OCCUPATIONAL HAZARD EXPOSURE AMONGST HEALTH WORKERS AT LETABA HOSPITAL, MOPANI DISTRICT, LIMPOPO PROVINCE.

BY

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A Mini-Dissertation

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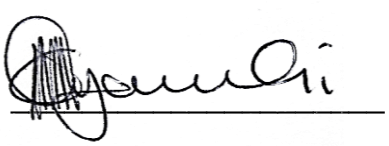
DECLARATION

"I declare that the mini-dissertation hereby submitted to the University of Limpopo, for the degree of Master of Public Health, Occupational Hazard Exposure Amongst Health Workers at Letaba Hospital, Mopani District, Limpopo Province, has not previously been submitted by me for a degree at this university or any other university, that it is my work in design and in execution, and that all the material contained herein has been duly acknowledged".



Date: 07/12/2020

DEDICATION

To my beloved parents, BT Myambi and KK Ngobeni for believing, understanding and supporting me during the hard times of my studies

I would also like to dedicate this mini dissertation to my kids, Nsovo Sean Nyambi and Vukona Tarsha Nyambi

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ABSTRACT

Background

Health care facilities are characterised by a high level of exposure to hazardous agents, which significantly endanger the health and life of workers. Occupational hazards, exposure to blood and body fluids accidents and safety precautions constitute an important public health issue. Occupational health is the identification and control of risks arising from physical, chemical, and other workplace hazards in order to establish and maintain a safe and healthy working environment. The high occurrence and burden of occupational hazards in hospitals include sharps/needlestick injuries, contact with blood and body fluids, blood-borne infections, and accidents. Health workers at Letaba Hospital are facing occupational health and safety risk at their workplace.

Objectives

The objectives of the study were to identify the type of work and related hazards that health workers are exposed to at Letaba Hospital and to find out if health workers at Letaba Hospital are aware of the occupational hazards at the workplace.

Methods

A quantitative descriptive cross-sectional method was used. The population comprised 649 nurses, doctors, cleaners, kitchen workers, laboratory technicians and laboratory technologists employed at Letaba Hospital. Stratified random sampling was used to select 374 health workers who participated in the study. A self-administered questionnaire was used for data collection. Descriptive and inferential statistics were used for data analysis.

Results

The study showed that health works, particularly nurses and doctors and nurses are exposed to needle pricks and kitchen workers are exposed to sharps. Cleaners and porters are exposed to slippery floors as well as uneven floors. Laboratory technicians, laboratory technologists and porters are exposed to specimen containers. Health

workers lack knowledge on the toxic gases available at the hospital. The study also revealed that health workers are aware of the risk of using uneven floors and the risk of using stairs/steps at their workplace.

Conclusion

The study concluded that health workers at Letaba Hospital experienced physical, biological, chemical as well as psychosocial hazards at their workplace.

Keywords

Occupational hazards, health workers and occupational health.

DEFINITION OF TERMS

Occupational Hazard

According to WHO (2009), Occupational hazard is a dangerous phenomenon, substance, human activity, or condition that may cause loss of life, injury, or other health impacts at the workplace. The occupational hazard in this study refers to injuries sustained from physical hazards, chemical hazards, biological hazards, psychosocial hazards, and ergonomic hazards.

Health Worker

Health workers are people whose job is to protect and improve the health of their communities. Together these health workers, in all their diversity, make up the global health workforce (WHO, 2016). Health workers in the study will be all the nurses, medical officers, medical lab technicians and medical technologists.

Exposure

Exposure is defined as a particular risk factor experienced by the worker, with specific modifying factors of intensity, frequency, and duration (Occupational Safety and Health Management Policy, 2012). Exposure will be used to refer to the situation where health workers are at the risk of being harmed by hazards.

Cleaners

A cleaner is a person, device, chemical agent, etc, that removes dirt, as from clothes or carpet (Collins English Dictionary, 2014). A cleaner in this study will be any person who works at Letaba hospital as a cleaner.

Medical Lab Technologist

A lab worker who has received at least 4 years offormal college or university education (e.g., a Bachelort
of Science degree in medical technology) andtraining in various techniques in clinical pa

thology, haematology, microbiology, chemistry, bloodbanking, immunology, and other ar eas of the lab (Segen's Medical Dictionary, 2011). In this study, a Lab technologist will be any worker who has qualification as a lab technologist and working at Letaba hospital laboratory.

Medical Lab Technicians

A trained health care professional who performs clinical testing on bodily substances in a laboratory setting (Medical Dictionary for the Health Professions and Nursing, 2012) Lab Technician in this study will be any technician trained to perform clinical testing in the laboratory at Letaba Hospital.

Porter

A person employed to carry burdens, especially an attendant who carries traveller's baggage at a hotel or transportation station (American Heritage Dictionary, 2011). A porter in this study will be any worker employed at Letaba Hospital as a porter.

