

SCHOOL OF PUBLIC HEALTH
COLLEGE OF HEALTH SCIENCES
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ASSESSMENT OF OCCUPATIONAL STRESS AMONG WORKERS OF COVID-19
TESTING SITES: THE CASE OF NOGUCHI MEMORIAL INSTITUTE FOR
MEDICAL RESEARCH

BY

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DECLARATION

I hereby declare that except for references to other secondary materials, which have been duly acknowledged, this dissertation is the result of my personal independent research and it has not been previously presented either in part or in whole to any other institution for the award of another degree.

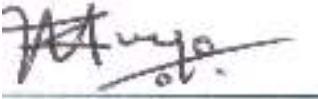


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DEDICATION

This work is dedicated to Hayford Kumah, Aretha Mawunyo Kumah, Elihu Mawudem Kumah and my mother, Margaret Amegbletor. We made it!

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All glory to God for His bountiful blessings, wisdom and strength to make this research materialise.

I am particularly indebted to my supervisor, Dr. Mawuli Dzodzomenyo for his valuable insights and inputs.

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Many thanks to the lecturers and staff of Biological, Environmental and Occupational Health Department for their support all year round.

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I am grateful to my husband Hayford Kumah. Your encouragement and ‘motherly role’ to the children in my absence is worth mentioning.

A special thanks to all who offered advice and assistance in diverse ways towards the completion of this study – God bless you all.

ABSTRACT

Background: Occupational stress has witnessed increased prevalence in the health care fraternity in recent times. COVID-19 has placed a lot of responsibility on the shoulders of health professionals as the whole world battles against the pandemic. Testing sites have been inundated with samples to determine their status and the next line of action in terms of treatment, management and policy. As soldiers in the fight against the pandemic, Laboratory Scientist must be in the position to meet the demand placed on them by the circumstances at hand to offer quality results thereby saving lives.

Objective: This study therefore aims to estimate the prevalence of occupational stress among workers of NMIMR during COVID-19 pandemic.

Methodology: The study was an institutional-based cross-sectional study involving a total of 153 staffs of NMIMR (one of the major COVID-19 testing centre in Ghana) as study participants. Structured questionnaires were used to collect data on the level of stress using the Marlin stress scale, in addition to data on the occupational stressors and coping mechanisms that the staff adopt to deal with the stress. Descriptive statistics were used to summarize the data while inferential statistics was employed for further analysis. STATA version 16 was used for all statistical analysis with a P-value <0.05 used to declare statistical significance.

Findings: The prevalence of stress among the workers at the Noguchi Memorial Institute for Medical Research was generally high (89.5%) with almost half of respondents experiencing moderate to severe stress. Chief among the job stressors affecting the workers included strict working hours and excessive workload. Working for 41-50 hours weekly, was 3.94 times more likely to predict stress as compared to working up to 40 hours a week. The coping mechanism

which was statistically associated with stress per the Chi square test in this study was consulting counsellors or religious leaders as means of coping with stress (p-value= 0.012).

Conclusion: Findings indicated that the research respondents have the proportion of stress being 85.5% with 10.5% of respondents experiencing severe forms of occupational stress. It was found that there existed a statistically significant difference between work context domain and the levels of occupational stress (p-value= 0.0388).

LIST OF ABBREVIATIONS

COPE	Coping Orientation to Problems Experienced
ILO	International Labour Organisation
IRB	Institutional Review Board
IT	Information Technology
MOH	Ministry of Health
NIOSH	National Institute for Occupational Safety and Health
NMIMR	Noguchi Memorial Institute for Medical Research
PHE	Pre Hospital Emergency
WHO	World Health Organisation

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CHAPTER ONE

1. INTRODUCTION

1.1 Background

Anyone may become overwhelmed and experience stress from time to time. Stress can be described as the brain's response to challenge or demand placed on it from family, work, school and other routine daily activities. The International Labour Organisation (ILO) defines job stress as a harmful physical and emotional response caused by an imbalance between the perceived demands and the perceived resources and abilities of individuals to cope with those demands (ILO, 2016). Stress is the body's response mechanism to a potential threat or danger that prepares the individual for flight thereby ensuring safety. However, when stress becomes chronic, it causes alterations in survival and lifesaving mechanisms responsible for proper function of digestive, reproductive, immunity and cardiovascular systems leading to various disease conditions. Sleeplessness, headaches, anger, irritability and depression are other resultants of occupational stress. Since everyone experiences stress at one point or the other, it is essential to adopt coping mechanisms to prevent the consequences which may sometimes be suicidal (American Psychology Association, 2020)

Stress occurs in two forms; eustress (positive stress) and distress (negative stress). Eustress may be regarded as low to moderate stress which propels an individual to achieve work targets whiles distress occurs in highly stressful environments leading to reduced quality of work and health consequences (Wilkinson, 2001). The workplace has been a major arena of stress for many people. Workload is mostly found at the top of the list as a cause of stress. Time pressure, long working hours, lack of breaks, poor working conditions and difficult tasks all contribute to job stress.

Indirectly, job insecurity, poor promotion prospects, inadequate pay, increased risk of physical injury or infection may lead to stress among workers. As part of handling occupational stress workers must adopt coping mechanisms that work best for them to prevent their health from deteriorating (Akangbe & Tetteh, 2015).

When people experience stress, they tend to be forgetful, and easily irritable. They neglect responsibility; their judgements become blurred; and they become withdrawn. This makes the work environment around them tensed which does not auger well for productivity. A stressed worker is unable to concentrate and think clearly which may result in mistakes and physical injuries (Canadian Centre for Occupational Health and Safety, 2018).

The burden of occupational stress among medical laboratory professionals is increasing in the face of modifications in rapid technology, staffing models, organisational fiscal restraint and alterations in human health resource (Grant & Zychla, 2016). Pandemics have added to the list in recent times.

Mistakes on the part of health professionals including laboratory workers may have dire consequences on the health of individuals and may cost lives. When a worker feels unwell as a result of stress it leads to absenteeism and loss to the organisation in terms of healthcare costs. This may reduce the overall efficiency of output since that portion of work is left undone and / or places pressure on the remaining workers as they try to perform the sick worker's task in addition to theirs resulting in rippling effect of stress among staff.

Biomedical research laboratories perform large scale experiments with thousands of specimens undergoing numerous procedures per test. The likelihood of experiencing stress in the laboratory particularly as a function of complex procedures and workload is high (Goldberg, 2019).

The COVID-19 pandemic has placed lots of demand on various sectors and institutions with the health sector being at the forefront of the battle. Mass testing has been proposed as one of the strategies to combat the infection as infection rates keep rising (Nkansah, 2020). With the surge in cases it is envisaged that staffs of institutions involved in testing and management of this pandemic may be stressed which will affect the quality of results being released and their health.

In dealing with infectious diseases such as COVID-19, accuracy of results released by testing institutions and speed or turnaround time for results are of essence for the benefit of not just the patient but the entire health management team as this would guide policy direction. Stress is known to decrease immune responses of individuals. As staff who may be working on infectious agents including COVID-19 cases, high immunity is an essential asset to prevent infections as well as fight against these infectious agents in the unlikely but possible situation that the disease is contracted.

Since stress is a response to a situation it is essential to identify the stressor (the particular activity or situation that causes stress in the individual) and isolate the individual from it in order to permanently eliminate stress from the workplace, hence the essence of this study.

1.2 Problem Statement

Occupational stress is sometimes considered unavoidable by some employers who tend to pile up work load on employees for economic gains. However, occupational stress has been associated with absenteeism as a result of ill-health, high turnover and reduced output and is more strongly associated with bodily ailment than financial or family issues (National Institute for Occupational Safety and Health, 2014). Lately, occupational stress has been on the rise mainly as a result of global economic crisis cutting across all facets of occupations and globalisation.

The American society for clinical pathology has found that occupational stress due to workload is prevalent among laboratory workers and requires attention to guarantee health and wellbeing as well as improve satisfaction on the job (American Society for Clinical Pathology, 2020). Industries in the United States of America, loose an estimated amount of \$300 billion to work stress as a result of reduced productivity, accidents, high worker turnover, absenteeism as well as medical, insurance and legal cost (The American Institute of Stress, 2019). Job stress is among the major health hazards found at the workplace in recent times with multiple consequences on productivity and injuries, substance abuse, physical illness and family problems for workers (Communication Workers of America, 2017).

Occupational stressors are predictors of ill-health among women in managerial positions in Ghana and resulted in mental symptoms such as anxiety, depression and other physical symptoms that these women exhibited (Sackey & Sanda, 2009). Another Ghanaian study among health workers by *Kaburi et al* found that occupational stress has 2.3 times odds of resulting in leave of absence (Kaburi et al., 2019). The Ministry of Health (MoH) has identified psychological stress as one of the most common hazards among healthcare professionals in Ghana (MoH, 2010).

Accurate diagnosis is key for medical intervention for various disease conditions. Failure in this arena may lead to wrong diagnosis, wrong medication, trauma to patient and/or worsened medical status which can affect the survival of patients. It is therefore necessary to ensure that laboratory scientists perform their duties devoid of stress in order to ultimately save lives and prevent the consequences of stress on their own health (Mosadeghrad, 2014). In most of the researches constituting the literature review of this study, work overload has been taunted to be the main source of stress at the workplace.

COVID-19 has placed a demand on testing sites including Noguchi Memorial Institute for Medical Research (NMIMR) to test huge volumes of cases per day as infection rate keep increasing. Stressed members of staff may however not be able to generate accurate and quality output which is the key in laboratory analysis. In addition, the adverse effects of occupational stress on an individual may only show up after several years of continuously being stressed without interventions. Such outcomes are usually difficult to reverse hence early identification of job-related stress, as would be investigated in this study is critical to avoiding the consequences.

1.3 Justification

It is imperative that healthcare workers at the forefront of the fight against COVID-19 are in the condition to deliver excellent medical results required for policy making, disease control/management and prevention. Hence any factor that affects the achievement of these aims, which includes occupational stress, is worth studying about.

Workers of other COVID-19 testing sites and the healthcare fraternity at large stand to benefit from this study since the management of COVID-19 like other infectious diseases in general begins with disease surveillance through the testing processes to case management and prevention. Ghana's testing processes for COVID-19 is spear headed by NMIMR. With public health professionals pushing for mass testing for COVID-19 and the surge in testing demands, staff of NMIMR along with other health professionals must be capable of handling the demands of COVID-19 and other future pandemics without compromising their own health.

A quantitative method was adopted for this study so as to compare the relationship between the outcome and exposure variables. The choice of a cross-sectional study for this research is because this design gives room for an investigator to study a specific phenomenon (in this case,

occupational stress) within a particular population (NMIMR) within a certain time frame (Creswell, 2009). NMIMR being at the forefront of Ghana’s COVID-19 testing and having tested the largest number of cases so far was also selected as study population.

