).

#### **2.4.5 Body Mass Index**

Hypertension is becoming more common, and its link to fat, according to some clinical evidence, is a major public health problem. Cross-sectional comparisons, short follow-up intervals, limited assessments of blood pressure and weight, follow-up only through middle age, and modifications for only baseline characteristics that are said to vary with age have all been used in previous studies of the relationship between hypertension and obesity (Hasan, et al., 2012).

Obesity and overweight are thought to be independently linked to hypertension risk factors. Body mass index (BMI), waist circumference (WC), waist-stature ratio (WSR), and waist-hip ratio (WHR) are the markers frequently employed to evaluate the degree of obesity because the incidence of overweight and obesity is claimed to be increasing internationally (Ren, et al., 2016).

Another study by Kong et al., (2017) found a close link between obesity and metabolic illnesses, such as type 2 diabetes mellitus (DM), and cardiovascular diseases (CVD). These variables are currently the leading causes of death in the world. Even though an elevated body mass index (BMI) is commonly used as an indicator of obesity, the relationship between BMI and general mortality and BMI and cardiovascular illnesses is still a hotly debated topic, according to Kong et al., (2017).

#### **2.5.0 Prevalence of Hypertension**

According to Soumya, Surekha, and Surabhi (2018), according to a World Health Organization report from 2008, over 40% of persons over the age of 25 were hypertensive.

Elevated blood pressure is a major risk factor for the development of coronary heart disease. Hypertension has also been linked to heart disease and stroke (CVD). Pre-hypertension is defined as a systolic blood pressure of 120 to 139 mm Hg or a diastolic blood pressure of 80 to 89 mm Hg, as described by the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure's Seventh Report in 2003. (Soumya et al., 2018).

Hypertension was shown to vary widely in research by Kearney et al., (2004), with a low rate of around 3.4 percent among men in rural India and a high rate of nearly 72.5 percent among Polish women. In other wealthy countries, hypertension was found in between 20% and 50% of the population. In the United States' crude adult population, hypertension prevalence was 27.1 percent and 30.1 percent, respectively, according to data from the National Health and Nutrition Examination Survey 1999–2000. The authors also noted that the prevalence of hypertension is higher in black females than in black males, with proportions ranging from 35.8 to 30.9%, respectively, and that the similar trend exists in the white race, with proportions ranging from 30.2 to 27.7%, respectively, among females and males.

The number of new cases of hypertension reported in Ghanaian public facilities by outpatient has increased by more than tenfold, from around 49,087 in 1988 to about 505,180 in 2007. When compared to the overall number of disorders reported by outpatients, hypertension grew from 1.7 percent to 4.0 percent in all age groups over the same period in most locations, making it one of the top five most common causes of outpatient morbidity. Nonetheless, in Accra, Ghana's capital city, hypertension rose from fourth to second place after malaria as the most common cause of outpatient morbidity in 2007. (Bosu, 2010a).

### **2.5.1 Shift Work and Hypertension**

Shift work-related sleep deprivation is known to be associated with hypertension on its own, as it is frequently characterized by recurring episodes of intermittent hypoxia. There is growing evidence that obstructive sleep apnoea (OSA), a type of Sleep Disordered Breathing

(SDB), is common among hypertensive patients, ranging from 37 percent to 56 percent, as well as evidence that managing SDB can help improve blood pressure (BP) values and response to hypertensive treatment (Njamnshi et al., 2017).

Other research looked into the impact of shift work on resting blood pressure levels and daily blood pressure in the field, as well as whether shift work affects blood pressure's circadian profile. Certain research found no link between work shift and high blood pressure, while others found similar blood pressure levels in shift and day workers, and in some studies, shift workers had much higher blood pressure levels than day workers (Sampsa & Mikko-Härmä, 2010).

In addition, according to Barger et al., (2017), insufficient sleep, whether caused by decreased sleeping time or obstructed sleep apnea (OSA), and persistent circadian distraction caused by night shift work have negative effects on cardiovascular function regulation and are linked to an increased risk of cardiovascular disease and death.

### **2.5.2 Long Working Hours and Hypertension**

Environmental, psychological, and physiological factors are commonly identified as factors that influence the association between stress and blood pressure in studies looking at the health impacts of stress (Cohen, Keessier, & Gordon, 1995). According to the authors, a good model for stress comparison approaches assumes that environmental stressors are fundamental inputs that interact with a person's psychological makeup to produce a felt stress level. This psychological factor includes a person's personality, which is partly affected by genetics, as well as his or her past experiences (Cohen et al., 1995).

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level. This psychological factor includes a person's personality, which is partly affected by genetics, as well as his or her past experiences (Cohen et al., 1995).

### 2.6.0 Summary of Chapter

In summary, this chapter focused on the literature review and theoretical framework of the study. The literature review reveals that nursing and midwifery are known to be a very stressful occupation both physically and psychologically. The literature also revealed a low to high levels of reported occupational health events like burnout among nurses and midwives across the globe and this phenomenon has always been the case because of work related factors like high job demand, low job controls and limited social support especially from supervisors. This chapter reviews the concept and definitions of shift work. The health effects of shift work such as irregular shift work was reviewed. The health effect of long working hours such as job stress, work organization, workplace social support, and fatigue was discussed. Also, the socio-demographic factors and the prevalence of hypertension were reviewed. Related studies under shift work and hypertension, and long working hours and hypertension were reviewed.



## CHAPTER THREE

### RESEARCH METHODOLOGY

#### 3.0 Introduction

This chapter focuses on the methods used in the study. It discusses the methods that were employed for the study. This includes the research design, research setting or study setting, the study design, study population, sample choice and size and sample procedure. Similarly, this chapter looked at the data collection instrument, data collection procedure, methodological rigor, data management, data analysis and limitations of the study. Additionally, this chapter contains information on how ethical requirements and trustworthiness of the study were met.

#### 3.1 Study Design

This study is a cross-sectional study carried at the Korle-Bu Teaching Hospital in the period among nurses. The use of the cross-sectional design was deemed appropriate due in assessing the relationship between long working hours and shift system on hypertension among nurses in the Korle-Bu Teaching Hospital.

#### 3.2 Study Site

The Korle Bu Teaching Hospital is a tertiary referral hospital located in Ghana's southern region. It is West Africa's largest hospital, and it is located around 450 meters from the Korle Lagoon in Ghana's Ablekuma Sub-Metro. It spans 44 acres. The hospital's foundation stone was laid in 1921, and the facility was officially commissioned on October 9, 1923, by Sir Gordon Guggisberg, the Governor of the Gold Coast at the time.

About the years, the hospital has gradually expanded to its current capacity of over 2000 beds. It provides a 24-hour service and employs over 4500 people in various health and administrative fields. The hospital currently contains 17 clinical and diagnostic departments

and sections, each with its own set of personnel. It has a daily outpatient attendance of 1,200 people and a daily admission rate of roughly 150 people. It has a total of 2000 beds in its 48 operational wards, as well as 430 doctors and 1050 nurses.

Medicine, surgery, Obstetrics and Gynecology, Allied Surgery, Pathology, Hematology, Laboratories, Radiology, Anesthesia, and Polyclinics are the clinical and diagnostic divisions. Surgical and medical emergencies, as well as the Accident Centre, Pharmacy, Central Sterilization, and Supply Department and Physiotherapy, are among the others. All clinical departments participated in the trial at the same time. These clinical settings were chosen to provide a balanced view of the health effects of lengthy work hours and shift patterns on nurses.”

### **3.3 Study Population**

The study population included all three hundred and twenty (320) nurses at the clinical departments and units of the Korle bu teaching hospital who consents to the study.

**3.3.1 Inclusion criteria:** Nurses who consent to the study and have been working in the hospital department for at least a year.

### **3.3.2 Exclusion Criteria:**

1. Nurses on leave during the period of the study.
2. Voluntary and locum nurses.
3. Nurses undertaking mandatory national service.

### **3.4 Sample Size Determination**

According to Addo et al (2012), the hypertension rate is between 19.3% to 54.6%, this study will adopt the average of 37% as done by Egungwu, 2015 on work-related stress and prevalence of hypertension among nurses. Hence the probability for been hypertensive in this study will be 0.37. Using the sample size formula by Cochrane (1977) for cross-sectional study:

$$n = z^2 p(1-p) / (d^2)$$

Where “n” is the sample size,

“p” is the probability of being hypertensive, i.e 0.37.