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
HBV	Hepatitis B Virus
ILO	International Labour Organisation
NIOSH	National Institute for Occupational Safety and Health
NSI	Needlestick and Sharps Injury
OHS	Occupational Health and Safety
USBLS	United States Bureau of Labour Statistics

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CHAPTER 1

INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 Introduction

Health care facilities are characterised by a high level of exposure to hazardous agents, which significantly endanger the health and life of workers. Hazards are inherently properties of a substance, agent, source of energy or situation that has the potential of causing undesirable consequences, while risk is the probability that damage to 'life, health, and or the environment' may occur from a hazard (Aluko, Adebayo, Adebisi, Ewegbemi, Abidoye & Popoola, 2016) in Nigeria.

According to the study conducted by Al-Khatib, Ansari, Areqat, Darkhawaja, Mansour, Tucktuck, and Khatib (2015) in Palestine, Occupational hazards exposure to blood, body fluids accidents and safety precautions constitute an important public health issue. Occupational health is the identification and control of risks arising from physical, chemical, and other workplace hazards to establish and maintain a safe and healthy working environment. The high occurrence and burden of occupational hazards in hospitals include sharps/needlestick injuries, contact with blood and body fluids, blood-borne infections, and accidents.

Naresh et al., 2018 explained how occupational health and safety (OHS) In India relates to health, safety, and welfare issues in the workplace. Laws, standards, and programs related to occupational health and safety aim to make the workplace better for workers, co-workers, family members, customers, and other stakeholders. According to the national census of fatal occupational injuries (2016) in USA, fatal work injuries involving violence and other injuries by persons or animals increased by 163 cases to 866 in 2016. Workplace homicides increased by 83 cases to 500 in 2016

According to Naresh, Bhat, Chavan, Bhat and Vira (2018) in India, an occupational hazard is a potential source of harm or adverse health effect on a person or persons resulting from the work one does or from the environment in which one works. According to Ndejjo, Musinguzi, Yu, Buregyeya, Musoke, Wang and Ssempebwa,

(2015), the healthcare workforce worldwide represents 12% of the working population. Healthcare workers operate in an environment that is regarded as one of the most hazardous occupational environments. In addition to the usual workplace related exposures, healthcare workers encounter diverse hazards due to their work-related activities. Despite this knowledge, the healthcare work environment continues to be neglected by governments and organizations. Evidence from sub-Saharan Africa indicates that healthcare workers are frequently exposed to chemical, biological, physical, and psychosocial occupational hazards. They are constantly in contact with patients that expose them to infections and thus require proper protective measures to reduce their risk of acquisition of disease or injury (Ndejjo et al., 2015).

Occupational-related injuries disrupt the healthy environment of the workplace. Hence, Occupational safety is a major concern for organizations and society at large. Health care workers in South Africa, like any other workers, have the right to health and safety at work, and this is known as part of the basic human rights. Most of the world's population spend one third of their adult life at work contributing to the development of their well-being, their families and of the society. A healthy workplace is one in which workers and managers collaborate to use a continual improvement process to protect and promote the health, safety and well-being of all workers and sustainability of the workplace (WHO, 2010).

Every employee takes reasonable care for the health and safety of themselves. An employee may be affected by their actions or omissions. If they are involved in any incident which may affect their health or cause an injury to themselves, they must report such incident to their employer or to anyone authorized thereto by the employer, or to the health and safety representative in the section where he/she is working. Such must be done as soon as possible and must not be later than the end of the shift during which the incident occurred. If circumstances were such that the reporting of the incident was not possible, the employee shall report the incident as soon as practicable thereafter (OHS Act No. 85 of 1993 of South Africa).

The International Labour Oorganization estimates that some 2.3 million women and men around the world succumb to work-related accidents or diseases every year; this corresponds to over 6000 deaths every single day. Worldwide, there are around 340 million occupational accidents and 160 million victims of work-related illnesses annually (International Labour Organization, 2020). South Africa currently has no national occupational health (OH) guidelines for the protection of HCWs. The 1993 Occupational Health and Safety Act No. 8511 lays out general guidelines for the health of all workers in accordance with the Occupational Safety and Health Convention of the International Labour Organization (Tudor, Van Der Walt, Morgat, Dorman, Pan, Yenokyan, & Farley,v2016).

Letaba hospital is a regional hospital that accommodates several patients from the surroundings of greater Tzaneen as well as from other sub-districts. The workers' health has an impact on the service delivery which affects the health of patients and the hospital. The health of workers is affected by the ubiquity or pervasiveness of occupational hazards in the hospital. The continued reporting of occupational injuries in the hospital indicates the availability of hazards which needs to be attended to. A study was not conducted in the hospital to investigate the occupational hazards leading to injuries. The researcher will try to identify the occupational hazards leading to the reported injuries in the hospital.

1.2 Problem Statement

Letaba hospital's occupational health office receives cases of occupational related injuries every month. Most occupational related injuries happen because of availability of occupational hazard in the hospital. Health care workers at Letaba Hospital, particularly nurses and doctors experience occupational related injuries when performing their daily duties. The reported cases among doctors and nurses include cuts, bruises, and accidental needle stick injuries. There are also reported injuries among medical laboratory technicians and medical technologists which include cuts and bruises.