1.4 Conceptual Framework

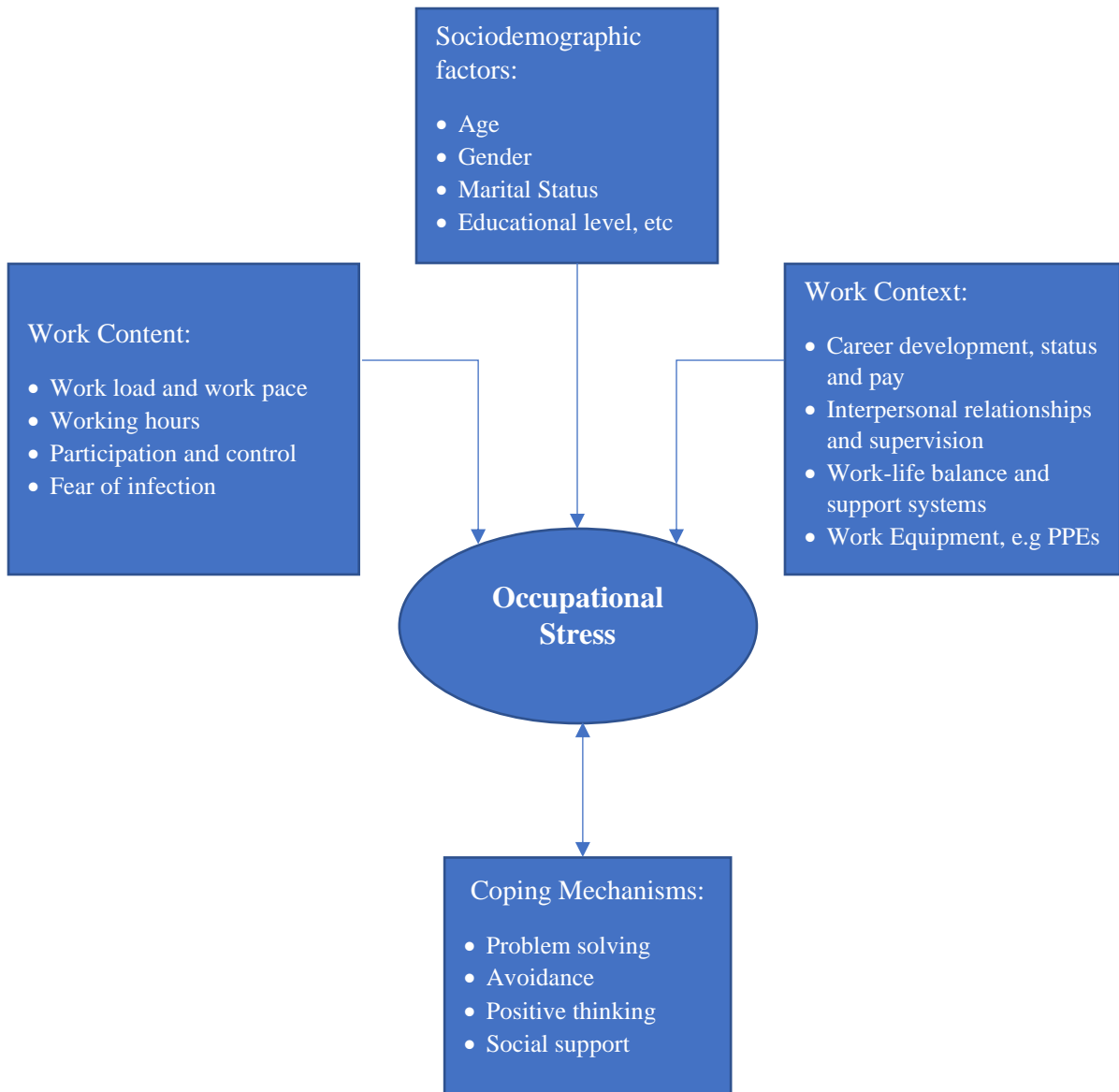


Figure 1.1: Conceptual framework showing factors that influence occupational stress and the possible coping mechanisms that are adopted. (Source: Researcher’s Own Construct)

People respond to occupational stress in varied ways (tearfulness, anxiety, fatigue, forgetfulness, depression). Conversely occupational stress may also illicit different outcomes and responses from different persons depending on their age, sex, educational level, marital status (serving as social support) and many more. Work experience however tends to mitigate against stress as workers find means of manoeuvring through their stressful schedules with time (Michie, 2002).

The work content of an individual may pose as a source of stress. These range from workload, conflicting roles, complex tasks, work pace, work hours and work schedule (poorly manages shift system and unpredictable work hours). Unpleasant task, lack of participation in decision making. Duties that are monotonous in nature coupled with the under or overutilisation of a person's skills are likely to induce stress at work (Leka, Griffiths, & Cox, 2004). High risk jobs keep workers in constant fear which increases their stress levels. In the context of this study, the risk of getting infected with infectious agents (COVID-19) in the line of duty can be stressful for workers in such institutions.

Work context describes features that are pertinent to the work environment. It comprises career development, interpersonal relationship, working in highly infectious or dangerous settings, inadequate lightening or ventilation or protective clothing and others. An organisational culture that is characterised by poor communication, career stagnation and home-work interferences give rise to occupational stress. Organisational factors may serve as stressors for individuals at the workplace. Everybody would want to rise up the career ladder after some years of work hence poor promotion prospects may cause stress among workers. Salaries serve as motivation to deliver at work. Where workers are of the opinion that the remuneration they receive is not commensurate with their work input or output, they are likely to get demoralised and experience stress. When

people work in organisations where they feel insecure about their job or positions, they harbour anxiety which constantly keeps them on edge causing stress. Inequality at work and lack of management support may leave workers with occupational stress.

In trying to cope with stressful work environments, people tend to adopt strategies which may be positive or negative. These range from problem solving, avoidance, positive thinking to social support. When behaviours like smoking cigarettes, overeating, abusing drugs and alcohol are adopted as means of coping with occupational stress, it leads to deterioration of health while Positive coping mechanisms in the form of social support from family and friends helps to alleviate stress substantially (American Psychology Association, 2020).

1.5 Research Questions

1. Are workers of COVID-19 testing sites stressed?
2. What are the predictors of occupational stress among these workers?
3. What mechanisms do these workers adopt in coping with stress?

1.6 Study Objectives

1.6.1 General Objectives

To assess the work conditions that influence occupational stress among staff of NMIMR during COVID-19 pandemic.

1.6.2 Specific Objectives

1. To estimate the prevalence of occupational stress among workers of NMIMR during COVID-19 pandemic.
2. To identify the work predictors of occupational stress among workers of NMIMR during COVID-19 pandemic.

3. To assess the coping mechanisms adopted by these workers towards stress during COVID-19 pandemic.
4. To assess the relationship between work context and work content and occupational stress during COVID-19 pandemic.(To assess the relationship between work related factors and occupational stress during COVID-19 pandemic)

CHAPTER TWO

2. LITERATURE REVIEW

Work creates an avenue for people to put their skills and expertise to use. It brings fulfilment especially when goals and aspirations are met and the individual stands to be rewarded for his or her output which benefits society at large. As fundamental as an occupation is, it may have a negative effect on health if not managed properly.

Occupational stress is the response individuals may have when work puts pressures and demands on them that goes beyond what their abilities and knowledge can handle. Conversely, others may feel stressed when their capabilities and knowledge are underutilized. Occupational stress is worsened when people feel they do not have the needed support from their superiors.

2.1 Prevalence of Occupational Stress among Health Workers

Health-care workers experience psychosocial stress in their workplace. For instance, in a cross-sectional study conducted by (Ngoc et al., 2020) in a National Dermatology Hospital in Vietnam, the researcher assessed the occupational stress prevalence and to examined the association with some characteristics among them. It was found that 6.4% of occupational stress was witnessed among doctors and nurses. This proportion was higher among nurse compared to doctor (8.0% vs. 2.2%); among those with diploma literacy compared to bachelor and above (10.6% and 2.3%). Health workers under 30 years old also had a higher rate (12.9%), health workers with under 5 years work experience (12.1%), night shift workers from 3–4 nights (33.3%), staff on temporary employment (12.8%), occasionally heavy workload workers (12.5%), and staff that worked hard occasionally (17.2%) compared to those in the comparison groups with p value <0,05. Ngoc et al. (2020) further reported that this prevalence was intense in certain departments namely surgery,

internal medicine and dermatology. Their study did not find the significant association between the prevalence of occupational stress and heavy workload and skill level.

A hospital based cross sectional study carried out on 87 randomly selected staff nurses working in two tertiary care teaching hospitals of Central Delhi, (Bhatia et al., 2010) reported that the prevalence of occupational stress amongst nurses was 87.4%. A multi-method study conducted among community health workers in Pakistan noted that over a quarter (26%) of them were found to have significant occupational stress (Haq et al., 2008).

In a Systematic Review and Meta-Analysis to determine the prevalence of psychosocial stress and its risk factors among health-care workers in Nigeria, it was reported that the overall prevalence of psychosocial stress was 61.97% (Onigbogi & Banerjee, 2019). In a cross-sectional design involving both qualitative and quantitative data collection approaches, (Nwankwo et al., 2018) observed a prevalence rate of psychosocial stress among Rwandan health-care workers at 15.3%. In a descriptive cross-sectional design carried out among 238 medical doctors in a tertiary health facility in Benin City, Edo State, it was reported by (Onowhakpor, 2018) that prevalence of occupational stress was 50.7%.

In an exploratory cross-sectional study conducted among 296 nurses and nurse-assistants in Accra, (Alhassan & Poku, 2018) noted that Ghanaian health-care workers had a psychosocial stress prevalence rate of 17%. Another study conducted at the Salaga Government hospital in Ghana to determine the psychological working and predictors of occupational stress among nurses revealed that 21% of the nurses that participated in the study expressed high to extreme levels of work stress (Kaburi et al., 2019).

2.2 Factors that Influence Occupational Stress

One major factor that influences the level of occupational stress among employees is increase workload. Hazardous working conditions, job insecurity, lack of resources and inadequate staff all contribute to stress. Employees who are dissatisfied with their remuneration and do not see any promotion prospects within their organization are likely to experience stress. Increased stress levels among workers have not only been associated with poor health but also the intention to quit one's job. Poor management support, lack of training and conflicting demands places stress on staff of various organizations at various levels. Women have been found to be more prone to stress as a result of organizational and interpersonal factors whiles job demand and role contradiction is more likely to stress men on the job (Mosadeghrad, 2014).

Most companies are birthed for economic gains. Management of these institutions may try to increase profit margins to prevent their investors from withdrawing their support from these institutions which is likely to increase stress levels. Trade and professional unions help to standardize the conditions of service across organizations. In the absence of the checks and balances that they provide, companies tend to exert pressure on staff. Competition among organizations coupled with rivalries are likely to get workers stressed on the job. The practice of laying off staff mainly for economic purposes is associated with job stress (Health and Safety Authority, 2011).

2.3 Predictors of Occupational Stress among Workers

The findings in a Systematic Review and Meta-Analysis carried out in Nigeria by (Onigbogi & Banerjee, 2019) revealed that work overload rate at 67.72% was the most prevalent psychosocial stress risk factor. Other risk factors were poor communication and staff attitude and lack of resources and equipment at 50.37% and 62.4%, respectively. In a qualitative cross-sectional study

conducted among nurses and pre-hospital emergency (PHE) staff by (Rajabi et al., 2018), it was found that the highest scores of the occupational stress factors in nurses were related to “Incompatibility between work schedule and life conditions” (0.03986) and “Being criticized by supervisors” (0.03723), respectively. (Rajabi et al., 2018) further noted that the most common stress factors in PHE staff were related to “Care of patients with critical health conditions” (0.07258), “High number of missions” (0.07056), respectively. Similarly, a comparative study conducted among nursing staff in Athens by (Eleni et al., 2010) revealed that increased work overload and conflict between professional and family roles contribute to the development of stress. A cross-sectional study carried out among clinical nurse specialists noted that the most frequently reported categories of work stress were conflicts with physicians, workload, and uncertainty concerning treatment (Chao et al., 2006).