“d” is the degree of accuracy desired, i.e., 0.05 and

“z” is confidence level, i.e., 1.96.

The sample size formula was derived from the (Cochrane, 1977) as follows n

$$\begin{aligned} &= z^2 p(1-p) / (d^2) = \frac{(1.96)^2 (0.37)(0.63)}{(0.05)^2} \\ &= 358 \end{aligned}$$

The total number of nurses at the Korle bu teaching hospital at the time of the study was 1050

$$\begin{aligned} n &= \frac{n_0}{N} \times n \\ &= 1 + (n_0 - 1) \end{aligned}$$

Where n is the sample size, N is the total population (1050) and n<sub>0</sub> is 358, n= 267

Accounting for non-response of 10 % n= (10/100) x 267=27

Hence, the sample size considering a 10 % non-response rate is **294** of nurses.

The table here for the distribution of nurses

**Table 3.1 Dependent and independent variables definition**

Independent variables	Operational definition	Scale of measurement
<b>Socio-demographic factors</b>		
Age	Age at last birthday	Continuous
Education level of patients	Certificate; Diploma, Tertiary	Ordinal

Length of service in the hospital	Number of years worked	Continuous
Sex	Male; Female	Nominal
Income	Monthly salary	Ratio
Lifestyle behavior	Alcohol intake, smoking, eating habits, physical activity. (Yes/No)	Nominal
Work shift/system		
Recurring work times	Repeated work routine in one day	Ordinal
Work hours	Working outside work hours	Continuous
Work schedule	Rotational, morning, afternoon, and evening	Nominal
<b>Working hours (Work-related stress)</b>		
Workload	Difficulty of concentration	Nominal
Workplace support	Degree of drowsiness	Nominal
Role conflict/ambiguity	Less or more sleep patterns	Ordinal
Dependent variable		
Hypertension	Hypertensive or non-hypertensive	Nominal

### 3.5 Sampling Methods

A convenience sampling technique was used in recruiting nurses available and willing to participate in the study. Presently, due to the COVID 19 pandemic, the work schedules of nurses are so tight that it is quite difficult for the researcher to reach out to all nurses in the

various departments in using probability sampling technique which may give all nurses an equal chance of being selected.

The convenience sampling method was therefore used in order to select nurses who are available for the study. This method was chosen in consultation with the supervisor of this research. However, data on the nurses available for recruitment into the study was obtained from each department taking into consideration the proportionate sampling allocation where the percentage to be selected from each department was based on the number of nurses available in the department. Nurses who met the inclusion criteria were recruited for the study after consenting.

### **3.7.0 Data Collection**

#### **3.7.1 Data Collection Tool**

The questionnaire was adopted from Folkard and Descartes, (2016), Karasek et al., (1990), and Abubakari (2018) and used in collecting information from the nurses. The questionnaire was divided into three sections (A, B, C, D and E). Section A collects information on participants' socio-demographic factors [(age, marital status, education, income, religion, family history of hypertension, sex, lifestyle (alcohol intake, cigarette/marijuana smoking, and eating pattern)].

The height and weight of eligible individuals were measured using a portable stadiometer and a bathroom weighing scale accredited by the Ghana Standards Authority (GSA), respectively, and their BMI was calculated using a portable BMI Matrix chart. Section B captures the knowledge of nurses on Hypertension. Section C gathered information on participant's shift work/system (recurring work times performed the same day in the relay; working outside "traditional" work hours; work routine). Section D solicited information on participants' long working hours (workload, work control, and work relationship support).

Section E was used in collecting data on participants Blood pressure readings. In administering the questionnaire, participants were required to sign a written consent form (Appendix A) after the purpose of the study, requirements for participation, risks, benefits, voluntary nature of the study, and confidentiality of responses were explained to them. The questionnaire was administered to the nurses face-to-face and in a preferred setting of the participants.

After a 5-minute resting time, participants' blood pressures were measured using an OMRON digital electronic sphygmomanometer during the interview. Three (3) times the measurements were taken, and the average blood pressure values were collected. Participants' weights were taken in their work uniforms, with all pockets entirely emptied, and expressed in kilograms to the nearest 0.5kg. Participants' heights were also measured and expressed in meters using a normal stadiometer. Thus, the data gathering methods were deemed appropriate as it sought to gather data from respondents using questionnaires and also the statistical method employed was deemed fit in determining the size of the population whilst also aiding in the data analysis process.

### **3.7.2 Data Collection Procedure**

The purpose of the research was explained to every participant. Questions in the questionnaire were explained to the nurse's understanding. The questionnaire was administered to the nurses face-to-face and in a preferred setting of the participants. After a 5-minute resting time, participants' blood pressures were measured using an OMRON digital electronic sphygmomanometer during the interview.

Three (3) times the measurements were taken, and the average blood pressure values were collected. Participants' weights were taken in their working uniforms, with all pockets entirely emptied, and expressed in kilograms to the nearest 0.5kg. Participants' heights were also measured and expressed in meters using a normal stadiometer.

### 3.8 Pretesting

Pretesting of data collections tools was done at Kaneshie Polyclinic with 20 nurses to validate survey tools. The purpose was to establish if the tool is worded and devoid of major biases and can seek the type of information intended. Pretesting was also carried out to eliminate irrelevant questions to make them reliable.

### 3.9 Data Processing and Analysis

At the onset of data collection, three research assistants with public health backgrounds were trained on the administration of questionnaires to the population and to address any issues concerning the questionnaires. Questionnaires completed were cross-checked and data from them were coded into a Microsoft Excel spreadsheet. Data was cross-checked again by the main researcher to ensure that data entered into the computer were accurate. The study adapted Stata Version 13 for its descriptive statistics including frequency tables, pie charts, and bar charts to express data. Frequency and percentages tables for socio-demographic were generated.

Continuous data were reported as mean and standard deviation while categorical data were reported as proportions. The shift status was classified as 'YES' or 'NO' with the 'YES' having subcategorization as the morning, afternoon, and evening shifts. Morning and evening shifts were classed as the low-stress factor with a stretch of 8hours and evening as the high-stress factor with a stretch of 12hours. The long period of the stretch from those who go on shift was compared to their hypertension values. The shift status of nurses and work-related stress status was compared with the hypertension status. Chi- 26 square test was used to comparing differences in proportions.

Work-related stress questions were sub-categorized into the workload, work control, and work relationship. High workload related stress was defined as a positive answer to at least 5 out of 8 questions on workload, low work control was defined as a positive answer to only

one question out of 3 questions on job control and low work relationship was defined as a positive answer to one out of 3 questions on work relationship which included co-worker and supervisor support. Reporting on high workload, low work control, and low work relationship categorize you into high work stress group, with a low workload, high work control, and high work relationship class you into a low work stress group.

Nurses reporting high job demand, low job control, and low social support were categorized into high job strain groups, those with high job demand, high job control, and high social support represented active groups. High work stress and low work stress were compared by characteristics of study participants. Hypertensive and non-hypertensive individuals were compared. Schmidt and Kohlmann, 2008 have argued that the use of prevalence ratio will overestimate the effect size of disease above 10%. This study measured the association between high job strain (work-related stress) and hypertension using an odds ratio.

### **3.10 Ethical Considerations**

Ethical approval was sought from the Institutional Review Board (IRB) of Korle Bu Teaching Hospital (KBTH) with IRB number; KBTH-IRB/000178/2020. Permission was sought from Departmental Management Teams of the three study sites/departments. Participants' information was treated as confidential. To ensure confidentiality, the names of participants did not appear on the questionnaire or any write-up. Thus, information obtained from study participants was kept in a file that did not have the participant's name on it, but a code number assigned.

There may be some minimum risk to participants in this study. This risk may come from the use of questionnaires in the collection of participants' information. However, no experimental procedures were involved. Study participants had the right to voluntarily participate or refuse to participate in this study which did not offend the investigator in any

way. In case of a need to ask pertinent questions about the rights of study participants, participants were told to contact the IRB Office of the Korle Bu Teaching Hospital between the hours of 8 am-5 pm or the principal investigator through the contact numbers below. 0242370840/ 0202838291.