The potentiality or presence of occupational hazards at Letaba hospital poses threat to the health and well-being of health care workers. Health workers at Letaba Hospital experience low morale as well as burnout. There have been reported cases where workers inhaled paint during the ward renovation; there have also been cases of needle stick injury and injuries caused by floor slippery during wards cleaning. Injuries and stress negatively affect the health of workers and subsequently the hospital is adversely affected because the affected workers will not be able to perform their duties.

Since the occupational related injuries continue to be reported at Letaba hospital, the researcher tried to identify the occupational hazards that lead to occupational related injuries among health workers.

1.3 Research Question

What are the occupational hazards that health workers at Letaba Hospital are exposed to?

1.4 Aim the study

The aim of the study was to identify the occupational hazards exposure amongst health workers at Letaba Hospital.

1.5 Objectives of the study

- To identify the type of work and related hazards that health workers are exposed to at Letaba Hospital
- To find out if health workers at Letaba Hospital are aware of the occupational hazards at the workplace.

1.6 Significance Of The Study

The study might help in adding more data on occupational hazards that hospital workers are exposed to in hospital setting. The study findings will also help to improve the gabs on occupational hazard exposures amongst hospital workers. The study will help policy makers to adjust and improve the working environments in the hospitals inclusive of

Letaba Hospital. The future researchers will also use the findings of this study as their reference to their studies. The findings of this study will also help in the training of hospital workers concerning occupational hazards in the hospitals as well as their health and safety.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides the literature review for this study. The purpose of a literature review is to discuss the findings from previous research on the topic. This literature review is sub-divided into the topics relevant to the study. The information was obtained from published articles, online resources, books, journals, and reports that are related to occupational health hazards at the workplace.

2.2 injuries and diseases encountered at workplace

Zhang, Gu, Cui, Stallones and Xiang (2015) explained that needlestick and sharps injuries are a major occupational injury to health care workers worldwide. Needlestick and sharps injuries are major occupational hazards for health care workers worldwide. Needlestick injuries are the second most common occupational injury identified by the National Health Service (NHS), accounting for 17% of all injuries among health care workers.

A study conducted by Chawla et al. (2016) in South Asia indicates that musculoskeletal disease is one of the diseases that health care workers suffer from due to the functions they perform at work. Musculoskeletal disease is a common and costly problem worldwide. It encompasses a wide spectrum of diseases of the musculoskeletal system and multisystem connective tissues that range from traumatic injury to congenital malformation, including but not limited to various inflammatory, mechanical, and auto immune conditions. It has a profound global impact both in terms of morbidity and mortality.

Tuberculosis (TB) in all its forms is a major occupational hazard for healthcare workers worldwide. The transmission of drug-sensitive and drug-resistant strains of Mycobacterium tuberculosis occurs through infected droplets aerosolized by patients with active pulmonary TB. The transmission risk to health care workers is highest when

patients have unrecognized TB or are receiving inappropriate treatment (Delft et al. 2015) in Denmark. According to the study conducted by Holden, Bradley, Curran, Pollard, Smith (2018) in the United Kingdom, the UK is a low-prevalence country with 74% of infections occurring in persons born outside the UK; nosocomial outbreaks are consequently rare. The rate of tuberculosis is almost 21 times higher in non-UK born than in UK-born individuals. Outbreaks of TB in hospitals, nursing homes, and prisons are a challenge due to close contact between individuals and the general health circumstances of these individuals

2.3 Occupational hazards encountered at workplace

2.3.1 Physical hazards

Physical hazards are factors within the environment that can harm the body without necessarily touching it, e.g. Radiation: including ionizing, nonionizing (microwaves, radio waves, etc) (WHO, 2016).

A study conducted by Horan, Singh, Moeller, Matthews, Barratt, Jex and O'Brien (2018) in Ohio, USA explained that health care work is physically demanding, as the key daily activities require bending, twisting, and lifting motions that are associated with injury. Musculoskeletal can be described as an injury resulting from physical avoidance like change in movement patterns. Health care workers may tend to be avoidant to some of their daily activities in fear of injuries or change their movement patterns related to the function being performed at a particular time.

Horan, Singh, Moeller, Matthews, Barratt, Jex and O'Brien (2018) also identified patient aggression as one of the physical hazards, including physical or verbal threatening or sexual behavior in USA. Patient aggression is also recognised as a growing concern to the health care workers because it poses a threat to them as they render their daily services. An aggressive patient becomes a threat to the health care workers as some of the patients can physically become violent. Health care workers may consciously or unconsciously reduce the time spent with the patient as a way of coping from aggression or threatening behaviour of the patient which can ultimately diminish care quality through decreased attentiveness to patient requests or needs.

According to the study conducted by Bolanie, Tinubu, Mbada, Oyeyemi and Fabumni (2010) in Southwest Nigeria, the work-related musculoskeletal disorders can be the result of work-related events and are common to health care workers. The nursing population, which constitutes about 33% of the hospital workforce, is at particularly high risk and accounts for 60% of the reported occupational injuries. They further explained that musculoskeletal disorders have a significant impact on the quality of life, absenteeism, work restrictions, likelihood of transferring to another job or developing a disability than any other group of diseases, with a considerable economic toll on the individual, the organization, and the society.