In a quantitative study conducted to explore the impact of the demographic, employment and organizational factors related to stress of Chinese nurses that work in different departments and different hospitals in Wuhan city, China, (Sawafta et al., 2016) found that demographic, employment and organizational factors have an impact on the stress level of Chinese nurses. Even when (Sawafta et al., 2016) controlled for demographic factors, it is shown that employment and organizational factors contributed to the stress level of Chinese nurses within different departments and different hospitals in Wuhan city.

A multi-method study to investigate the viewpoint of community health workers in Pakistan, called Lady Health Workers (LHW) on their job-description, the problems they face and the levels of stress they encounter, (Haq et al., 2008) found that the factors associated with stress included having low socio-economic status and having to travel long distances for work. In Benin,

(Onowhakpor, 2018) noted that the main occupational stressors found were workload (94.3%), sleep deprivation (89.5%) and inadequacy of resources (89.1%).

A comparative study on work stress among medical laboratory technicians in India aimed at identifying and comparing the sources and impact of stress and coping mechanisms, identified stressors to include long and unsociable working hours, time pressure and deadlines, inequity in the work shift, seeking no consent when scheduling duty roster and unexpected changes in work schedule. Experiences such as inability to leave duty when one's shift is over, intra and interdepartmental conflicts, lack of opportunity to partake in decision making and poor communication channels to Doctors and administrative staff were all reported to result in stress among laboratory workers (Rajan, 2015).

Also, in Ghana it was found in Komfo Anokye teaching hospital Nurses and medical doctors were also more likely to feel stress on the job compared with other health care professionals. Most employees mentioned workload as the main source of stress in their line of duty (Yeboah, 2014). In conclusion, health professionals who work on night shift base and do more than the regular 40 hours per week are more likely to develop stress as a result of their work. Longer working hours and shift based schedules have been associated with occupational stress (Birhanu et al., 2018)

2.4 Occupational Stress during COVID-19 Pandemic

Several healthcare workers over the world are on the front lines of the coronavirus outbreak and have to deal with a heavier and more stressful workload compared to periods when the pandemic was non-existent. As a result, these workers are exposed to some occupational stressors including separation from family, heightened exposure to the coronavirus, fears of contracting COVID-19 working in conditions with insufficient resources. In addition, the novel nature of the virus makes

it challenging to remain mentally healthy amidst rapidly evolving situations requiring new learnings (Vinkers et al (2020), Chen et al (2020) and Greenbeg et al (2020).

Studies of previous epidemics that have occurred on global scale, such as the severe acute respiratory syndrome (SARS) outbreak, found a greater risk of post-traumatic stress disorder and overall increase in mental health disorders during and after the epidemic among healthcare workers as well as among the general public (Reynolds et al 2015 and Styra et al 2008). Consequently, measures have been proposed along with interventions for treating trauma, stress and burnouts to help frontline health workers and other healthcare professionals to prevent or deal with stress, trauma and burnouts. The literature also continues seeking to better understand the emotional state and experience in healthcare workers during a pandemic (Raudenska et al, 2020).

2.5 Work Content as Sources of Occupational Stress

Stressors that are directly related to the work that we do are termed work content stressors. These range from workload, conflicting roles, complex tasks, work pace, work hours and work schedule (poorly manages shift system and unpredictable work hours), unpleasant task and lack of participation in decision making. Duties that are monotonous in nature coupled with the under or overutilisation of a person's skills are likely to induce stress at work (Leka et al., 2004).

2.6 Relationship between Work Context and Occupational Stress

Occupational stress is one of the major health hazards of the modern workplace (Communications Workers of America, 2017). Occupational stress and stressful working conditions have been linked to low productivity, absenteeism, and increased rates of accidents on and off the job.

Work context describes features that are pertinent to the work environment. It comprises career development, interpersonal relationship, working in highly infectious or dangerous settings,

inadequate lightening or ventilation or protective clothing and others. An organisational culture that is characterised by poor communication, career stagnation and home-work interferences gives rise to occupational stress (Health and Safety Authority, 2011).

In a pathway analysis conducted to investigate indirect effects of socioeconomic position on mental health via stressful work, it was concluded by (Hoven et al., 2015) that individuals holding lower occupational positions are more likely to experience injurious effect of job stress. Stressful work characterized by low control and effort-reward imbalance serves as mediator in determining the effects of occupational position on depressive symptoms. The results of this study show that the reputation and prestige that a job offers to a person usually as a result of the position held, has a bearing on the stress level and it is attributed to the fact that such positions are accompanied by non-material reward and autonomy (which allows for individual control of work demands).

A study conducted on the impact of job stress on staff performance revealed that working conditions, interpersonal relations and career advancements were the main causes of stress. The stress experienced by the staff was also noticed to largely affect their performance as the stress was physical and emotionally based. The study further recommended that employers should assign task that match the competence, abilities, and expertise of individuals to eliminate stress as a result of job demand (Asamoah-Appiah & Aggrey-Fynn, 2018). In a study among nurses in Nigeria, lack of an efficient communication system, unplanned staff assignments were all reported to contribute to stress on the job (Adenike et al., 2019). In a descriptive cross-sectional study conducted at faculty of nursing, Damanhour University, Egypt, it was reported that the most frequently used coping mechanism was religious and acceptance (Abd et al., 2019). The study found that gender and living with family are good predictors of coping strategies.

Moreover, (Kokoroko & Sanda, 2019) posit in Ghana that co-worker support decreases an individual's chances of experiencing stress on the job. (Kokoroko & Sanda, 2019) further found that co-worker support strengthened the positive relationship between workload and stress.

2.7 Effects of Occupational Stress

Organizations have a moral and legal responsibility to ensure a safe working environment for staff. The labour law of Ghana makes it a requirement for Employers in Ghana to ensure that their employees are not exposed to conditions and environments that will lead to work related injuries. Companies must also ensure that certain items are maintained at the premises to help respond adequately and mitigate the effects of accidents should they occur. In view of this, the services of occupational health and safety specialists are essential to put measures in place to curb such occurrences, or at the very least, to respond to them adequately (ILO, 2014)

Occupational stress has different effects on different individuals. These effects may be influenced by age, sex, emotional state, personality traits, understanding of self among others. Stress may have a physical, mental, cognitive or behavioural effect on an individual (Leka et al., 2004).

2.7.1 Occupational Stress as a Cost to the Organisation

The cooperate image of an organization is important in keeping that organization in business. Any organization that upholds the total wellbeing of its employees eventually becomes the employer of choice for many job seekers (Burton, 2007). It gives the employers the opportunity to recruit the best among the host of qualified people applying for a position which has implications on work output. Moreover, workers feel privileged to be affiliated with such an organization and so offer their best towards the progress of the company.

2.7.2 The Financial Cost of Occupational Stress

Stressed workers have decreased morale towards work. They may contemplate quitting their job thereby decreasing staff turn-over which have dire consequences on staff recruitment.

Occupational stress has been associated with increasing client complaint and accidents culminating in a rise in absenteeism. The effects of occupational stress has a direct bearing on productivity and therefore deprives organizations of economic gains in addition to tarnishing the image of these organizations (Leka et al., 2004)

2.7.3 Health Effects of Stress

Occupational stress has a significant positive relationship with mental health among women in managerial positions in Ghana (Sackey & Sanda, 2009). Though socioeconomic status and other characteristics like age, education and type of organization all determine the effect of job stress on the mental health of the study participants, a proportion of mental health among this category of women is attributed to occupational stress. For instance, literature has made the assertion that stressors in the work environment may result in physical symptoms, anxiety and depression. The mental health of workers at the workplace is being influenced by inadequate resources, lack of performance appraisal, staff shortages and high staff turnover, excessive responsibility and feeling isolated (Sackey & Sanda, 2009).

2.8 Coping Mechanisms adopted by Workers towards Stress Management

Some level of stress at the workplace (eustress) is considered as normal and necessary to deliver output. However, when it becomes expressive in one's health and behaviour, then it becomes an unhealthy stress requiring attention. It is recommended that dealing with job stress be all encompassing, spanning from work environment through organizational protection to the individual level (Quick & Henderson, 2016).

In a descriptive cross-sectional research carried out among medical doctors in Benin City, it was reported by (Onowhakpor, 2018) that most of the respondents used the following occupational coping strategies frequently: prioritizing and solving problems accordingly (81.7%), reorganizing my work (78.2%) planning ahead (77.3%) amongst others. A hospital based cross-sectional study carried out in two tertiary care teaching hospitals of Central Delhi by (Bhatia et al., 2010) noted that out of the given possible coping strategies, most nurses resorted to positive strategies. According to (Bhatia et al., 2010), 34.5% reported that talking to people is the most effective strategy adopted by them in coping with stress, 57.5% resorted to not to avoid people in stress. Also, most nurses did not follow negative strategies like smoking or drinking and neither did they alter their eating or sleeping habits to handle their stress.

A study conducted by (Adzakpa et al., 2016) found that nurses at the St. Dominic Hospital at Akwatia in Ghana adopt four main ways of managing occupational stress. While some take some time off (break time) to relieve the stress, others prefer to meditate. A number of the nurses also engage in exercises while others opt for relaxation as ways of coping with the stress that is associated with their jobs. The study reported that 89.04% of the nurses are able to identify their stressors and avoid them while 8.22% resort to taking of drugs. About 84.93% said they would communicate their feelings instead of bottling them up. Better time management, altering the situation and adjusting standards and attitudes are strategies used by 93%, 36.99% and 83% of the nurses respectively. 83.56% of the nurses indicated that they would maintain their sense of humour and laugh all the time to keep their stress in check; and 68.49% said they accept the things they can't change. 5.48% of the nurses studied said they eat excessively when they experience occupational stress (Adzakpa et al., 2016).

CHAPTER THREE

3. METHODS

3.1 Study Design

This research was an institutional based cross-sectional study among workers of the Noguchi Memorial Institute for Medical Research at the University of Ghana in the Greater Accra Region of Ghana.

3.2 Study Area

3.2.1 Testing Centres

In the initial stages of the COVID-19 pandemic in Ghana, NMIMR served as the only testing site for all cases recorded in the southern sector of the country. As the case count kept increasing, and with the Greater Accra region recording majority of cases, it became necessary to equip other laboratories in the metropolis. Private testing facilities were also brought on board to augment the diagnostic process, reduce the pressure on NMIMR and generate real-time laboratory results required for critical decision making in the control of the pandemic in Ghana.

3.2.2 Noguchi Memorial Institute for Medical Research

NMIMR is Ghana's leading biomedical research institute under the College of Health Sciences of the University of Ghana in the Greater Accra Region. The semi-autonomous institution conducts research into infectious and non-infectious diseases and offers diagnostics and other support services in national public health programs in addition to training students in biomedical research. All these activities help to fulfil their mandate of supporting the health sector. NMIMR comprises 9 technical departments namely Bacteriology, Parasitology, Virology, Immunology, Chemical Pathology and Animal Experimentation, Nutrition, Electron Microscopy and Epidemiology. Other

support units in the institute include ICT, Administration, IRB, and Accounts among others (NMIMR, 2018).