## CHAPTER FOUR

### FINDINGS OF THE STUDY

#### 4.1 Introduction

This section presents the results of the data for the important feature using summary statistics. Frequencies, mean, and standard deviations were obtained for quantitative variables while qualitative variables were computed in frequencies and percentages. The results were presented in tables and graphs. The chi-square test of independence was used to check for independence between the shift workers and the non-shift workers. Logistic regression was used to calculate the odds ratio of being hypertensive working on shift work or the non-shift work. The means of the group were compared using the independence T-test. Results were evaluated at a significance level of  $p < 0.05$ .

#### 4.2 Demographics Characteristics

Two hundred and ninety-four nurses (294) participated in the study. The majority of the respondents were females ( $n=214$ ) representing 72.8% and the rest were males ( $n=80$ , 27.2%). The overall mean age for both groups was 32.83 years with a standard deviation of 6.72 years. Of the total respondents, more than half run shift ( $n=243$ , 82.8%) and 17.2% ( $n=51$ ) did not run shift. The mean age  $\pm$  of those who did not run shift was 31.2 years  $\pm$  10.2 years and those who run shift were 31.8 years  $\pm$  9.8 years. Amongst those who run shift, more than half ( $n=122$ , 50.2%) are single, 37.7% are married, 10.6% are divorced and 1.5% are widowed.

Whereas, among those who do not run shift, 52.7% are single, 30.9% are married and the rest (16.4%) are divorced as shown in table 4.1 below. The majority of the respondents are general nurses ( $n=156$ ), 28 are critical care nurses, 30 are Health care Assistants, 16 are Mental health nurses and the rest were midwives. More than half of the respondents have served 5-9 years ( $n=190$ ), 57 have served between 10-14, 32 have served less than 5 years, 21 between 15-20 years.

**Table 4.1: Demographic statistics**

Socio-demographics variables		Frequency	Percentages
<b>Sex</b>			
	Female	233	72.8%
	Male	87	27.2
<b>Age</b>	Mean age for both females and male	32	
<b>Marital status</b>			
	Single	148	50.2%
	Married	112	38%
	Others	34	11.8%
<b>Shift status</b>	Yes to shift	243	82.8
	No to shift	51	17.2%
<b>Job title</b>	General Nurse	156	
	Critical care nurse	28	
	Health care assistant	30	
	Mental health nurse	16	
	Midwife	64	
<b>Number of years in service</b>			

	<5years	21	
	5-9 years	190	
	10-14 years	57	
	15-20 years	21	
<b>Income</b>			
	1000-2000	195	
	>2000	125	
<b>Own a car</b>	Own a car	94	
	Taxi commercial	174	
<b>Physical activity</b>	Walking	26	
	Workout	13	
	Running/jogging	43	
	Walking	106	
	None	162	
<b>Do you drink alcohol?</b>	Yes	234	
	No	60	
<b>Hypertensive history</b>	Yes	206	

<b>Have you been diagnosed with hypertension?</b>	No	88	
	Yes	137	
	No	157	

### 4.3 Shift Status Distribution

82.8% of the nurses reported that they were on shift at the time of the study with 17.2% reporting no shift. Amongst respondents who run shifts, more than half of the respondents mentioned that in the last 12 months, they were scheduled frequently for the morning shift, 30.9% for the afternoon shift, and 17% for evening shifts as noted in table 4.3. On average, 68.7% (n=182) of the respondents have  $\leq 6$  hours of sleep in a day, whereas 31.3% sleep for more than 6 hours.

**Table 4.2: Characteristics of Shift System**

		Frequency	Percentages %
<b>Shift status</b>	No	51	17.2%
	Yes	243	82.8%
<b>Class of shift</b>	Morning	153	52.1%
	Afternoon	91	30.9%
	Evening	50	17%

<b>Hours spent at work</b>	Morning shift (7.5) hours		
	Afternoon shift (6.8) hours		
	Evening shift (11.8) hours		
Hypertension scores	Morning shift		25% of high hypertension
	afternoon shift		25% of high hypertension
	evening shift		50% of high hypertension

#### 4.4 Shift System Assessment and Hypertension

All the nurses on shift status recorded a class of hypertension as defined in section 3. Of the three-shift type, the evening shift reported 50% of high hypertension with 25% each for morning and evening shifts. Logic regression analysis depicted that there was a statistically significant association between shift work and hypertension at a 95% confidence interval (table 4.4) which means that we fail to reject the null hypothesis that shift work affects nurses with hypertension ( $p = 0.021$ ). Shift work nurses are 1.70 times likely to have hypertension than nurses who did not run a shift.

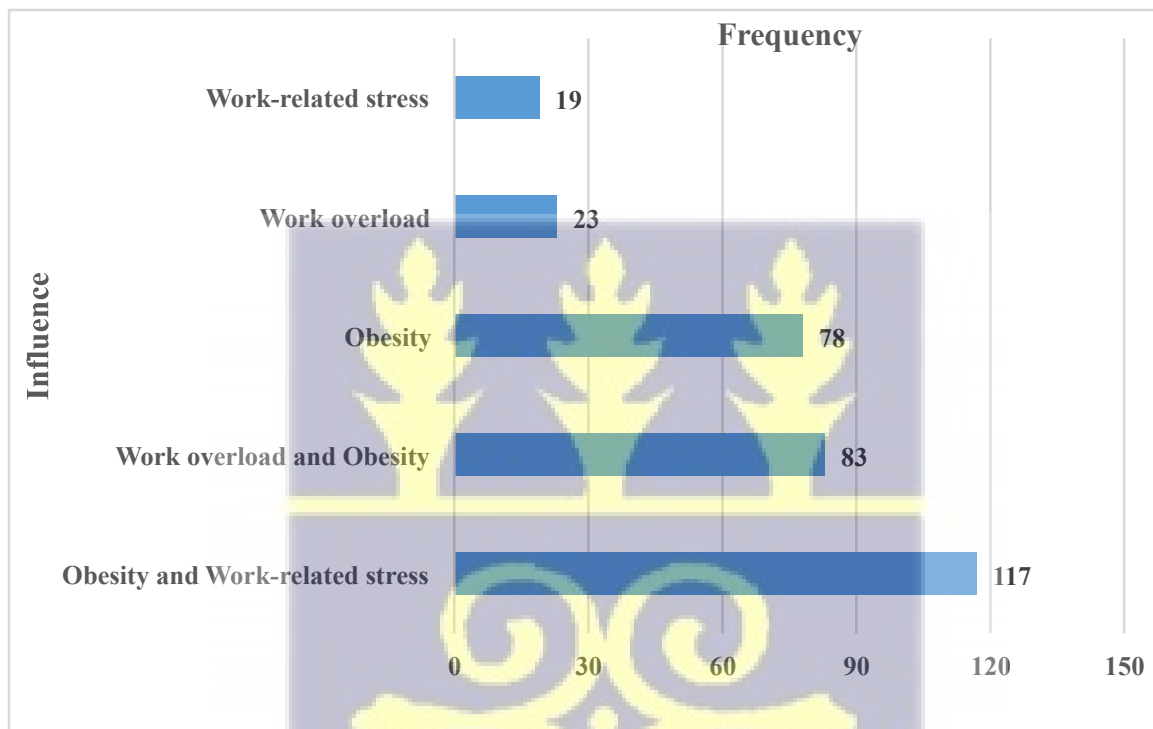
**Table 4.3 Odds ratios of hypertension according to shift work**

Variable		OR (95% C.I)	p-value
<b>Run shift</b>	No	1	-
	Yes	1.70 (1.25-2.31)	*0.001