Furthermore, Horan et al. (2018) indicated that patient aggression is positively related to the health care workers' withdrawal from the workplace. The patient's behaviour is outside of the employee or the organization's control, which means that the physical injuries caused by patients' aggression may not be controlled nor avoided. Safety compliance may be a personal behavioural strategy on work hazards and avoidance coping mechanism.

A study conducted by Harmse, Engelbrecht and Bekker (2016) in Pretoria, South Africa highlighted pain, swelling and difficulty in moving as the symptoms and physical signs of musculoskeletal disorder, which is caused by exposure in the workplace, affecting the muscles, tendons, nerves, blood vessels, joints and bursae of the hand, wrist, arm and shoulder caused by repetitive movement. All the respondents in the study conducted by Harmse et al. (2016) bore physical signs of a serious injury suffered from working environment. A study conducted by Dlungwane, Voce and Night (2018) in South Africa shows that there is a high prevalence of lower back pain resulting in prolonged position, working in cramped position, bending or twisting, and pushing or pulling.

2.3.2 Chemical hazards

Chemical hazards are present when a worker is exposed to any chemical preparation in the workplace in any form (solid, liquid or gas). Some are safer than others, but to some workers who are more sensitive to chemicals, even common solutions can cause

illness, skin irritation, or breathing problems, e.g. Liquids like cleaning products, paints, acids, and solvents (WHO, 2016).

According to the study conducted by Gorman, Dropkin, Kamen, Nimbalkar, Zuckerman, Lowe, Szeinuk, Milek, Piligian and Freund (2013) in New York, there are a variety of cleaning products that are used during hospital housekeeping activities on floors, windows, bathrooms, carpets, and other surfaces throughout the hospital and waiting areas. Workers who are involved in the hospital environmental service and housekeeping staff are at highest risk of exposure; however, hospital patients, visitors, and other hospital staff can also be regarded as those at the risk of being exposed. Accidental exposures to large concentrations can occur through spills or during mixing of incompatible chemicals.

Gorman et al. (2013) also mentioned formaldehyde as a confirmed human carcinogen. Skin exposure can cause sensitization, which can lead to dermatitis upon contact with small amounts of formaldehyde or formalin. Other health effects of formaldehyde exposure are irritation and burning of nose and throat, irritation of mucous membranes, burning of the skin, coughing, and vomiting. Formaldehyde is also highly flammable.

According to the study conducted by Hedlund and Madsen (2018), biogas is also regarded as the chemical hazard which entails three major risks; first being the explosion due to methane content, second one being the toxicity risk due to the presence of hydrogen sulphide and other gases, the third risk is the microbial risk due to the presence of pathogens. Biogas production presents significant emerging risks and that the number of accidents is growing faster than the amount of energy produce.

According to the study conducted by Carraro, Bonetta, Bertino, Lorenzi, Bonetta, and Gilli (2016) in Italy, hospital wastewater also contains hazardous chemicals such as antibiotics, analgesics and anti-inflammatories, psychiatric drugs, β-blockers, anaesthetics, disinfectants, chemicals from laboratory activities, developer and fixer solutions from photographic film processing and X-ray contrast media. The hospital wastewater is hazardous to both humans and the environment due to the presence of

pathogens, pharmaceuticals substances, and products of laboratories and research activities.

2.3.3 Psycho social hazards

These are hazards or stressors that cause stress (short term effects) and strain (long-term effects). These are the hazards associated with workplace issues such as workload, lack of control and/or respect, e.g., workload demands, workplace violence, Intensity and/or pace, lack of respect, etc (WHO, 2016).

Boyaci, Sensoy, Beydag and Kiyak (2014) in Turkey explained that stresses which have significant effects on individuals, and affect their attitudes, behaviour, and interpersonal relationships, is a case formed by the combination of several factors. For the formation of stress, people need to be affected by the environment they live in. People's physical and emotional status, lifestyle and financial status determines the level of being affected by these changes. Today, stress-related diseases increase day by day, so the people and institutions are confronted with an important problem to be faced since they provide service to intensively stressed individuals and also the staff encounters with stressful situations very often, the field of health care is considered a work environment, a lot more stressful than the other work environments. While providing the service, health care staff, they see a lot of patients and patient relatives with many different levels of health problems. These situations threaten employees' health and cause stress due to uncertainty and obscurity which affect the health care staff as well as the patient

Psychosocial or organizational factors are primarily related to social or organizational environment such as occupational stress, job satisfaction, monotonous work, social support at work, perceived work demands, etc. perceived stress can trigger the fight or flight response stimulating the endocrine system. Stress can also lead to increased muscle tension, decreased blood supply in the extremities, breakdown of muscle protein and its repair and alteration of the inflammatory or immune response (Stave & Wald, 2017).

A study conducted by Khamisa, Peltzer, Ilic and Oldenburg (2017) in South Africa explains that health care profession is one of the most stressful professions which involves emotions when dealing with patients, long working hours and enter-professional as well as interpersonal conflicts and personal stress. Personal stress includes stress experienced in the home environment including ongoing health problems of loved ones, relationship problems as well as financial problems whereas work stress includes stress experienced in the work environment related to patient care, job demands, staff issues, lack of support and overtime. These stressors contribute to workers being unproductive at the workplace and are regarded as the major contributors to burnout, job dissatisfaction and health outcomes through a pattern of physiological, emotional, behavioural, and cognitive processes.