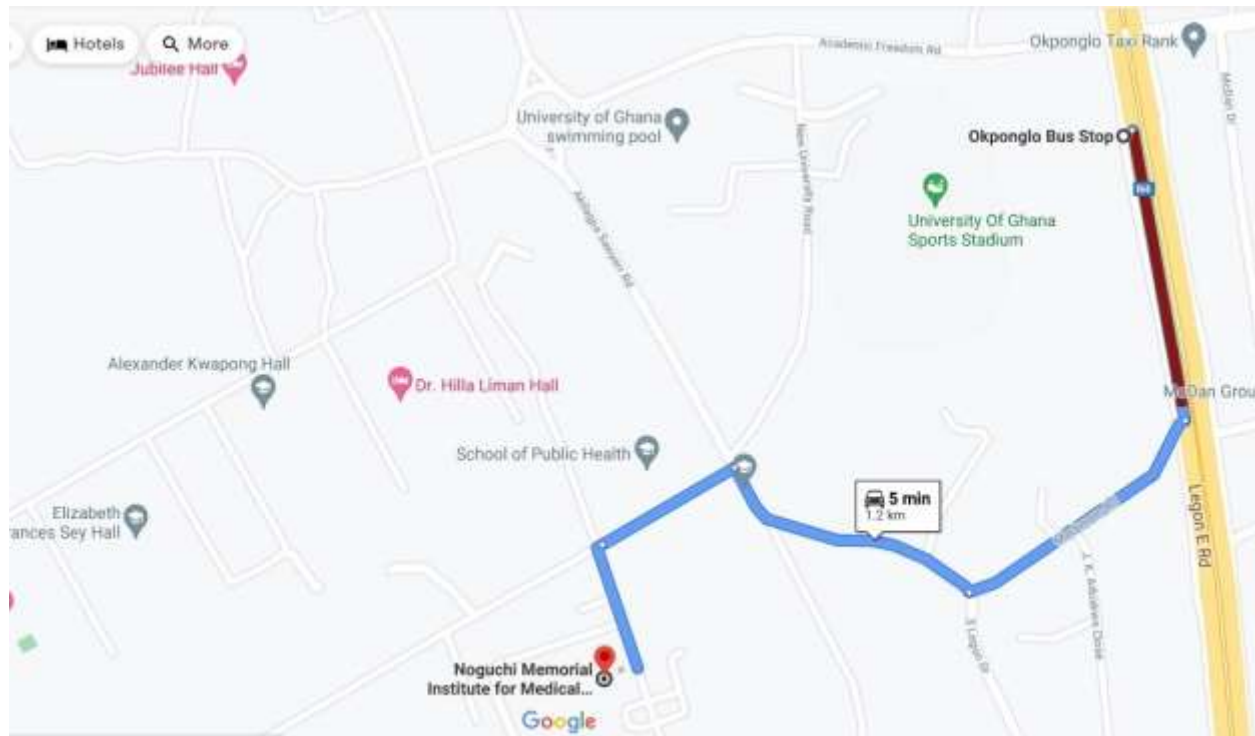


Figure 3.1 Geographical location of NMIMR (source: google maps)

3.3 Study Population

The study population comprised of workers of NMIMR who constitute the nine main departments namely virology, Bacteriology, Nutrition, Parasitology, Immunology, Epidemiology, Electron Microscopy, Animal Experimentation and Chemical Pathology.

3.3.1 Inclusion Criteria

All staff that constitute the nine technical departments and who were present during the time of data collection and consented to take part in the study will be included in the study.

3.3.2 Exclusion Criteria

Staff members in the other support units (ICT, accounts, maintenance etc.) of NMIMR were excluded from the study. Also, staff who declined to participate were not forced to do so.

3.4 Sample Size

The study adopted the Yamane's formula for known population (Taro Yamane, 1967) given by,

$$n \geq \frac{N}{1 + Ne^2}$$

N= size of population

n = minimum sample size required

e = acceptable margin of error at 95% confidence interval

Using the above parameters, the resultant minimum required sample size is:

$$n \geq \frac{230}{1 + 230 \times 0.05^2}$$

$$n \geq 146$$

Thus, a minimum of 146 respondents were required for the study.

Considering a 10% non-response rate brought the sample size to 161.

3.5 Sampling Method and Data Collection Instrument

Data was collected over a two-week period. Systematic Sampling was used to select 161 respondents from a sample frame of 230 people. In applying this method every (Nth) 2nd person was selected until the desired sample size of 161 was reached. Hard-copy questionnaires and informed consent forms were administered to staff who worked in the nine departments and consented to the study. A semi-structured questionnaire with open and closed ended questions was

used to collect the required data. The questionnaire was in four sections. Section A solicited sociodemographic information from respondents such as age, income, sex, marital status etc. The Marlin Stress Scale (The Marlin Company, 2001) was adapted to assess the occupational stress level of workers of respondents in section B. There were eight questions in this section with responses on a five-point Likert scale: never, rarely, sometimes, often and very often (corresponding to a score of 1 to 5, the last three questions are however reverse scored). A respondent may have a minimum score of 8 and a maximum of 40 indicating various degrees of occupational stress or otherwise. A score of 8-15 represents the absence of occupational stress, 16-20 fairly stressed, 21-25 moderately stressed, 26-30 severely stressed and 31-40 very severely stressed. Section C explored the occupational stressors (strict and nonflexible working hours, workload in excess of available time, exclusion from decision making, inadequate, inconsiderate or unsupportive supervision, unfair performance evaluation system, absence of avenue of support for domestic and work problems, fear of contracting COVID-19, inadequate PPEs, uncomfortable PPEs and shunning of family and friends because of association with COVID-19 work).

Section D assessed coping mechanisms (problem solving, avoidance, positive thinking and social support) using the Brief COPE (Coping Orientation to Problems Experienced) Scale (Carver, 1997).

3.6 Study Variables

i. Dependent or Outcome Variable

- Occupational stress

ii. Independent

- Sociodemographic characteristics of respondents: Age, Sex, educational level, marital status, income level.
- Work Content
- Work Context
- Coping mechanisms

3.7 Data Processing and Analysis

Raw data from the questionnaires was entered into Microsoft Excel for cleaning and validation from where it was imported into STATA (version 16) for statistical analysis. Descriptive analysis was conducted to obtain statistics including mean and proportions which were presented in tables.

Chi-square test was also employed to test association between the dependent and independent variables which are categorical in nature. Statistical significance was set at <0.05 at 95% confidence interval. Logistic regression was applied to measure the strength of association between occupational stress and some demographic characteristics as well as the stressors. Pearson's correlation was used to establish the type of relationship between the dependent and independent variables.

3.8 Quality Control

The questionnaire was pre-tested at the Public Health and Reference Laboratory at Korle-bu Teaching Hospital. This aims to identify ambiguities and any other challenges likely to be encountered by study participants when filling the questionnaire. All inconsistencies were corrected before administering to participants of study at NMIMR.

The research assistants who involved in the data collection process were trained on the questionnaires and nature of responses being requested so that they provide adequate assistance to respondents who require it.

The data entry process was closely regulated to ensure that information provided by respondents are accurately captured in the Microsoft Excel software, and subsequently STATA software. The responses on each questionnaire received was first entered by the research assistant, and then verified by the researcher.

3.9 Ethical Issues

Ethical clearance was sought from the Institutional Review Board (IRB) of NMIMR. (Approval number NMIMR-IRB CPN 006/20-21)

3.9.1 Approval and Access

Permission was also sought from the management of NMIMR for the study via an introductory letter from my Head of Department.

3.9.2 Consent Process

Informed consent was sought from the participants of the study. The content of the consent form was explained to them after which they appended their signature in agreement to get involved in the study. The content of the consent form included the title of research, the objectives, risk involved in participation, ethical principles as well as entire process of the study.

3.9.3 Voluntary Withdrawal

Participation in the study was voluntary and respondents had the choice of withdrawing from the study at any point in time without any consequences to their action or inactions.

3.9.4 Information Storage and Disposal

Respondents were fully assured of confidentiality of the information they divulge. It was also made known to respondents that their information will be used strictly according to the purpose for which it was solicited.

Only the principal investigator, research assistants, and the supervisor of this thesis had access to the information. Names were also not be required on questionnaires so as to eliminate traceability. Hardcopies of questionnaires will be kept under lock and key for five years after which it will be burnt. Soft copies of the results of the study will be saved on a laptop computer with a password.

3.9.5 Potential Risk/Benefits

Contents of questionnaire were not likely to pose any direct risk to the participants and they did not stand the chance to lose besides their time that was spent in filling the questionnaire. There was no direct benefit to participating in the study. However, the study may influence management decisions concerning occupational stress among the workers at NMIMR leading to a healthy work environment and worker satisfaction.

CHAPTER FOUR

4. RESULTS

Introduction

This chapter reports the results obtained from the fieldwork. For the purposes of clarity and understanding, the results have been presented according to the objectives of the study. After presenting data on the background characteristics of the workers, the chapter presents results on the prevalence of excessive occupational stress among workers at the Noguchi Memorial Institute for Medical Research, predictors of occupational stress among the workers, coping mechanisms adopted by workers in managing occupational stress, and relationships between work context and work content and occupational stress. Finally, this section is concluded by summarizing key results.

4.1 Sociodemographic Characteristics of Respondents

Out of a total of 161 questionnaires distributed, 157 was returned representing a response rate of 95%. Data cleaning subsequently resulted in 153 completed questionnaires suitable for analysis. From the findings of the study detailed in table 4.1, it was found that respondents who were less than 30 years, 107 (70.4%) formed the majority group in this study, followed by respondents who were within 30-39 years, 33 (21.7%). The results also showed that respondents who were research assistants were the majority, 80 (52.3%). Many of the study respondents were from the Virology department, 64 (42.7%). This was immediately followed by those from the Parasitology department, 37 (24.7%). Majority of the respondents were males, 81 (53.3%). In addition, greater number of the respondents were single, 126 (82.9%), and majority had obtained their first degree, 100 (67.1%) at the time of conducting this study. The results further showed that majority of the respondents earned between GH¢1,001-GH¢2,000, 52 (35.1%), followed by those who earned

between GH¢501-GH¢1,000, 36 (24.3%) as their monthly net income. A majority of respondents, 87 (58%) indicated that they were employed on contract basis.

Table 4.1: Socio-demographic characteristics of respondents

Sociodemographic	Frequency	Percent	Total
Age			152
Less than 30 years	107	70.4	
30-39 years	33	21.7	
40-49 years	8	5.3	
Above 49 years	4	2.6	
Sex			152
Male	81	53.3	
Female	71	46.7	
Marital status			152
Single	126	82.9	
Married	26	17.1	
Level of education			149
HND/Diploma	5	3.4	
First Degree	100	67.1	
Postgraduate	44	29.5	
Monthly net income			148
Less than GH¢500	4	2.7	
GH¢501-GH¢1000	36	24.3	
GH¢1001-GH¢2000	52	35.1	
GH¢2001-GH¢3000	30	20.3	
Above GH¢3000	26	17.6	
Type of Employment			150
Permanent	24	16.0	
Secondment	4	2.7	
Contract	87	58.0	
Internship	35	23.3	

The results presented in table 4.2 indicated that a significant number of the respondents, 67 (44.7%), spent between 41-50hrs working weekly while 44 (29.3%) spent above 50 hrs working weekly. The results also showed that majority of the respondents have worked in NMIMR from 1-5 years, 77 (50.3%). Respondents who indicated that they were working in the laboratory were

134 (88.7%). Out of those who confirmed working in the laboratory, as many as 66 (49.3%) indicated that they had laboratory work experience spanning 1-5 years. Majority, 107 (70.4%), of the laboratory workers were involved in COVID-19 testing. For the respondents who were involved in COVID-19 testing, majority (73.8%) indicated that they were specifically assigned to the laboratory testing followed by those who were responsible for sample registration, 16 (15.0%).