**Table 4.4 Odds ratios of hypertension according to shift work**

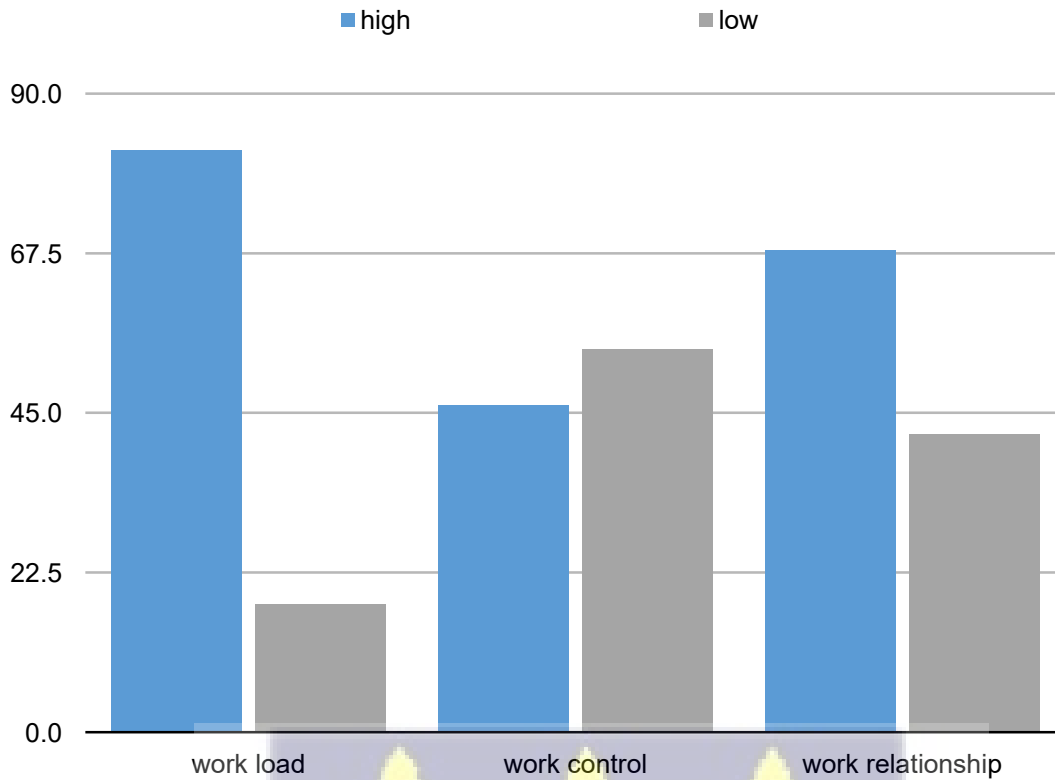
**Knowledge of the risk factors of Hypertension Distribution**

This section sought to find out if respondents know about hypertension. Generally, all (100%) of the respondents knew hypertension. Out of the total risk factors addressed in the questionnaire, work-related stress, work overload, and obesity were the most familiar risk factors (as depicted in fig.4.1) with salt intake and alcohol the most attributing factors of hypertension (100% awareness).



**Figure 4.1: Hypertension Status**

Out of the total respondents, 90% stated that hypertension cannot be treated at work, majority of the respondents mentioned that the sex of the individual does not have any influence on hypertension (94%).



**Figure 4.2 Distribution of participants by work-related stress (workload, work control, and work relationship)**

#### **4.5 Distribution of participants by work-related stress (workload, work control, and work relationship)**

The distribution of nurses by the workload, work control, and work relationship is shown in figure 4.3 above. 82% of the 294 nurses reported perceived high workload, 54 % perceived low work control while 42% reported perceived low work relationship. The prevalence of high work-related stress was 70% with females having more than half of high work-related stress (72%) than the male with 28%. The characteristics of the study population by work-related stress (high and low work stress) is depicted in Table 4.4 as married nurse staffs reported (86% of high work-related stress with midwives nurses recording the high percentage of high work related stress (90 %).). Ninety percent of nurses on shift reported high stress with just 10% recording low stress.

**Table 4.4 Distribution of nurses by work-related stress at Korle Bu Teaching Hospital, Accra, 2015. (n= 294)**

variables		Low stress (%)	High stress (%)
<b>SEX</b>			
	Female	28%	72%
	Male	72%	28%
<b>Marital status</b>			
	Single	29%	71%
	Married	24%	86%
<b>Shift status</b>	Others	31%	69%
	Yes to shift	10%	90%
	No to shift	80%	20%
<b>Job title</b>	General Nurse	22%	78
	Critical care nurse	23%	87%
	Health care assistant	44	56%
	Mental health nurse	22%	78%

	Midwife	10%	90%
<b>Number of years in service</b>			
	<5years	50%	50%

	5-9 years	25%	75%
	10-14 years	20%	80%
	15-20 years	22%	78%
<b>Income</b>			
	1000-2000	43%	57%
	>2000	33%	67%
<b>Own a car</b>	Own a car	33%	67%
	Taxi commercial	35%	65%
	Walking	10%	90%
<b>Physical activity</b>			
	Workout	46%	54%

	Running/jogging	44%	56%
	Walking	44%	56%
	None	22%	78%
<b>Do you drink alcohol</b>	Yes	38%	72%
	No	33%	67%
<b>Hypertensive history</b>	Yes	34%	86%
	No	40%	60%
<b>Have you been diagnosed with hypertensive</b>	Yes	32%	78%
	No	35%	65%

### Hypertension Status Distribution Among Nurses

Section 3 defines the studies hypertension measured. 78% of the 294 nurses for this study reported hypertensive values of mean systolic for respondents who run shift been 124.1 mmHg  $\pm$  26.1 mmHg, and the mean systolic for respondents who don't run shift recording 131.6 mmHg  $\pm$  28.3mmHg. The systolic for respondents who don't run shift was higher than those who run shift, but the difference was insignificant.

The mean diastolic for the respondents who run shift was 77.12 mmHg  $\pm$  14.3 mmHg, and the mean diastolic was 77.5 mmHg  $\pm$  14.1 mmHg there was no statistically significant difference between them. 75% of females recorded the highest measure of hypertension with 15% recording the lowest.

**Table 4.4\_Hypertensive State of Respondent**

Variable	Run Shift		P-value
	No	Yes	
Mean systolic (SD)	131.6 $\pm$ 28.3	124.1 $\pm$ 26.1	0.73
Mean Diastolic (SD)	77.5 $\pm$ 14.1)	77.12 $\pm$ 14.3	0.849

**Table 4.5 Hypertension status distribution by job title, sex, and family history**

Variable		Hypertensive (%)	No hypertensive (%)
Sex	Male	25	75
	Female	75	25
Job title	General Nurse	11	2
	Critical care nurse	14	6
	Health care assistant	2	9
	Mental health nurse	21	2
	Midwife	32	3
Family history of hypertension			
	Yes	(70%)	
	No	30%	

For this study, the hypertensive status for gender, job title, and family history was considered. 75% of females were more hypertensive with 25% being male. The job title of nurses affects the hypertensive status, midwife staffs recorded the highest percentage of hypertension with health care assistants recording the least of 2% as depicted in the table above.

**Association between Shifts, Work-Related Stress, and Hypertension**

**Table 4:** Below shows the factors which are associated with hypertension. There was a statistically significant association between shift work and hypertension which means that we fail to reject the null hypothesis that shift work affects nurses with hypertension ( $p = 0.021$ ). Shift work nurses are 1.70 times likely to have hypertension than nurses who did not run a shift.

There was also a statistically significant association between work-related stress and hypertension ( $p = 0.001$ ). Nurses who perceived high work-related stress reported 90% which is more than the ones who perceive low work-related stress (10%). The study reported a significant association between work-related stress and increased prevalence of hypertension (CI=1.03 15.02,  $p= 0.021$ ) (Table 5).