2.3.4 Biological Hazards

These are the hazards are associated with working with animals, people, or infectious plant materials, e.g., examples include Blood and other body fluids Fungi/mould, Bacteria, and viruses (WHO, 2016).

According to Walton and Rodgers (2017), as many nursing assistants are women of childbearing age, human immunodeficiency virus, hepatitis B virus, hepatitis C virus, varicella zoster virus, vherpes simplex virus, human parvovirus B19, cytomegalovirus, rubella, measles, enteroviruses, mumps, and influenza have become a concern as they can cause complications for pregnant women and their unborn children. Nursing assistants who assist patients with the daily activities are also in the high risk of coming into contacts with patients' urine, faeces, sweat, and saliva as they assist with toileting, incontinence care, oral care, and bathing in different settings in their workplace

Biological hazards are infectious agents transmitted to others via contact with infectious patients or their bodily fluids (e.g., bacteria, viruses, and fungi). Blood borne pathogenic exposures may occur due to percutaneous needle stick injuries; in addition, there is also a risk of other infections such as tuberculosis, or organisms such as salmonella, or methicillin resistant Staphylococcus aureus (Naresh et al., 2018) in India.

Nwankwo, Karanja and Vasanthakaalam (2018) in Rwanda indicated that findings from some studies on different cadres of health care workers showed higher prevalence of exposure to blood or other body fluids. Common influencing factors include, personal behavioural factors, environmental and organizational managerial factors. They further explained that some common occurring health conditions which health workers are constantly exposed to while they discharge off their duty includes blood-borne pathogens, such as hepatitis B and C and human immunodeficiency virus respiratory pathogens like influenza, tuberculosis, diphtheria and varicella and most recent discovered severe acute respiratory syndrome. According to Yesilgul, Cicek, Avci, and Huseynikliogl u (2018), when the nurses' risk perceptions were analysed in dangerous situations, it was found that the first three dangers were ranked as blood, blood products and diseases contaminated with body fluids (HIV, hepatitis B and C), circulatory abnormalities due to standing for long periods of time (varicosis, edema) and tiredness due to long and intensive work hours in shifts, respectively.

According to the study conducted by Ndejjo et at. (2015) in Uganda, Biological hazards are associated with working in a government facility and not wearing all the necessary Personal Protective Equipment (PPEs). They further indicated that the use of PPEs reduced acquisition of illnesses in hospital setting. The study conducted by Tudor, Van Der Walt et al. (2016) in South Africa indicated that there were 46% of active cases of tuberculosis their risk for tuberculosis did not differ significantly from other cadre of staff. Due to the high tuberculosis incidence in the communities where this study took place, it is possible that HCWs may have been exposed to tuberculosis in the community.

2.4 Health and Safety training at workplace

The importance of health and safety at the workplace is to ensure that workers are empowered in improving their working conditions. They should be provided with information necessary to effectively participate and respond to occupational health issues. They are equipped with information that will assist them to make sure that they are safe from hazards available in their workplaces.

The Occupational Safety and Health Management Policy (2012) in Uganda stipulate, among other issues, the fundamental right of each worker to the highest attainable standard of health. Workers have the right to know the potential hazards and risks in their work and workplace and they should, through appropriate mechanisms, participate in planning and decision-making concerning occupational health and other aspects of their own work, safety, and health.

More than half of the population in the study conducted by Lay et al. (2016) were exposed to workplace hazards and nearly one third of respondents were vulnerable to a work injury or illness due to hazard exposure in conjunction with either inadequate OHS policies and procedures, inadequate awareness of workplace rights, responsibilities and hazards, or inadequate empowerment to ensure a safe work setting. This overall vulnerability was significantly more prevalent among younger respondents, temporary employees, and those working in smaller workplaces.

Workers should be empowered to improve working conditions by their own action. They should be provided with information necessary to effectively participate and respond to occupational health issues. Workers with individual susceptibilities, handicaps and other characteristics affecting their working capacity have a right to job adaptation that fits their situations (The Occupational Safety and Health Management Policy, 2012) in Uganda. Furthermore, Horan et al. (2018) in USA believe that positive safety behaviours (i.e., safety compliance) could influence secondary appraisals of physical work hazards by providing the employee with additional resources (e.g., motivational, or attentional resources) to address the threats to well-being in their environment, reducing the need for avoidance coping.

Naresh et al. (2018) in India indicated that it is important that employees know of the potential hazards in their workplace and employers conduct awareness programs to inform and educate their employers about these hazards, including their prevention (following universal precautions) and emergency management. Employees' perceptions on safety in the workplace are based on several factors such as support from management, safety policies and procedures developed in the organization and

monitoring of compliance to safety norms by the staff. Health care worker safety is also an important component of hospital accreditation norms. If the employees' health and well-being are taken care of, then they will feel valued. The employees will become more productive with less sluggishness and events of absenteeism and will contribute towards better patient care.