Table 4.2: Work characteristics of respondents work place

Work Characteristic	Frequency	Percent	Total
Hours spent working weekly			150
Up to 40 hrs	39	26	
41 - 50 hrs	67	44.7	
Above 50 hrs	44	29.3	
Working Experience at NMIMR			153
Less than 1 year	49	32	
1 - 5 years	77	50.3	
6 - 10 years	15	9.8	
Above 10 years	12	7.8	
Laboratory Worker			151
No	17	11.3	
Yes	134	88.7	
Years of Laboratory Work			134
Less than 1 year	39	29.1	
1 - 5 years	66	49.3	
6 - 10 years	18	13.4	
Above 10 years	11	8.2	
COVID-19 Testing			152
No	45	29.6	
Yes	107	70.4	
Testing stage involved			107
Laboratory testing	79	73.8	
Data Entry	12	11.2	
Sample registration	16	15	
Job			153
Others	73	47.7	
Research Assist.	80	52.3	

Department			150
Virology	64	42.7	
Parasitology	37	24.7	
Bacteriology	35	23.3	
Others	14	9.3	
Type of Employment			150
Permanent	24	16.0	
Secondment	4	2.7	
Contract	87	58.0	
Internship	35	23.3	

4.2 Proportion of excessive Occupational Stress among Workers

The workplace stress assessment showed that an appreciable number (40.5%) of the respondents rarely felt unpleasant or unsafe work conditions at their places of work (table 4.3). Also, 46 (30.1%) respondents noted that they sometimes felt unpleasant or unsafe with their work conditions. More than a quarter of the respondents (32.7%) claimed that the work had never conferred any negative effect on them. With regards to workload, substantial portion (43.6%) of the respondents complained that sometimes their work load was too much for them.

In addition, 51 (33.3%) of the respondents said that it was never difficult for them to express their opinions or feelings at the work place while 50 (32.7%) of them noted that they rarely found difficulty in expressing their opinions or feelings at the work place. Majority (32.0%) of the respondents also indicated that they sometimes experienced work pressure which interfered with their family or personal life. Most of the respondents, 58(38.2%), mentioned that they often had adequate control/input over work duties, and 36(23.7%) respondents noted that they very often had adequate control/input over work duties. Likewise, many of the respondents said they were able to often use their skills/talent at work, 66(43.4). Finally, a greater number of the respondents 82 (53.9%) noted that they never felt like quitting their jobs due to associated stress as detailed in table 4.3.

Table 4.3: Determinants of Worker Stress

Workplace stress assessment	Never	Rarely	Sometimes	Often	Very often	Total
	n(%)	n(%)	n(%)	n(%)	n(%)	n
Unpleasant or unsafe work conditions	37(24.2)	62(40.5)	46(30.1)	6(3.9)	2(1.3)	153
Work having negative effect	50(32.7)	44(28.8)	45(29.4)	11(7.2)	3(2.0)	153
Too much work	17(11.4)	24(16.1)	65(43.6)	31(20.8)	12(8.1)	149
Difficulty in expressing opinions/feeling	51(33.3)	50(32.7)	34(22.2)	10(6.5)	8(5.2)	153
Work pressure interferes with family/personal life	39(25.5)	31(20.3)	49(32.0)	20(13.1)	14(9.2)	153
Adequate control/input over work duties	10(6.6)	16(10.5)	32(21.1)	58(38.2)	36(23.7)	152
Able to utilize skills/talent at work	4(2.6)	8(5.3)	18(11.8)	66(43.4)	56(36.8)	152
Feel like quitting job due to associated stress	82(53.9)	38(25.0)	20(13.2)	9(5.9)	3(2.0)	152

%- Percentages, n- number or frequency

The levels of stress shown in table 4.4 indicated that overall, majority of the respondents, 40.5% (95%CI=33.0-48.5), reported a low stress level whereas 10.5% (95% CI=6.5-16.4) indicated severe stress when stress was categorised into four levels. At the binary outcome level of stress, 89.5% (95% CI=83.6-93.5) of the respondents were found to be stressed.

Table 4.4: Prevalence of occupational stress among respondents

Stress Level	Observation	Proportion	95%CI
Ordinal Outcome			
Normal	16	10.5	6.5-16.4
Fairly Low	62	40.5	33.0-48.5
Moderate	59	38.6	31.1-46.6
Severe	16	10.5	6.5-16.4
Binary Outcome			
Normal	16	10.5	6.5-16.4
Stressful	137	89.5	83.6-93.5

The results from the bivariate analysis of the association between background characteristics and stress presented in table 4.5 revealed that only the hours spent working per week ($p < 0.002$) and involvement in COVID-19 testing ($p < 0.014$) significantly influenced the stress level of respondents. A higher proportion of respondents who worked above 50 hours a week reported stress (95.5%) as compared to those who worked 41-50 hours a week (94.0%) and those who worked up to 40 hours a week (74.4%). Also, majority of the respondents who were involved in COVID-19 testing suffered from stress (93.5%), as compared to those who were not involved (80%). However, the other background characteristics were not found to significantly influence stress levels.

Table 4.5: Bivariate analysis of the association between background characteristics and stress

Variable	Stress level			Chi-square statistic (p-value)
	Normal n(%)	Stressful n(%)	Total n	
Age				2.85(0.415)
Less than 30 years	14(87.5)	93(68.4)	107(70.4)	
30-39 years	2(12.5)	31(22.8)	33(21.7)	
40-49 years	0(0.0)	8(5.9)	8(5.3)	
Above 49 years	0(0.0)	4(2.9)	4(2.6)	
Job Designation				0.75(0.387)
Others	6(37.5)	67(48.9)	73(47.7)	
Research Assist.	10(62.5)	70(51.1)	80(52.3)	
Department				5.64(0.130)
Virology	3(20.0)	61(45.2)	64(42.7)	
Parasitology	7(46.7)	30(22.2)	37(24.7)	
Bacteriology	3(20.0)	32(23.7)	35(23.3)	
Other	2(13.3)	12(8.9)	14(9.3)	
Type of employment				2.09(0.555)
Permanent	1(6.3)	23(17.1)	24(16.0)	
Secondment	0(0.0)	4(3.0)	4(2.7)	
Contract	10(62.5)	77(57.5)	87(58.0)	
Internship/National service	5(31.2)	30(22.4)	35(23.3)	
Sex				0.61(0.435)
Male	10(62.5)	71(52.2)	81(53.3)	
Female	6(37.5)	65(47.8)	71(46.7)	
Marital status				3.69(0.055)
Single	16(100.0)	110(80.9)	126(82.9)	
Married	0(0.0)	26(19.1)	26(17.1)	
Level of education				2.53(0.282)
HND/Diploma	0(0.0)	5(3.7)	5(3.4)	
First Degree	12(85.7)	88(65.2)	100(67.1)	
Postgraduate	2(14.3)	42(31.1)	44(29.5)	
Monthly net income				5.34(0.264)
Less than GH500	0(0.0)	4(3.0)	4(2.7)	
GH501-GH1000	5(33.3)	31(23.3)	36(24.3)	
GH1001-GH2000	8(53.3)	44(33.1)	52(35.1)	
GH2001-GH3000	1(6.7)	29(21.8)	30(20.3)	
Above GH3000	1(6.7)	25(18.8)	26(17.6)	
Hours spent working weekly				12.46(0.002)
Up to 40 hrs.	10(62.5)	29(21.7)	39(26.0)	
41 - 50 hrs.	4(25.0)	63(47.0)	67(44.7)	
Above 50 hrs.	2(12.5)	42(31.3)	44(29.3)	

Table 4.2: Bivariate analysis of the association between background characteristics and stress (Continued)

Variable	Stress level			Chi-square (p-value)
	Normal	Stressful	Total	
Years of working at NMIMR				1.70(0.637)
Less than 1 year	6(37.5)	43(31.4)	49(32.0)	
1 - 5 years	8(50.0)	69(50.4)	77(50.3)	
6 - 10 years	2(12.5)	13(9.5)	15(9.8)	
Above 10 years	0(0.0)	12(8.7)	12(7.9)	
Working in the laboratory				1.01(0.316)
No	3(18.8)	14(10.4)	17(11.3)	
Yes	13(81.2)	121(89.6)	134(88.7)	
Involved in testing for COVID-19				6.09(0.014)
No	9(56.3)	36(26.5)	45(29.6)	
Yes	7(43.7)	100(73.5)	107(70.4)	

4.3 Predictors of Occupational Stress among Workers

The results presented in table 4.6 showed that respondents who were 30+ years of age were 3.24 times more likely to have stress as compared to respondents less than 30 years of age (cOR= 3.24; 95% CI 0.70-14.87; $p = 0.131$). This difference was however statistically insignificant since the p-value is less than 0.05. Furthermore, respondents who were in the parasitology department were 21% less likely of suffering from stress as compared to respondents who were in the virology department (cOR = 0.21; 95% CI = 0.05-0.87; $p = 0.032$). This difference was statistically significant. After adjusting for other variables, respondents were 52% less likely to suffer from stress, and was statistically insignificant (aOR = 0.52; 95% CI =0.11-2.54; $p = 0.421$). Also, respondents whose highest educational level was postgraduate (cOR = 2.71; 95% CI = 0.58-12.65; $p= 0.205$) were 2.71 times more likely to suffer from stress as compared to respondents who had HND or degree. But this difference did not have any statistically significant association with the likelihood of suffering from stress. The results further showed that respondents who spent 41-50

hours working weekly (cOR = 5.43; 95% CI = 1.57-18.77; p= 0.007) as well as those who spent above 50 hours a week working (cOR = 7.24; 95% CI = 1.47-35.52; p= 0.015) were 5.43 and 7.24 times more likely to suffer from stress as compared to respondents who spent up to 40 hours weekly at work. After adjusting for other variables, only spending 41-50 hours weekly at work was a significant predictor of stress and was 3.94 times more likely to predict stress as compared to working up to 40 hours a week (aOR = 3.94; 95% CI =1.04-14.98; p=0.044). Also, respondents who were involved in COVID-19 testing were statistically 3.57 times more likely to suffer from stress as compared to those who were not involved in the COVID-19 testing (cOR=3.57; 95% CI= 1.24-10.29; p=0.018). After adjusting for other variables, a respondent involved in COVID-19 testing was 2.86 times more likely to suffer from stress (aOR = 2.86; 95% CI =0.84-9.78; p=0.094). However, this did not show any statistically significant relationship between respondents who were involved in COVID-19 testing and those who were not involved in COVID-19 testing.