**Table 4.6 Association between work-related and hypertension among nurses**

Variable		N (%)	OR (95% C.I)	p-value
Run shift	No		1	-
	Yes		1.70 (1.25-2.31)	*0.001
Work-related stress			1	

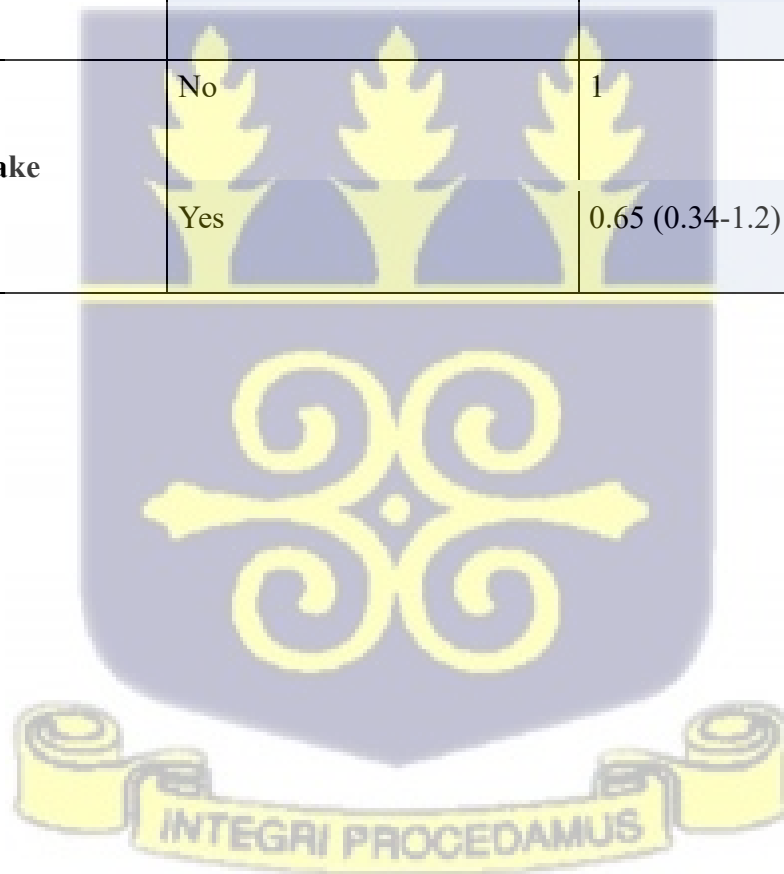
	High	90%	1.05 (0.98-3.12)	*0.021
	Low	10%	1.02 (1.01-1.03)	0.211
<b>High workload</b>	High	66%	1.4 (0.57-2.16)	0.382
	Low	34%	1	
<b>High work control</b>	High	72%	1	
	Low	28%	1.2 (0.6-2.31)	0.228
<b>High relationship work</b>	High	44%	1	
	Low	56%	0.65 (0.34-1.2)	0.100

Variable Hypertensive Crude RR (95% CI)  $X^2$  p-value Adjusted RR (95% CI)  $X^2$  p-value

**Table 4.7: Odds ratios of hypertension according to shift work, work-related stress, and socio-demographic factors**

Variable		OR (95% C.I)	p-value
<b>Run shift</b>	No	1	-
	Yes	1.70 (1.25-2.31)	*0.001
<b>Work-related stress</b>		1	

	Workload, work control, work relationship	1.05 (0.98-3.12)	*0.021
	Age	1.02 (1.01-1.03)	0.211
<b>Sex</b>	Male	1.4 (0.57-2.16)	0.382
	Female	1	
<b>Income</b>	<2000ghc	1	
	>2000ghc	1.2 (0.6-2.31)	0.228
<b>Alcohol intake</b>	No	1	
	Yes	0.65 (0.34-1.2)	0.100



## CHAPTER FIVE

### DISCUSSION OF FINDINGS

#### 5.0 Introduction

This chapter provides discussion of the findings made in previous chapter. Discussions are provided on each objective by referring to the findings made in the study. More so, deductions and inferences are made in the discussion by making comparisons with available literature. These discussion takes into cognizance the activities of nurses which remain crucial in public healthcare delivery. Thus, the cadre of workers may be extensively engaged in extended work shifts in the clinical environment which may have a significant impact on their health resulting in occupational fatigue and affecting their attentiveness and critical thinking (Tabone, 2004; Winwood, Winefield & Lushington, 2006).

The study by Russek & Zohman (1958), is documented as one of the first studies to report an association between occupational-related stress and cardiovascular diseases. Later, other studies also attributed the increased risk of ill health such as cardiovascular complications, sleep deprivation, decreased immune function, anxiety, and musculoskeletal health issues to shift work and working for long hours (Wong, Dawson & Vandongen, 2019; Spurgeon, Harrington & Cooper, 1997; Landsbergis, Travis, & Schnall, 2013; Sampsa & Mikko-Härmä, 2010; Njamnshi et al., 2017).

In Ghana, the prevalence of hypertension in all age groups among outpatients increased significantly from 1.7% to 4.0% in most regions, as hypertension is ranked among the top five outpatient morbidities reported in various health facilities across the country (Bosu, 2010a). In Accra, which the capital city of Ghana where this current study was conducted, hypertension has been rated as the second commonest source of outpatient morbidity in 2007 (Bosu, 2010a). Another study has also revealed cardiovascular diseases as a major cause of early death among people of their working-age (Schnall, Dobson, Landsbergis, 2016). About 10-20% of

cardiovascular complications in people in their working-class are said to be occupationally related (Schnall, Dobson, Landsbergis, 2016).

### 5.1 Effects of Long Hours and Shift System on Hypertension

This study assessed the effect of long working hours and shift system on hypertension among nurses in Korle-Bu Teaching Hospital. A total of 294 nurses participated in the study. Of the total, more than half run shift at work (n=243, 82.8%). Findings from the demographic characteristics of the nurses revealed that the majority (72.8%) were females. Other studies in Ghana have also documented female dominance in the nursing profession (Boafo, Hancock & Gringart, 2016; Boakye, Numarce, Ameh & Bello, 2018; Kaburi et al, 2019). This is also seen in most studies involving nurses in developed countries (Cude & Winfrey, 2007; Meadus, & Twomey, 2007).

This branch of health care is naturally seen as a job for the females who are said to be endowed naturally with caring abilities according to Battice, (2010). The significant contributions of Florence Nightingale have also added to the dominance of women in this sector of health care. Also, the women's liberation movement which was oriented towards gender balance encouraged several women to be engaged in health care delivery (OssesParedes, Valenzuela Suazo, & Sanhueza Alvarado, 2010). Akiwumi mentioned that the nursing occupation in Ghana was previously dominated by males. However, in 1899, the arrival of the first nursing sister in the then Gold Coast encouraged several women to enter the trade (Akiwumi, 1970).

Akiwumi further stated that after the establishment of the premier teaching hospital (Korle Bu Teaching Hospital) in the Gold Coast, young ladies with a good education were recruited into the profession readily because of the nature of the nursing job and the traditional role of women in the Ghanaian society (Akiwumi, 1970). The overall mean age of the nurses was 32.83 years. This age was similar to the average age of nurses recorded in other studies

(Boafo, Hancock & Gringart, 2016; Boakye, Numarce, Ameh & Bello, 2018; Kaburi et al, 2019).

## 5.2 Psychological Working Conditions and Predictors of Occupational Stress

Kaburi et al, (2019) in their study of psychological working conditions and predictors of occupational stress among nurses at the Salaga Government Hospital in Ghana, also recorded an average age of 34.2 years for nurses. This mean age shows that most of these nurses were young adults in their prime ages which is very significant as the health care delivery sector is known to be a very busy environment requiring active and energetic people with the willingness to respond quickly and timely to urgent needs of patients. According to Asamani, Amertil, Ismaila, et al, (2019) from 2008 to 2018, there has been a shift in the age profile of the nursing workforce in Ghana where about 43% of the nurses in 2008 were young people in the age range 25-35 years compared to the situation in 2018 in which 81% of nurses in Ghana are younger than 35 years.

Due to the nature of the health care systems, most health facilities usually require services and staffing around the clock. Though variation exists in the degree of workload between day and night work schedules, work is usually organized in shifts to cover the need for staff at all times. This current study revealed that amongst the nurses on a shift schedule, averagely, nurses spend 7.5 hours on their morning shift, 6.8 hours on afternoon shifts, and 11.8 hours on evening shifts. The nurses work for an average of 39.3 hours of shift work per week. Another study by Kaburi et al, (2019) reported an average of 45 hours of shift work among nurses each week at the Salaga Government Hospital in the Northern Region of Ghana. These average working hours may differ from facility to facility due to the culture and tradition of the work environment.

### **5.3 Differences in Night Shift Characteristics**

Differences in night shift characteristics have also been attributed to the heterogeneity in the outcome of studies on shift work among health workers (Torquati, Mielke, Brown & KolbeAlexander, 2017). Increased shift work duration above 8 hours has been associated with fatigue leading to an increased risk for accidents (Folkard, Lombardi, Tucker, 2005; Wagstaff & Sigstad, 2011). Also, long weekly working hours greater than 55 hours per week have been associated with an increased risk of diabetes, stroke, and cardiovascular complications (Landsbergis, Travis, & Schnall, 2013; Kivimaki et al, 2015).