Nwankwo et al. (2018) explained that the health organizations in Rwanda often allocate limited resources towards occupational health and safety interventions, in worksite, health promotion and health and safety interventions, and are forced by combination of legal, financial, and moral factors. Providing high-quality health care in safe and healthy environment is regarded as highly important in the societies.

The study conducted by Nkomo, Niranjan and Reddy (2018) in South Africa, 25% of the workers were aware of the occupational health and safety act but they could not explain it to the next person. Most respondents in this study indicated that the training provider need to improve the quality of their training. The study conducted by Moyo, Zungu, Kgalamono and Mwila (2015) in South Africa indicated that specialist training in occupational medicine remains greatly constrained in expanding economies. Human resources for OHS have proven to be a major challenge in southern Africa, as is career development in OHS. Career pathing is a challenge even for occupational medicine, a stand-alone specialty recognized by both the College of Medicine South Africa and the Health Professionals Council of South Africa.

CHAPTER 3

RESEARCH METHODOLOGY

Research methodology is the path through which researchers need to conduct their research. It shows the path through which researchers formulate their problem and objective and present their results from the data obtained during the study period. This research methodology chapter shows how the research outcome was obtained in line with the objective of the study (Sileyew, 2019).

3.1 Research Method

Quantitative method was used to obtain numerical data from the respondents. A list of questions that the participant answers in writing or by marking answers on an answer sheet (Fraenkel et al., 2012). The data collected was only numerical and categorical data obtained through questionnaires.

3.2 Research Design

Descriptive cross-sectional study was used to describe the occupational hazards at one specific point in time. The descriptive approach was used to reveal patterns about the occupational health hazards that are unnoticed at Letaba Hospital. The descriptive research design approach helped to obtain information concerning the status of occupational health hazards at Letaba Hospital. It attempts to gather quantifiable information that can be used to statistically analyse a target audience or a particular subject (Bernard & Bernard, 2012).

3.3 Study Site

The study was conducted at Letaba Hospital, which is about 17 kilometres away from Tzaneen, and about 4 kilometres away from NkowaNkowa Township in the Mopani District of Limpopo Province, South Africa. It is located at the eastern region of Tzaneen. The hospital's workers are dominated by Xitsonga and Sepedi speaking people. Letaba Hospital comprises of the Administration section, ten wards (female and male medical, female and male surgical, paediatric, psychiatric, gynaecological and

maternity), TB ward, Staff clinic (Occupational Health and Safety Office), Health Support services (occupational therapists, social workers, physiotherapists, psychologists), Allied (Speech and hearing, dental and X-ray), casualty and Out Patient Department (OPD), Theatre and Technical department (maintenance/workshop and grounds men) and wellness clinic (Nyeleti). The hospital consists of 851 employees and 852 vacant positions.