Table 4.6: Predictors of occupational stress among respondents

Variable	cOR[95% CI]p-value	aOR[95% CI]p-value
Age		
Less than 30 years	Ref	
30+ years	3.24[0.70-14.87]0.131	
Job Designation		
Others	Ref	
Research Assist.	0.63[0.22-1.82]0.391	
Department		
Virology	Ref	Ref
Parasitology	0.21[0.05-0.87]0.032	0.52[0.11-2.54]0.421
Bacteriology	0.52[0.10-2.75]0.445	0.80[0.14-4.53]0.804
Other	0.29[0.04-1.96]0.206	0.31[0.04-2.52]0.275
Type of employment		
Permanent	Ref	
Contract	0.29[0.03-2.33]0.242	

Internship/National service	0.22[0.02-2.02]0.182	
Sex		
Male	Ref	
Female	1.53[0.53-4.43]0.437	
Level of education		
HND/Degree	Ref	
Postgraduate	2.71[0.58-12.65]0.205	
Monthly net income		
From GH500-GH1000	Ref	
GH1001-GH2000	0.78[0.24-2.61]0.694	
GH2000+	3.86[0.71-20.98]0.118	
Hours spent working weekly		
Up to 40 hrs.	Ref	Ref
41 - 50 hrs.	5.43[1.57-18.77]0.007	3.94[1.04-14.98]0.044
Above 50 hrs.	7.24[1.47-35.52]0.015	5.11[0.86-30.43]0.073
Years of working at NMIMR		
Less than 1 year	Ref	
1 - 5 years	1.20[0.39-3.71]0.747	
6 + years	1.74[0.33-9.31]0.515	
Working in the laboratory		
No	Ref	
Yes	1.99[0.51-7.86]0.324	
Involved in testing for COVID-19		
No	Ref	Ref
Yes	3.57[1.24-10.29]0.018	2.86[0.84-9.78]0.094

4.4 Coping Mechanisms adopted by Workers towards Stress Management

The results from table 4.7 showed that a good number of the respondents adopted strategies to deal with stress, 142 (92.8%). Majority of the respondents also noted that they ignored the stress situations and did not allow them to show in their lives, 86 (56.2%). In coping with stress, many

of the respondents in this study tried looking for positives in the situation, 140 (91.5%), while some 79 (51.6%) consulted counsellors, religious leaders and many others to help cope with the situation.

Table 4.7: Coping mechanism adopted by respondents to manage stress

Coping Mechanisms	Yes	No	Total
	n(%)	n(%)	n
Invent strategies to deal with situation	142(92.8)	11(7.2)	153
Ignore situations and don't allow the stress to show	86(56.2)	67(43.8)	153
Try looking for positives in the situation	140(91.5)	13(8.5)	153
Consult counsellors, religious leaders etc.	79(51.6)	74(48.4)	153

From the results presented in table 4.8, it was found that of the respondents whose coping mechanism against stress was to invent strategies to deal with the situation, majority of them suffered from stress, 126 (88.7%). Interestingly, all respondents who did not invent any strategies to deal with the situation suffered from stress, 11 (100.0%). Majority of the respondents who said they ignored stress situations and did not allow them to show in their lives, 79 (91.9%), and many of those who did not ignore the stress situations also suffered from stress, 58 (86.6%). For respondents who tried to look for positives in stressful situations 124 (88.6%) suffered stress while all those who did not try looking for any positives in coping with stress also suffered from stress, 13 (100.0%). Most of the respondents who did not consult counsellors and or religious leaders were actually suffering from stress, 71 (95.9%). Likewise, those who consulted counsellors and or religious leaders had majority of them suffering from stress, 66 (83.5%).

Furthermore, the results presented in table 4.8 showed that respondents who developed the coping mechanisms of inventing strategies to deal with stress; ignoring stress situations and not allowing

the stress to show; and trying to look for positive aspects in dealing with the situation; did not have any statistical association with respondents suffering from stress as their respective p-values were all greater than 0.05. However, respondents who consulted counsellors and or religious leaders as means of coping with stress exhibited statistically significance association with stress (Chi-square= 6.28; p-value= 0.012).

Table 4.8: Association between stress and respondents' coping mechanisms

Coping Mechanisms	Stress Level			Chi-square (p-value)
	Normal	Stressful	Total	
Invent strategies to deal with situation				1.38(0.239)
No	0(0.0)	11(100)	11	
Yes	16(11.3)	126(88.7)	142	
Ignore situations and don't allow stress to show				1.13(0.288)
No	9(13.4)	58(86.6)	67	
Yes	7(8.1)	79(91.9)	86	
Try looking for positives in the situation				1.66(0.198)
No	0(0.0)	13(100.0)	13	
Yes	16(11.4)	124(88.6)	140	
Consult counsellors, religious leaders etc.				6.28(0.012)
No	3(4.1)	71(95.9)	74	
Yes	13(16.5)	66(83.5)	79	

4.5 Relationship between Work Context and Work Content with Occupational Stress

The results presented in Table 4.9 indicated that majority of the respondents whose working hours were not strict suffered from stress, 91(66.9%). Also, respondents whose workload was not excessive experienced stress most, 84(62.2%) compared to those who had excessive workload, 51(37.8%). Respondents who participated in decision making at their workplaces mostly suffered from stress in this study, 101(74.3%).

In addition, majority of the workers who had supportive supervision, fair performance evaluation system, and support for domestic or work problems were affected by stress [125(91.2%), 109(80.7%), and 83(61.5%) respectively]. Moreover, respondents who did not fear contracting COVID-19 greatly suffered from stress, 90(66.2%), while most respondents who had adequate PPEs at their workplace experienced stress, 109(80.1%). For respondents who had full compliments of PPEs, many of them had stress, 113(83.7%), while workers who had family and friends support during COVID-19, majority experienced stress, 127(93.4%).

In conclusion, the findings further showed that excessive workload and no support for domestic or work problems were statistically associated with occupational stress in this study [Chi-square(p-value) = 6.30(0.012) and 6.54(0.011)] respectively.

Table 4.9 Association between stress and Stress-related hazards at work

Occupational Stressors	Stress Level		Total	Chi-square(p-value)
	Normal	Stressful		
Working hours are strict				0.43(0.513)
No	12(75.0)	91(66.9)	103(67.8)	
Yes	4(25)	45(33.1)	49(32.2)	
Workload excessive				6.30(0.012)
No	15(93.7)	84(62.2)	99(65.6)	
Yes	1(6.3)	51(37.8)	52(34.4)	
Non-participation in decision-making				1.36(0.243)
No	14(87.5)	101(74.3)	115(75.7)	
Yes	2(12.5)	35(25.7)	37(24.3)	
Inadequate, inconsiderate/unsupportive supervision				0.12(0.733)
No	15(93.7)	125(91.2)	140(91.5)	
Yes	1(6.3)	12(8.8)	13(8.5)	
Unfair performance evaluation system				3.72(0.054)
No	16(100.0)	109(80.7)	125(82.8)	
Yes	0(0.0)	26(19.3)	26(17.2)	
No support for domestic/work problems				6.54(0.011)
No	15(93.7)	83(61.5)	98(64.9)	
Yes	1(6.3)	52(38.5)	53(35.1)	
Fear of Contracting COVID-19 in line of duty				1.49(0.222)
No	13(81.3)	90(66.2)	103(67.8)	

Yes	3(18.7)	46(33.8)	49(32.2)	
Inadequate PPEs				0.50(0.479)
No	14(87.5)	109(80.1)	123(80.9)	
Yes	2(12.5)	27(19.9)	29(19.1)	
Full complement PPEs uncomfortable				0.15(0.695)
No	14(87.5)	113(83.7)	127(84.1)	
Yes	2(12.5)	22(16.3)	24(15.9)	
No family and friends because of COVID-19 work				0.00(0.994)
No	14(93.3)	127(93.4)	141(93.4)	
Yes	1(6.7)	9(6.6)	10(6.6)	

The demographic characteristics' relationship with work context in table 4.10 showed that respondents who were between 40-49 years were 9.11 times more likely to experience stress from work context as compared to respondents who were less than 30 years (cOR = 9.11; 95% CI = 1.17-71.02; p = 0.035). Also, workers who were married were 9.40 times more likely to suffer from stress as a result of work context as compared to workers who were single (cOR =9.40; 95% CI = 1.21-73.27; p=0.033). After adjusting for other variables, workers who earned above GH¢3,000 monthly, were 3.75 times more likely to suffer from work context as compared to workers who earned less than GH¢500 (aOR = 3.75; 95% CI =1.82-7.74; p = 0.000).

Table 4.10: Association between Socio-Demographic characteristics and work context

Variables	Work Context	
	cOR(95%CI)P-value	aOR(95%CI)P-value
Age		
Less than 30 years	Ref.	Ref.
30-39 years	1.48(0.45-1.48)0.515	0.90(0.24-3.43)0.881
40-49 years	9.11(1.17-71.02) 0.035	3.13(0.58- 8.52)0.993
Above 49 years	2.43(0.52-11.20)0.257	0.21(0.01-3.06)0.250
Sex		
Male	1.44(0.17-11.87) 0.735	1.12(0.07-17.76)0.935
Female	Ref.	Ref.
Marital status		
Married	9.40(1.21-73.27) 0.033	9.64(0.71-131.75)0.089
Single	Ref.	Ref.
Monthly Net Income		
Less than GH¢500	Ref.	Ref.
GH¢500-GH¢1000	2.21(0.60-8.16)0.232	1.51(0.24-9.26)0.659
GH¢1001-GH¢2000	1.73(0.37-8.09)0.484	7.33(0.30-177.86)0.221
GH¢2001-GH¢3000	1.36(0.29-6.42)0.696	7.14(0.15- 8.54)0.992
Above GH¢3000	0.99(0.12-8.42)0.994	3.75(1.82-7.74) < 0.000

The study results in table 4.11 showed that respondents who were between 40-49 years were 6.0 times more likely to experience stress from work content as compared to respondents who were less than 30 years (cOR = 6.0; 95% CI = 1.24-28.92; p = 0.026). The results further showed that workers who were married were 3.88 times more likely to suffer stress from their work content as compared to workers who were single (cOR =3.88; 95% CI = 1.26-11.95; p=0.018). After adjusting for other variables, workers who earned between GH¢501-GH¢1000 monthly, were 12.82 times more likely to suffer from work context as compared to workers who earned less than GH¢500 (aOR = 12.82; 95% CI =1.19-138.33; p = 0.036).

Table 4.11: Association between Socio-Demographic characteristics and work content

Variables	Work Content	
	cOR(95%CI)P-value	aOR(95%CI)P-value
Age		
Less than 30 years	Ref.	Ref.
30-39 years	3.32 (0.50-15.64) 0.233	1.53(0.21-11.20) 0.677
40-49 years	6.00(1.24-28.92) 0.026	2.66(0.29-23.94) 0.384
Above 49 years	2.91(0.44-19.13) 0.266	2.10(0.19-23.51) 0.548
Sex		
Male	0.94(0.42- 2.11) 0.879	2.85(0.95-8.54) 0.062
Female	Ref.	Ref.
Marital status		
Married	3.88(1.26-11.95) 0.018	3.52(0.91-13.67) 0.069
Single	Ref.	Ref.
Monthly Net Income		
Less than GH500	Ref.	Ref.
GH500-GH1000	4.35(0.87-21.78) 0.074	12.82(1.19-138.33) 0.036
GH1001-GH2000	1.93(0.55-6.80) 0.304	3.72(0.53-26.10) 0.187
GH2001-GH3000	4.24 (1.42-12.60)0.129	1.34(0.19-9.73) 0.771
Above GH3000	4.35(0.87-21.78) 0.074	0.93(0.23-3.79) 0.919

4.6 Relationship between Work Context and Work Content with Occupational Stress

From the table 4.12, both the mean times of content and context domain were higher in stressful level as compared to respondents who were normal (Mean±SD = 1.45±1.29 and 0.92±1.14 respectively). There existed a statistically significant difference between content domain and the two levels of stress (Normal and Stressful) [t-test(p-value) = -2.09(0.0377)]. Similarly, there existed a statistically significant difference between context domain and the levels of stress [t-test(p-value) = -2.08(0.0388)]. These statistically significant differences between the means of stress level at the content domain and the stress level at the context domain were however reversal in the directionality of the effect or relationship, which has no bearing on the significance of the difference between the content and context domains of stress.