All the nurses in this current study had knowledge about hypertension. This finding is supported by the work of Olayinka, Owolabi, David, and Amole, (2015) who also reported good knowledge of hypertension among health workers in Nigeria. Another study in Nigeria about hypertension prevalence, knowledge, attitude & awareness among pharmacists recorded good knowledge of hypertension (Abah, Dare, & Jimoh, 2014). Risk factors associated with hypertension were also examined. From the study, almost all (78%) of the nurses mentioned obesity as a risk factor for hypertension. Another study on the effect of Obesity and Other Risk Factors on Hypertension among Women of Reproductive Age in Ghana, mentioned obesity as a risk factor for hypertension (Oyekale, 2019).

### **5.4 Lifestyle Risk Factors and Hypertension**

Findings from the study on diet and lifestyle risk factors associated with incident hypertension in women aged between 27 to 44 years revealed obesity as a risk factor for hypertension (Forman, Stampfer, Curhan, 2009). Praso et al (2012), also found obesity as a risk factor for hypertension. A Chinese cross-sectional survey designed to analyze the alteration of prevalence, awareness, treatment, and control rates of hypertension in Chinese nursing staff also mentioned obesity as a risk factor for hypertension (Zhao, 2019). Obesity as a risk factor for hypertension in this current study is also consistent with the results of the ATTICA study in

Greece, which confirmed that obesity is associated with hypertension (Pantagiotakos, Pitsavos, Chrysohoou, 2004).

A family history of hypertension was also reported in this study as a risk factor for hypertension. The findings from a systematic review by Addo et al. (2012) also confirmed that a family history of hypertension is significantly associated with hypertension. Excessive intake of salt has also been linked to hypertension and premature deaths globally (Afshin, 2019). This was confirmed by the findings from this study as the nurses indicated excessive intake of salt as a risk factor for hypertension. This was consistent with the findings of Hoshide, (2019) which concluded that increased estimated sodium intake was associated with hypertension. Mozaffarian, (2014) stated that 1 in 10 deaths from cardiovascular disease (CVD) is ascribed to excessive intake of salt intake.

Most (72%) of the nurses stated that alcohol consumption contributes to hypertension. Among excessive drinkers, the consumption of alcoholic beverages is said to increase the odds of elevated blood pressure (Santana, 2018). In line with the results from this current study, a prospective cohort study has also reported excessive alcohol consumption as a risk factor for hypertension (Sesso, 2008). Núñez-Córdoba et al (2009) in a prospective Mediterranean cohort study of alcohol consumption and the incidence of hypertension indicated that alcohol consumption is associated with a risk of hypertension. The nurses in this study were also asked whether the sex of an individual has any influence on hypertension. The majority (98%) of the nurses stated that the sex of the individual does not have any influence on hypertension.

### **5.5 Gender Differences in Hypertension**

It is worth noting that Everett & Zajacova (2015) in a study of gender differences in hypertension among young adults revealed that women were far less likely to be hypertensive compared to men. Cutler et al. 2008, also mentioned that among young men and women aged between 18 to 29 years, men were more likely to develop hypertension than women. A study

by Kearney et al., (2004), however, stated a low rate of 3.4% for hypertension in Police men compared to their women counterpart who had a high rate of about 72.5%. This observed gender differences in hypertension may be attributed to biological and behavioral factors such as sex hormones, chromosomal differences, and other biological sex differences that are protective against hypertension in women (Sandberg & Ji, 2012).

### **5.6 Shift Work as a Risk Factor for Hypertension**

The shift work was also found to be a risk factor for hypertension in this current study. A statistically significant association between shift work and hypertension was noted ( $p = 0.001$ ). Shift working nurses in the study were about 2 times more likely to have hypertension than nurses who did not run a shift. Shift work may result in poor sleep which is also recognized to be independently associated with hypertension (Njamnshi et al., 2017). Other research has looked into the effect of shift work in resting blood pressure and daily blood pressure and has found a link between shift work and high blood pressure (Sampsa & Mikko-Härmä, 2010).

In this study, work-related stress was also found to be connected with hypertension ( $p = 0.021$ ). Environmental, psychological, and physiological factors are commonly characterized as having an impact on the link between stress and blood pressure in studies on the health impacts of stress (Cohen, Keessier & Gordon, 1995). According to Nascimento et al, (2019), nurses who work in shifts have a higher prevalence of negative factors related to work, coupled with inadequate habits and lifestyles and changes in sleep blood pressure compared to workers who were not exposed to this work schedule. The effect of long working hours and shift system on hypertension among nurses at the Korle Bu Teaching Hospital showed that long hours of work in the nursing profession drain the energy level of nurses at each day of work.

### 5.7 Long Working Hours and its impact on Quality of Health of Nurses

These nurses often dread waking up to another day to go to work. Long working hours are also known to result in sleep disturbance among night shift workers (Scott, 2006). This was also found in the current study nurses working for 12-hour shifts testified significantly poor general sleep qualities and felt more exhausted after sleep. Higher levels of chronic fatigue, anxiety, and emotional exhaustion among nurses working 12-hour shifts may be related to poor general sleep qualities (Ede Il-Gustafsson, 2002; Ferri, 2016). Good sleep habits and a serene environment are basically required to improve the circadian rhythm. It is important to explain this phenomenon to nurses to enable them managed the challenges of sleep disturbances significantly (Owens, 2007; Ferri, 2016).

The outcome of a study conducted by Stimpfel, Sloane, Aiken & (2012) to examine the relationship between nurses' shift length, burnout, job dissatisfaction, and intention to leave the job shows that increase in the shift length is associated with a significant increase in the odds of burnout, job dissatisfaction, and intention to leave the job. The study also revealed that the odds of burnout and job dissatisfaction were about three times higher for nurses who worked longer shifts than for nurses engaged in shifts work of 8 hours duration (Stimpfel, Sloane, Aiken &, 2012). The prevalence of hypertension among nurses who are engaged in shift work and long working hours in this study was 55%. The outcome of the Nurses' Health Study II identified Black women on rotating shift schedules as having a 46% increased risk of developing hypertension (Lieu, 2012).

A study in Africa also revealed a prevalence of hypertension in the urban population to be 21.3% (Longo-Mbenza, 2007). A study in France also indicated the prevalence of hypertension to be 24.7% in men, and 22.1% in women (Atallah, 2007). Soumya, Surekha and Surabhi (2018) reported that about 40% of people who are aged more than 25 years were hypertensive in 2008. The Seventh report of the Joint National Committee on Prevention,

Detection, Evaluation, and Treatment of High Blood Pressure classified a new category of patients who have a systolic blood pressure of 120 to 139 mm Hg or a diastolic of 80 to 89 mm Hg as pre-hypertension (Soumya et al., 2018).

In conclusion, hypertension remains a significant health complication that may affect all works of life with debilitating effects. Since 1988, new cases of hypertension reported in outpatient public facilities in Ghana have increased more than ten-times from about 49,087 to about 505,180 in the year 2007 (Bosu, 2010a). Thus, the findings of the study are deemed as relevant for public health since it provides information on whether stress from shift work is associated with the prevalence of hypertension. This information will be important in health promotion or education for nurses and those who engage in shift work. Therefore, the findings of this study is consistent with previous investigations on the subject area.



## CHAPTER SIX

### CONCLUSION AND RECOMMENDATION

#### 6.1 Conclusion

This study was designed to assess the effects of long working hours and shift systems on hypertension among nurses in Korle-Bu Teaching Hospital. Amongst the nurses on a shift schedule, nurses averagely spend 7.5 hours on their morning shift. 6.8 hours on the afternoon shift. And 11.8 hours on the evening shift respectively, the nurse's work for an average of 39.3 hours of shift work per week. All the nurses had knowledge about hypertension. Risk factors associated with hypertension in this study were obesity, family history of hypertension, excessive intake of salt and alcohol. The study also found out that stress was a major risk factor associated with hypertension with shift work and workrelated. The prevalence of hypertension among nurses who engaged in shift work and long working hours in this study was 55%. Thus, long working hours and shift work among nurses at the Korle-Bu Teaching Hospital, were found to be one of the causes of draining energy from nurses on each day of work and make them dread waking up to go to work.