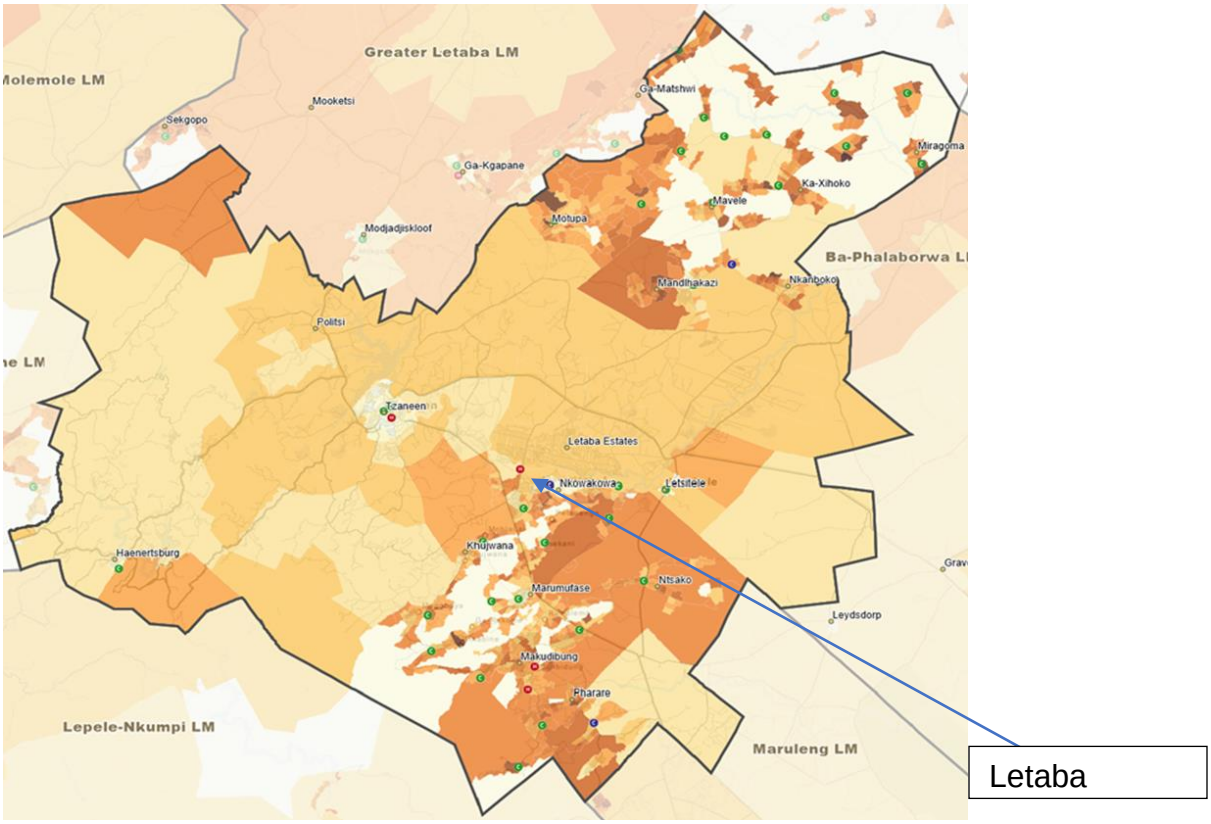

Figure 3.1 Map of Mopani District showing Letaba Hospital (SDF map catalogue, Greater Tzaneen local municipality, 2011)

3.4 Population and Sampling

3.4.1 Population

The study consisted of health workers at Letaba hospital who are involved in medical treatment of patients. For this study, the population was medical doctors and professional nurses involved in transporting patients from one ward to another. The study population also included medical laboratory technicians and medical technologists

because they often report cases of injuries that occur when they open specimen and the blood spilling on them. The population of the study was 551 which consisted of 44 medical officers, 4 community service doctors, 20 intern doctors, 476 professional nurses, 4 medical laboratory technicians and 3 medical technologists. The number of the population was obtained from the Human Resource Department at Letaba hospital.

3.4.2 Sampling

Process of selecting a number of individuals (a sample) from a population, preferably in such a way that the individuals are representative of the larger group from which they were selected (Fraenkel et al., 2012). Probability sampling was used, whereby the relative frequency with which a particular event occurs among all events of interest (Fraenkel et al., 2012). Stratified random sampling involves dividing the population into smaller sub-groups known as strata. Stratified random sampling was used, which provided equal opportunity for the formed strata to be represented in the sample. The strata was used so that all the groups of health workers, in terms of their age, gender, qualification and professional rank, are represented on the study. Yamane's formula was used to calculate the sample size and was presented on the table 1 below.

Where:

- n is the sample size?
- N is the population size
- e is the sampling error (5%) (0.05)

$$n = \frac{N}{1+N(e)^2}$$

Table 3.1: Distribution of sample

Group	Population	Sample
Medical Officers	**68**	**58**
Professional nurses	**476**	**217**
Medical Laboratory Technicians	**03**	**03**
Medical Laboratory	**04**	**04**

Technologists		
Kitchen workers	**29**	**27**
Cleaners	**12**	**12**
Porters	**14**	**14**
Ward attendants	**43**	**39**
TOTAL	**649**	**374**

Based on the presented results from the table, 374 health workers were selected to participate in the study. After the minimum sample size of 374 health workers was calculated, a random sample was conducted to obtain the desired sample size. Stratified random sampling provided an opportunity for each stratum to be represented in the sample. A list of all the population size was obtained and divided into four stratums according to their age, gender qualifications and professional rank. Then sample was randomly made from each stratum using simple random sampling to obtain a sample size.

3.5 Inclusion and Exclusion criteria

3.5.1 Inclusion Criteria

The study included all professional nurses working at Letaba Hospital, Medical Officers, Community Servers, and Intern Doctors. The study also included laboratory staffs which included medical laboratory technicians and medical technologists. This population was used because most reported cases in the OHS office are reported by them.

3.5.2 Exclusion Criteria

The study excluded student nurses and professional nurses who were on leave during data collection. The study also excluded specialist medical doctors who are not full-time employees at Letaba Hospital.

3.6 Pilot study

A piloting of the questionnaire was conducted at NkowaNkowa health centre prior to data collection. Piloting the questionnaire enabled the identification of flaws that would

compromise the integrity of the study. Ten questionnaires were self-administered in NkowaNkowa Health centre by ten nurses. The pilot study allowed the researcher to assess the feasibility of the study, to determine whether the sample size and sampling technique were adequate and effective, and to test the adequacy of the research instruments. The pre-test revealed that some questions were vague, so those questions were refined. The pre-test made it possible to refine the questionnaire by re-writing ambiguous question. After the pre-test, the questionnaire was finalized and administered to health care workers at Letaba Hospital.

3.7 Data collection

A self-administered structured questionnaire that consisted of close-ended questions was used for data collection (see appendix 1). A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents and it is used for statistical analysis of the responses (Omoijiade & Evbuomwan, 2019). The questionnaire took 30 to 40 minutes to complete. Each respondent was personally given the questionnaire by hand to complete, and it was collected thereafter. The questionnaire consisted of pre-determined questions from which the respondents had to choose the answer that is most appropriate to them. The questionnaire consisted of three sections in which Section was about the demographic data. Sections B was about the type of work and hazards exposed to. Section C was about the health workers' awareness on hazards. The researcher designed the questionnaire with the assistance of the supervisor. All the questionnaires were able to be submitted back. The researcher was guided by the literature review to develop the questionnaire. It took four weeks for all the questionnaires to be submitted back due to some health care workers being on their off days. The respondents were day shift and night shift stuff.