The results in this study also showed a relationship between content domain and stress, which was statistically 69% more likely to exist (OR=1.69; 95% CI= 1.01-2.84; p=0.045). Finally, context domain was also 2.22 times more likely to result in stress, but it has statistically insignificant relationship between it (context domain) and stress (OR=2.22; 95% CI= 0.99-4.97; p=0.052).

Table 4.12: Relationship between work content and work context with occupational stress

Domain	Stress Level		T-test (p-value)	OR[95% CI]p-value
	Normal Mean±SD	Stressful Mean±SD		
Content	0.75±1.06	1.45±1.29	-2.09(0.0377)	1.69[1.01-2.84]0.045
Context	0.31±0.60	0.92±1.14	-2.08(0.0388)	2.22[0.99-4.97]0.052

CHAPTER FIVE

5. DISCUSSION

Occupational stress is important to Biomedical professionals and has an impact on their well-being, work effectiveness, and job turnover (Chao et al., 2006). It is therefore important to understand the phenomenon which will aid in developing appropriate intervention for reducing the occupational stress for good human resource management in all workplaces, including Biomedical research facilities, in low- and middle-income states like Ghana.

5.1 Proportion of Occupational Stress among Health Workers

This study has found that the proportion of stress among the workers at the Noguchi Memorial Institute for Medical Research was generally high. This finding is consistent with what was reported in a hospital based cross-sectional study conducted among staff nurses working in two tertiary care teaching hospitals of Central Delhi, that recorded high prevalence of occupational stress amongst the nurses (Bhatia et al., 2010). The finding in this study also agreed, to a large extent, with what was reported in a Systematic Review and Meta-Analysis among health-care workers in Nigeria, that the overall prevalence of psychosocial stress was 61.97% (Onigbogi & Banerjee, 2019). Another similar finding was reported in a descriptive cross-sectional study carried out among medical doctors in a tertiary health facility in Benin City, Edo State, that the prevalence of occupational stress was 50.7% (Onowhakpor, 2018). The finding of the present study however differed from what was reported in a cross-sectional study conducted by (Ngoc et al., 2020) in Vietnam among doctors and nurses that the occupational stress accounted for 6.4%. A multi-method study conducted among community health workers in Pakistan also reported with a far lower proportion that just over a quarter (26%) of respondents were found to have significant occupational stress (Haq et al., 2008). Also, in Ghana as low as 21% of nurses in a study expressed

high to extreme levels of work stress (Kaburi et al., 2019), while the psychosocial stress prevalence rate of 17% was reported among nurses and nurse-assistants in Accra (Alhassan & Poku, 2018). Another very lower proportion of stress was reported in a cross-sectional design conducted by (Nwankwo et al., 2018), who observed a prevalence rate of psychosocial stress among Rwandan health-care workers at 15.3%. The different research subject is likely to account for the difference between this study and previous studies. While this study selected all the categories of workers in the study area, most of the earlier studies chose only the subjects that were nurses and excluded other cadre of staff. Another reason is that since the respondents of this current study were interviewed regarding the COVID-19 period when they were fully engaged in getting test results for the COVID-19 cases in a timely manner, they were most likely to be at higher risk of experiencing occupational stress.

This present study found that workers who were most affected by stress included those who were less than 30 years of age (86.9%). This did not correspond with what was reported by (Ngoc et al., 2020) that stress rate was lower in health workers under 30 years old (12.9%). The occupational stress of young workers at the NMIMR could be attributed to the fact that the study was conducted during the COVID-19 pandemic. Another finding was that research assistants, who worked in the virology department, and male respondents were most affected by stress. The other most affected groups were those who were married, those with lower qualifications, those who earned the least (less than GH¢500 monthly) and those who worked from above 40 hours a week. Earning less income and working above the normal 40 hours a week could have also increased the respondents' likelihood of getting stressed on the job. Also, those who have over 10 years work experience and were likely to have higher job roles in NMIMR, and those who worked in the laboratory, as well as those who were involved in COVID-19 testing were more likely to be stressed. A varied stress

rate was also reported by (Ngoc et al., 2020): health workers under 5 years at work (12.1%), temporary employment (12.8%), heavy workload occasionally (12.5%), and working hard occasionally (17.2%). The reasons for these findings may be that the less educated people are, the more they are mentally pressured to become more professional, to improve their skills in order to keep up with the job. They are also placed lower than subjects with a university or higher degree, leading to a higher risk of occupational stress. All respondents who were married reported occupational stress. This could be due to the fact that being married places other family and social responsibilities on the individual including in-law relationships which may expose one to occupational stress if those responsibilities are not juggled properly.

This study found that stress among the workers was significantly influenced by the number of hours the workers spent at work in a week and their involvement in COVID-19 testing.

A majority of the respondents (43.6%) felt that sometimes work load gives them stress while some 20.8% were of the view that work load was often too much for them. This results supported the assertion that a heavy workload is one of the primary causes of stress among employees (Picincu, 2019).

5.2 Predictors of Occupational Stress among Workers

The job stressors affecting the workers included strict working hours, excessive workload, non-participation in decision making, inadequate/inconsiderate and supportive supervision, and unfair performance evaluation system. This finding supports what was reported by (Onowhakpor, 2018) that the main occupational stressors found were workload, sleep deprivation and inadequacy of resources. Another similar finding was reported in India that lack of opportunity to partake in decision making and poor communication channels to Doctors and administrative staff all resulted in stress among laboratory workers (Rajan, 2015). This finding also supported what was revealed

in a Systematic Review and Meta-Analysis carried out in Nigeria by (Onigbogi & Banerjee, 2019), that work overload was the most prevalent psychosocial stress risk factor. Finally, the present study findings agreed with what was revealed in a cross-sectional study carried out among clinical nurse specialists that the most frequently reported categories of work stress were conflicts with physicians, workload, and uncertainty concerning treatment (Chao et al., 2006).

Other stressors which were found in this present study included no support for domestic/work problems, fear of contracting COVID-19, inadequate PPEs, PPEs being uncomfortable, and shunning of family and friends because of COVID-19 work. This finding in part also supported what was reported in a comparative study conducted among nursing staff in Athens by (Eleni et al., 2010), that increased work overload and conflict between professional and family roles contribute to the development of stress. Perhaps with the mentality of getting results ready on time, while ensuring that one does not get infected with COVID-19, those who handle samples every now and then but think they may not to be getting the best of personal protective equipment would have applied more psychological effort and pressure in manoeuvring to protect themselves at work, leading to a higher risk of occupational stress than other groups.

This study's findings showed that the only occupational factor which was a significant predictor of stress was working for 41-50 hours weekly, which was 3.94 times more likely to predict stress as compared to working up to 40 hours a week. This finding is consistent with what was reported by (Birhanu et al., 2018) that longer working hours and shift based schedules have been associated with occupational stress. This finding also corresponded with (Yeboah, 2014), who noted that health professionals who do more than the regular 40 hours per week were more likely to develop stress as a result of their work at the Komfo Anokye teaching hospital. Sawafta et al., 2016 noted that employment and organizational factors contributed to the stress level of Chinese nurses within

different departments and different hospitals in Wuhan city, and buttresses this study's finding as well.

5.3 Coping Mechanisms adopted towards Stress Management

This present study has revealed that a good number of the respondents instituted some measures which they have used as coping mechanism against their occupational stress. The workers confirmed that they invented strategies to deal with stress (92.8%), ignored stress situations and did not allow them to show in their lives (56.2%), tried looking for positives in their situations (91.5%), and sought social support from counsellors, etc (51.6%) to help them cope with their stress situations. The findings in this study supported similar ones which were reported in the study carried out among medical doctors in Benin City, that most of the respondents used the following occupational coping strategies frequently: prioritizing and solving problems accordingly (81.7%), reorganizing my work (78.2%) and planning ahead (77.3%) amongst others (Onowhakpor, 2018). The finding is also consistent with (Bhatia et al., 2010), who revealed in Central Delhi that 34.5% nurses reported that talking to people is the most effective strategy they adopted in coping with stress, while 57.5% resorted to not to avoid people in stress. This result is also similar to what was reported at the St. Dominic Hospital at Akwatia in Ghana that in managing occupational stress among nurses, about 84.93% said they would communicate their feelings instead of bottling them up, use better time management (93%), alter the situation (36.99%) and adjust their standards and attitudes (83%) (Adzakpa et al., 2016).

The coping mechanism which was statistically associated with stress in this study was consulting counsellors and or religious leaders as means of coping with stress. This result did not agree with that of (Abd et al., 2019) who found that gender and living with family are good predictors of stress coping strategies.

5.4 Relationship between Work Context and Occupational Stress during COVID-19

Work context in this study considers features such as career development, interpersonal relationship, working in highly infectious or dangerous settings, inadequate lighting or ventilation or protective clothing, status and pay, interpersonal relationships, work-life balance and others that are pertinent to the work environment. At work, relationships with managers, peers and others can dramatically affect how staff feel at work (National Health Service Foundation Trust, 2014).

In this study, the findings showed that excessive workload (work content variable) and no support for domestic or work problems (work context variable) were statistically associated with occupational stress in this study. This finding could be caused by after-work fatigue which influences the experience of stress. This finding was in support of what have been previously reported in other studies in diverse forms. For instance, in a cross-sectional study conducted in a Ghanaian telecommunication company by (Kploanyi et al., 2020) reported that workload was the most reported of the four psychosocial stressors assessed. Similarly, stress experienced was also noticed to largely affect the performance of staff in another study as the stress was physical and emotionally based (Asamoah-Appiah & Aggrey-Fynn, 2018). Also in Nigeria, lack of an efficient communication system and unplanned staff assignments were reported to contribute to stress on the job among nurses (Adenike et al., 2019). This present study finding also agreed with what was reported in Ghana, that, co-worker support decreases an individual's chances of experiencing stress on the job and also strengthened the positive relationship between workload and stress (Kokoroko & Sanda, 2019).

It is also found in this study that workers who earned above GH¢3000 monthly, were statistically 3.75 times more likely to suffer from work context as compared to workers who earned less than GH500, while workers who earned between GH¢501-GH¢1000 monthly, were 12.82 times more

likely to suffer from work context as compared to workers who earned less than GH¢500. This supports the claims that more often, higher income-level workers have more personal choices in their lifestyles and more resources at their disposal, leading to lower levels of stress, though it is not always the case (Scott, 2020).