#### 6.2 Recommendation

Following the conclusions from this study, the following recommendations would help ameliorate, the effect of long working hours and shift system on hypertension among nurses in Korle-Bu Teaching Hospital. Additional studies with a larger cohort of nurses will be more significant in studying the effect of long working hours and shift systems on hypertension among nurses. The clinical psychologist in counselling nurses with challenges of work stress should be encouraged in the clinical environment. More nurses should be trained and employed to reduce the current burden of nurse to patient-ratio. Nurses should have access to and enjoy free medical care in health facilities across the country. Annual periodic screening of hypertension should be a program for all nurses and other health workers.



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## APPENDICES

### APPENDIX A: CONSENT FORM

Title of study: Association of Long Working Hours, Shift Work and Hypertension among Nurses in Korle-Bu Teaching Hospital (KBTH)

Researcher: Emma Clotley  
Department: Biological, Environmental and Occupational Health  
Phone: +233(0)242370840  
Email address: emma.clotley11@yahoo.com

#### General Information about the Research:

Healthcare workers are exposed to a variety of hazards at the workplace, which consists of but not narrowed to only shift work and work-related stress from intense to routine tasks and long working hours. Furthermore, work-related stress is also known to increase attrition rates, emotional instability, negative feelings, and absenteeism among nurses and indirectly compromising patient care and safety. This study is about the effects of shift work and long working hours on hypertension among nurses at the Korle-Bu Teaching Hospital.

#### Procedures of the study:

Consent was sought from permanent nurses (both males and females) who have been in the hospital for at least one year. Patients who meet the inclusion criteria were served with a structured questionnaire, which takes about 25 minutes to complete, to solicit their views on the topic under study. The study hopes to assess the effects of long working hours and shift systems on the nurse's health in Korle-Bu Teaching Hospital. It is a quantitative study that uses a structured questionnaire to solicit information from the respondents.

#### Possible Risks and Discomforts:

The study may cause some minimum risk to the participant through the use of questionnaires as there may be some discomfort in participants releasing their personal data for the study.

#### Possible Benefits:

There is no direct financial benefit to participants. However, information from this study represents the baseline information for policymakers and stakeholders in healthcare. It is hoped that the results obtained for this study will be used by policymakers and management of the hospital in particular to improve upon working conditions or to enforce existing ones with the objective of better improvement of the health of nurses.

#### Confidentiality:

Information obtained from study participants has been treated as confidential and kept in a file that does not contain the participant's name, a coded number has been assign to the file, which will not be disclosed to anyone.

#### Compensation:

There is no financial compensation or any form of reward for participating in this study.

#### Voluntary Participation and Right to Leave the Research:

Study participants had the right to voluntarily participate or refuse to participate in this study which did not offend the investigators. Thus, participating in this research was voluntary, whereby the participant can withdraw without any penalty.

#### Contacts for Additional Information:

This proposal has been reviewed and approved by the Institutional Review Board (IRB) at the Korle-Bu Teaching Hospital, which has the mandate to protect participants from harm. In case of any research-related injury or pertinent questions about the rights of study participants, participants may contact the IRB Office between the hours of 8 am-5 pm through the landline below. Study participants may also contact the investigator with the address and telephone numbers below for further information about the study.

Contact Information:

The Chairman,  
Institutional Review Board,  
Korle-Bu Teaching Hospital, Accra.  
0302666766  
Email addresses: rdo@kbth.gov.gh

Researcher: Emma Clotley  
Department: Biological, Environmental and Occupational Health  
Phone: +233(0)242370840  
Email address: emma.clotley11@yahoo.com

Volunteer Agreement:

I..... have been invited to take part in the above-stated research (effects of long working hours and shift system on hypertension among nurses). I have had the opportunity of understanding the benefits, risks, and procedures for the research title. I have also been given an opportunity to have any questions about the research answered to my satisfaction. I agree voluntarily participate in this study.

.....

Name and signature of participants' parent/guardian Date

If participant cannot read the form themselves, a witness must sign here:

I was present while the benefits, risks and procedures were read to the volunteer. All questions were answered, and the volunteer has agreed to participate in the research.

.....

Name and signature of witness Date

I certify that the nature and purpose, the potential benefits, and possible risks associated with participating in this research have been explained to the above individual.

.....

Name signature of person who obtained consent Date

## APPENDIX B: QUESTIONNAIRE

### Association of Long Working Hours, Shift Work and Hypertension among Nurses in KorleBu Teaching Hospital (Kbth)

Dear Respondent,

The research was carried out on the above topic. I would therefore like to take some minutes of your time to answer these questions. Have assurance that the answers you give will be strictly confidential. Also, your name will not be mentioned in any of our research reports. Thank You!

#### SECTION A: Socio-Demographic Factors

1. Age (At last birthday).....

2. Sex:

Male " Female "

3. Weight ..... kilograms Height ..... meters BMI.....

4. Marital status:

Single " Married " Divorced " Separated " Co-habiting " Widowed "

5. Job Designation:

General Nurse " Public Health nurse " Health Assistant " Mental Health nurse "

6. Years of service (work service)

<5 " 5 - 9 " 10-14 " 15-20 " >20 "

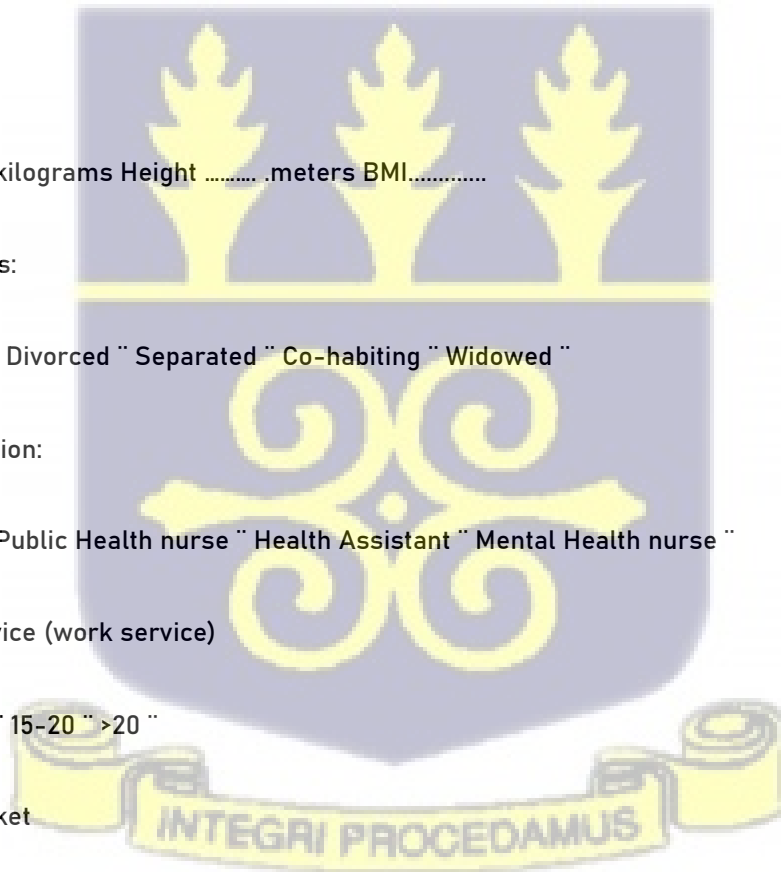
7. Income bracket

<GHC500 " GHC500-900 " GHC 1000-2000 " >GHC2000 "

8. How many dependents do you have? None " 1-4 " >4 "

9. Mode of transportation?

Own car " Family car " Taxi/Commercial " Walking "



10. What type of Physical activity do you do currently?

Aerobic " Workout " Cycling " Running/Jogging " Swimming " Walking " None "

11. What is the frequency per week of the physical activity you engage in?

None " Once a week " 2-3 times a week " 4-7 times a week "

12. Have you ever smoked a cigarette?

Yes " No "

13. Do you currently smoke cigarettes?

Yes " No "

14. If yes, how many cigarettes do you smoke a day on average?

1-9 cigarettes " 10-20 cigarettes " >20 cigarettes "

15. Do you drink alcohol?

Yes " No "

16. If yes. Please specify the type and frequency of alcohol you drink.

Whisky " Rum " Beer " Wine " Liquor " Other, Specify.....