CHAPTER SIX

6. CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The proportion of stress among the workers in this study at the Noguchi Memorial Institute for Medical Research was generally high (89.5%). This study also found that workers who were most affected by stress were less than 30 years of age (86.9%), those who were research assistants, worked in the virology department, and male respondents. The other most affected groups of workers by stress were those who were single, degree holder, monthly net income earners from GH1001-GH2000, those who worked from 41-50 hours a week, those worked in the institute for 1-5 years, laboratory workers, and those who were involved in the COVID-19 testing. As a result, this study found that stress among the workers at NMIMR was significantly influenced by the number of hours the workers spent at work in a week and their involvement in COVID-19 testing.

The job stressors affecting the workers at NMIMR included strict working hours, excessive workload, non-participation in decision making, inadequate/inconsiderate and supportive supervision, as well as unfair performance evaluation system. Additionally, fear of contracting COVID-19, inadequate PPEs, full complement PPEs uncomfortable, and the shunning of family and friends because of COVID-19 work were found to influenced the development of occupational stress. The only occupational factor which was a statistically significant predictor of stress was working for 41-50 hours weekly, and was 3.94 times more likely to predict stress as compared to working up to 40 hours a week.

The coping mechanisms used by workers during stress were: invention of strategies to deal with stress, ignoring situations and trying not to let the stress show, trying to look for positives in their

situations, and also consulting counsellors and religious leaders to help them cope with their stress situation. The coping mechanism which was statistically associated with stress management in this study was consulting counsellors and or religious leaders.

Moreover, it was found in this study that there existed a statistically significant difference between work context domain and the stress level among the respondents (p-value= 0.0388).

6.2 Recommendations

1. The Noguchi Memorial Institute for Medical Research should conduct screening for all staff to identify subjects having occupational stress and give appropriate intervention such as optimisation of shift system.
2. For staff of the Virology, Parasitology, and Bacteriology departments, the Institute needs to enhance the exchange of sharing experiences and sharing the work volume.
3. The Institute should encourage its staff to embark on career development, develop good interpersonal relationship, and ensure balance in their work-life.
4. This study further recommend that the employer should assign task to staff that match their competences, abilities, and expertise of individuals to eliminate stress as a result of job demand.
5. Further studies should use a standardized tool to examine occupational stress and follow-up data to evaluate the effectiveness or otherwise of interventions.

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APPENDIX 1: INFORMED CONSENT

NMIMR-IRB CONSENT FORM TEMPLATE

Title: Assessment of occupational stress among workers of COVID-19 testing sites: the case of Noguchi Memorial Institute for Medical Research

Principal Investigator: Antoinette Kumah

Address: School of Public Health, University of Ghana
Department of biological, environmental and occupational health
University of Ghana

General Information about Research

This study therefore aims to determine the level of occupational stress experienced by workers of COVID-19 testing site using NMIMR as case study as well as identify the stressors so as to make the work environment healthy and conducive for churning out quality results in the timely manner in which it is required for the current and future pandemic that may surface. Participation in the study is likely to take 15 to 25mins after they have given consent to do so. This study is mainly for academic purposes.

Possible Risks and Discomforts

Contents of questionnaire are not likely to pose any direct risk to the participants and they do not stand the chance to lose besides their time that will be spent in filling the questionnaire

Possible Benefits

There will be no direct benefit to participating in the study. However, the study may influence management decisions concerning occupational stress among the workers at NMIMR leading to a healthy work environment and worker satisfaction.

Confidentiality

Respondents are assured of confidentiality of the information they divulge to the best of our ability. Respondents' information will be used strictly according to the purpose for which it is being collected. In order to eliminate traceability, Names are not be required on questionnaires. Only the principal investigator, research assistant, and her supervisor shall have access to the information.

Compensation

Participants will not be compensated.

Voluntary Participation and Right to Leave the Research

Participation in this study is completely voluntary. Respondents may withdraw from the study at any point in time without any consequences to their action or inactions.

Contacts for Additional Information

You may please contact the principal investigator or the supervisor for the study on 0246510700 or 0208376845 respectively for clarity on any aspect of the study.

Your rights as a Participant

This research has been reviewed and approved by the Institutional Review Board of Noguchi Memorial Institute for Medical Research (NMIMR-IRB). If you have any questions about your rights as a research participant you can contact the IRB Office between the hours of 8am-5pm through the landline 0302916438 or email addresses: nirb@noguchi.ug.edu.gh.

VOLUNTEER AGREEMENT

The above document describing the benefits, risks and procedures for the research title ‘Assessment of occupational stress among workers of COVID-19 testing sites: the case of Noguchi Memorial Institute for Medical Research’ has been read and explained to me. I have been given an opportunity to have any questions about the research answered to my satisfaction. I agree to participate as a volunteer.

Date

Name and signature or mark of volunteer

If volunteers 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 take part in the research.

Date

Name and signature of witness

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.

Date

Name Signature of Person Who Obtained Consent

APPENDIX 2: QUESTIONNAIRE

QUESTIONNAIRE

This research work aims at assessing the work conditions that influence occupational stress among staff of Noguchi Memorial Institute for Medical Research (NMIMR). The researcher is undertaking this work as part of the requirements for the award of a Master of Public Health (MPH) degree by the University of Ghana, Legon.

The information being collected via this questionnaire is purely for academic purpose. All responses will be treated with strict confidentiality and used solely for the purpose of the study. Results will be presented in an aggregated form to protect respondent's anonymity.

SECTION A

BACKGROUND INFORMATION

Please indicate the appropriate answers

1. Age as at last birthday (in years)?

<input type="checkbox"/> Less than 30 years	<input type="checkbox"/> 30 – 39 years
<input type="checkbox"/> 40 – 49 years	<input type="checkbox"/> above 49 years

2. Designation (Job role):

3. Department:

4. Type of employment

<input type="checkbox"/> Permanent
<input type="checkbox"/> Secondment
<input type="checkbox"/> Contract
<input type="checkbox"/> Internship / National Service

5. Sex

<input type="checkbox"/> Male	<input type="checkbox"/> Female
-------------------------------	---------------------------------

6. Marital status:

<input type="checkbox"/> Single	<input type="checkbox"/> Married	<input type="checkbox"/> Separated
<input type="checkbox"/> Divorced	<input type="checkbox"/> Widowed	

7. Highest level of education:

<input type="checkbox"/> HND/Diploma	<input type="checkbox"/> Degree
<input type="checkbox"/> Postgraduate	<input type="checkbox"/> Other (please specify).....

8. What is your net income on a monthly basis?

<input type="checkbox"/> Less than GH¢500	<input type="checkbox"/> GH¢501 – GH¢1,000
<input type="checkbox"/> GH¢1,001– GH¢2,000	<input type="checkbox"/> GH¢2,001 – GH¢ 3,000
<input type="checkbox"/> Above GH¢3,000	

9. How many hours do you spend working in a week prior to COVID-19?
 Up to 40 hours 41 to 50 hours
 Above 50 hours
10. How many hours do you spend working in a during the COVID-19 Pandemic?
 Up to 40 hours 41 to 50 hours
 Above 50 hours
11. How long have you been working at NMIMR?
 Less than 1 year 1 to 5 years
 6 to 10 years Above 10 years
12. Do you work in the laboratory?
 yes no
13. If yes to previous question, how long have you been working in the laboratory?
 Less than 1 year 1 to 5 years
 6 to 10 years Above 10 years
14. Have you been involved in testing for COVID-19?
 yes no
15. If yes to previous question, what stage of the COVID-19 testing process are you involved in?
 laboratory testing data entry sample registration
 other (please specify):.....

SECTION B - WORKPLACE STRESS ASSESSMENT

These set of questions assess your level of stress with regards to the workplace during the COVID-19 pandemic.

Please read each statement and tick one response each – **Never; Rarely; Sometimes; Often; or Very Often** to indicate how much the statement applies to you. There are no right or wrong answers.

ITEM	Never	Rarely	Sometimes	Often	Very Often
1. Conditions at work are unpleasant or sometimes even unsafe.					
2. I feel my job is negatively affecting my physical or emotional wellbeing.					
3. I have too much work to do.					
4. I find it difficult to express my opinions or feelings about my job conditions to my superiors.					
5. I feel that my job pressure interferes with my family or personal life.					
6. I have adequate control or input over my work duties.					
7. I am able to utilize my skills and talents to the fullest extent at work.					
8. I sometimes feel like quitting my job because of the stress associated with it.					

SECTION C – OCCUPATIONAL STRESSORS

These set of questions bring out your level of stress with regards to the workplace during the COVID-19 pandemic.

Please indicate by selecting “Yes” or “No” whether each of the following stress-related hazards affects you in your work.

Stress-related hazards at work	Yes	No
1. The working hours assigned me are strict and not flexible.		
2. My work load is in excess of time available		
3. I am not included in decision-making regarding work processes that affect me.		
4. I get inadequate, inconsiderate or unsupportive supervision over my work.		
5. The performance evaluation system (and consequently promotion) is unfair		
6. There is no avenue of support for domestic and work problems.		
7. I fear I may contract COVID-19 in my line of duty		

8. My PPEs are inadequate		
9. I feel uncomfortable, reduced speed and skill when in the full complement of PPEs.		
10. My family and friends shun me because I work on COVID-19 samples		

SECTION D – COPING MECHANISMS

These last set of questions explores the mechanisms you adopt to cope with stress at the workplace during the COVID-19 pandemic.

Please indicate by selecting “Yes” or “No” whether you employ each of the following to help you cope with stress at the workplace.

How do you cope with Stress on the Job?	Yes	No
1. I try to come up with a strategy on what to do about the situation.		
2. I ignore the situation and try not to let the stress show		
3. I try to look for something good in the situation to see it in a different light.		
4. I seek help from counsellors, religious leaders, friends or relatives.		

APPENDIX 3: ETHICAL APPROVAL

NOGUCHI MEMORIAL INSTITUTE FOR MEDICAL RESEARCH
Established 1979A Constituent of the College of Health Sciences

Phone: +233-302-916438 (Direct)
E-mail: nirb@noguchi.ug.edu.gh
Telex No: 2556 UGL GH

My Ref No: DF22
Your Ref. No:

INSTITUTIONAL REVIEW BOARD



University of Ghana

Post Office Box LG 581
Legon, Accra
Ghana

2nd September, 2020

ETHICAL CLEARANCE

FEDERALWIDE ASSURANCE FWA 00001824

IRB 00001276

NMIMR-IRB CPN 006/20-21

IORG 0000908

On 2nd September 2020, the Noguchi Memorial Institute for Medical Research (NMIMR) Institutional Review Board (IRB) at a full board meeting reviewed and approved your revised protocol titled:

TITLE OF PROTOCOL : **Assessment of occupational stress among workers of COVID-19 testing sites: the case of Noguchi Memorial Institute for Medical Research**

PRINCIPAL INVESTIGATOR : **Kumah Antoinette, MPH Cand.**

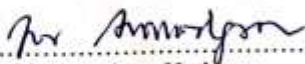
Please note that a final review report must be submitted to the Board at the completion of the study. Your research records may be audited at any time during or after the implementation.

Any modification of this research project must be submitted to the IRB for review and approval prior to implementation.

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

This certificate is valid till 1st September, 2021. You are to submit annual reports for continuing review.

Signature of Chair:



Dr. Abraham Hodgson
(NMIMR – IRB CHAIR)