17. Frequency of drinking alcohol

Bottle per day " 1- 4 per week " > 5 per week " once per month " occasionally " 18. Do you have blood relatives with a history of hypertension?

Yes " No "

19. If yes, what is the relation?

Father " Mother " Siblings " Child " Grandparent " Other (Specify).....

20. How often do you see your doctor for blood pressure checkups?

Monthly [ ] every 3-4 months " every 6 months" once a year " Nil "



21. Have you had a blood pressure reading of 140/90mmHg or above in the last 1year Yes "

No "

22. Has your doctor diagnosed you as being hypertensive?

Yes" No "

23. If yes, what was your blood pressure reading on diagnosis? .....

24. Have you been prescribed any medication to lower your blood pressure? Yes " No "

25. If yes, list medication and dosage.....

**SECTION B: KNOWLEDGE OF HYPERTENSION**

26. Does salt intake lead to hypertension?

Yes " No "

26. Does obesity lead to hypertension?

Yes " No "

27. Can regular exercising prevent hypertension?

Yes " No "

28. Which of the following influences on hypertension?

Work overload " Obesity " Work-related stress " a, b, & c " a & b only " None " 29. Can hypertensive be treated your work?

Yes " No "

30. Which blood pressure reading would you classify as and above as hypertensive?

140/90mmHg and above " Below 140/90mmHg "

31. Does alcohol consumption contribute to hypertension?

Yes " No "

32. Does the sex of an individual have any influence on hypertension?

Yes " No "

33. What was your last blood pressure reading? .....mmHg

34. Before your blood pressure measurement, were you aware of your hypertension status? Yes " No "

**SECTION C: SHIFT WORK ASSESSMENT**

37. Do you run shift? Yes " No "

38 If yes, please tick where appropriate the type and frequency per week and month in the matrix below.

Months		Number of days on morning shift	Number of days on afternoon shift	Number of days on evening shift

February	Week 1			
	Week 2			
	Week 3			
	Week 4			
March	Week 1			
	Week 2			
	Week 3			
	Week 4			
April	Week 1			
	Week 2			
	Week 3			
	Week 4			
May	Week 1			
	Week 2			

	Week 3			
	Week 4			

39. On the average, how many hours do you stay on following shifts in a day?

Morning..... Afternoon..... Night.....

40. On the average, how many hours of shift work per week do you run? .....

41. On the average, how many years have you been on shift work? .....

42. On the average, how many hours of sleep do you get in a day?

≤ 6 hrs " > 6 hrs.

43. In the last 12 months, which of the following has been you most frequent shift schedule? Morning  
" Afternoon " Night"

**SECTION D: LONG WORKING HOURS/WORK RELATED STRESS**

Please tick where appropriate/applicable to you.

	Strongly disagree (1)	Disagree (2)	Agree (3)	Strongly agree (4)
1.I often feel I'm 'at the end of my rope' with my work				
2.I often dread waking up to another day of my work				
3.I often wonder how long I can keep going at my work				
4.I feel that most of the time I'm just "living to work"				
5.Too much is expected of me in my work JD				

6. After a typical work period I have little energy left				
7. I usually feel exhausted when I get home from work				
8. My work drains my energy completely every day				
9. I usually have lots of energy to give to my family or friends				
10. I usually have plenty of energy left for my				
hobbies and other activities after I finish work				
11. I never have enough time between work shift to recover my energy completely				
12. Even if I'm tired from one shift, I'm usually refreshed by the start of the next shift				
13. I rarely recover my strength fully between work shifts				
14. Recovering from work fatigue between work shifts isn't a problem for me				
15. I'm often still feeling fatigued from one shift by the time I start the next one				
16. My job involves a lot of repetitive work JD				

17. My job allows me to make a lot of decision on my own JC				
18. My job requires a high level of skill JD				
19. I have a lot to say about what happens on my job JC				
I have an opportunity to develop my special ability				
My job requires working very fast JD				
My job requires working very hard JD				
My job requires lots of physical effort JD				
I am asked to do an excessive amount of work JD				
I have enough time to get the job done JD				
I am free from conflicting demands others make JD				
If work gets difficult, my colleagues will help me JS				
People I work with are getting the job done JS				
My supervisor pays attention to what I am saying JS				

I feel anxious at work				
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SECTION E: BLOOD PRESSURE (BP) MEASUREMENTS

BP	1st Reading	2nd Reading	3rd Reading	Mean BP
Systolic(mmHg)				
Diastolic (mmHg)				

Variable	SD	D	NS	A	SA
I often feel I'm 'at the end of my rope' with my work	50 (19%)	53 (20%)	3 (1%)	74 (28%)	85 (32%)
I often dread waking up to another day of my work	18 (7%)	27 (10%)	0 (0%)	61 (23%)	159 (60%)
I often wonder how long I can keep going at my work	61 (23%)	66 (25%)	5 (2%)	85 (32%)	48 (18%)
I feel that most of the time I'm just "living to work"	80 (30%)	50 (20%)	50 (20%)	39 (15%)	39 (15%)
Too much is expected of me in my work	13 (5%)	26 (10%)	9 (3%)	98 (37%)	119 (45%)
After a typical work period I have little energy left	53 (20%)	53 (20%)	14 (5%)	53 (20%)	92 (35%)

I usually feel exhausted when I get home from work	3 (1%)	13 (5%)	0 (0%)	106 (40%)	143 (54%)
My work drains my energy completely every day	80 (30%)	53 (20%)	5 (2%)	53 (20%)	74 (28%)
I usually have lots of energy to give to my family or friends	127 (48%)	84 (32%)	15 (5%)	21 (8%)	18 (7%)
I usually have plenty of energy left for my hobbies and other activities after I finish work	74 (28%)	100 (38%)	12 (4%)	42 (16%)	37 (14%)
I never have enough time between work shift to recover my energy completely	72 (27%)	119 (45%)	8 (3%)	53 (20%)	13 (5%)
Even if I'm tired from one shift, I'm usually refreshed by the start of the next shift	74 (28%)	45 (17%)	5 (2%)	61 (23%)	80 (30%)
I rarely recover my strength fully between work shifts	69 (26%)	80 (30%)	10 (4%)	74 (28%)	32 (12%)
Recovering from work fatigue between work shifts isn't a problem for me	132 (50%)	80 (30%)	14 (5%)	39 (15%)	0 (0%)
I'm often still feeling fatigued from one shift by the time I start the next one	84 (32%)	66 (25%)	9 (3%)	66 (25%)	39 (15%)
My job involves a lot of repetitive work	21 (8%)	32 (8%)	0 (0%)	53 (20%)	159 (60%)

My job allows me to make a lot of decision on my own	18 (7%)	39 (15%)	13 (4%)	95 (36%)	100 (38%)
My job requires a high level of skill	26 (10%)	31 (12%)	15 (5%)	87 (33%)	106 (40%)
I have a lot to say about what happens on my job	41 (15%)	42 (16%)	0 (0%)	108 (41%)	74 (28%)
I have an opportunity to develop my special ability	21 (8%)	31 (12%)	18 (6%)	121 (46%)	74 (28%)
My job requires working very fast	53 (20%)	66 (25%)	15 (5%)	92 (35%)	39 (15%)
My job requires working very hard	0(0%)	0 (0%)	0 (0%)	120(45%) )	145 (55%)
My job requires lots of physical effort	39 (15%)	53 (20%)	15 (5%)	92 (35%)	66 (25%)
I am asked to do an excessive amount of work	106 (40%)	92 (35%)	0 (0%)	26 (10%)	41 (15%)
I have enough time to get the job done	53 (20%)	26 (10%)	15 (5%)	92 (35%)	79 (30%)
I am free from conflicting demands others make	15 (5%)	15 (5%)	37 (14%)	74 (28%)	127 (48%)

If work gets difficult, my colleagues will help me	41 (15%)	41 (15%)	0 (0%)	132 (50%)	53 (20%)
People I work with are getting the job done	106 (40%)	79 (30%)	15 (5%)	41 (15%)	26 (10%)
My supervisor pays attention to what I am saying	15 (5%)	53 (20%)	0 (0%)	79 (30%)	119 (45%)
I feel anxious at work	92 (35%)	106 (40%)	0 (0%)	39 (15%)	26 (10%)

Responses of section D