3.8 Data Analysis

Microsoft excel 2013 was used to analyse data. Data was captured into excel using percentage. The categorical data was presented using percentages and frequencies. The excel was used to determine whether there was a significant difference between

the expected frequencies and the observed frequencies in one or more categories. Comparison between groups was done by looking at the highest percentage. P-value of less than 0.05 was considered significant. The Chi-square test was used to determine the relationship between variables.

3.8 Reliability and Validity

3.8.1 Reliability

Reliability is the extent to which a research instrument consistently has the same results if it is used in the same situation on repeated occasions (Heale, R & Twycross, 2015).

- *Test-retest reliability*

Test-retest reliability was ensured by pre-testing the questionnaire and was considered reliable when measurements made under constant conditions give the same results. When conducting the pre-testing the questionnaire, the researcher discovered that options under some questions needed to be changed.

- *Parallel-forms Reliability*

Parallel-forms Reliability were achieved by ensuring that the questionnaire and questions used are consistent among all the respondents.

3.8.2 Validity

Validity was ensured by basing the questionnaire on current scientific knowledge regarding the research theme, obtained through literature review and present the questionnaire to some experts in the field to validate that it is accurate and representative. Validity is defined as the extent to which a concept is accurately measured in a quantitative study (Heale, R & Twycross, 2015).

- *Content validity*

To achieve content validity, the questionnaire included a variety of questions on the types of work and related work hazards that health workers are exposed to and works

awareness on the occupational hazards. The questionnaire was submitted to experts in quantitative research and occupational hazards to ensure content validity.

- *Face validity*

Face validity was ensured by making sure that the questionnaire appeared to measure what it was supposed to measure. The questionnaire consisted of questions that were relevant to the topic.

- *Criterion validity*

Criterion validity was ensured by comparing the data on the piloted questionnaire with what the researcher had observed in the hospital.

- *Construct validity*

The construct validity was ensured by making sure that the piloted questionnaire was given to a health worker for completion. It was also ensured by making sure that the results talk about occupational hazards and awareness. Construct validity refers to whether you can draw inferences about test scores related to the concept being studied (Heale & Twycross, 2015).

3.9 Bias

Sampling bias exists when a particular feature of an individual influences their participation or inclusion in a study (Stuber et al., 2013) The sampling bias was minimized by ensuring that the questionnaires was piloted, adjusted, and simplified so that respondents were more likely to participate. The researcher considered all the population at Letaba hospital to avoid bias.

3.10 Ethical considerations

3.10.1 Ethical clearance and permission

The researcher wrote and submitted the research proposal to the Faculty of Health Science, Department of Public Health and Senior Degrees Committee at the University of Limpopo for approval, after which it was presented to the Turfloop Research Ethics Committee (TREC) to obtain ethical clearance.

3.10.2 Informed consent

The respondents of the study were requested to sign consent forms before they start responding to the questionnaires. The respondents were informed before they started responding to the questionnaires that participation to the study was voluntarily and they could withdraw anytime if they felt that they could not continue. Respondents were also informed that they can complete the questionnaire on their own pace without hurry.

3.10.3 Protection from Harm

Questions that were likely to cause emotional harm were avoided in the questionnaire to ensure less risk of harm. Respondents could complete questionnaire in their own private and comfort place which avoided physical harm.

3.10.4 Confidentiality and Anonymity

The respondents were informed that the study would respect their confidentiality as well as their anonymity. The respondents' records were not stored for the purpose of the study. Each respondent was given a specific number which would be used to identify them during their participation in the study. The respondents were also informed that the study was only for academic purpose.

3.10.5 Protection from discomfort and harm

The study did not have any risk related to the physical harm of respondents. The questionnaire was designed to be completed between 40-60 minutes to avoid fatigue, headache, and muscle tension. This was based on the fact that a listening span for a human being is between 40-60 minutes.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

The previous chapter discussed the research methodology which consists of research design, study site, study population, sampling method, inclusion and exclusion criteria, data collection method, data analysis, validity and reliability and the ethical considerations.

This Chapter presents the results of the study and its discussion. The results are presented into four parts: demographic data, type of work and hazards exposed to, duration and frequency of exposure, and awareness on hazards.

4.2 Characteristics of respondents

4.2.1 Gender of respondents

The study consisted of 374 health workers, with female health workers being in the majority (66%) and only 34% were males as shown in table 4.1. The study shows that the Letaba hospital is dominated by female health care workers than men. The result also suggests that activities at Letaba Hospital attract female more than males.

Table 4.1: Respondents' gender

Gender	Frequency	Percentage %
Male	128	34
Female	246	66
Total	374	100

4.2.2 Age distribution of respondents

As shown in Table 4.2, the largest proportion of respondents (36%) fell into the age range of 31-40 years. There were only 21% of respondents aged 51 and above which is considered close to pension stage. Most health workers are in their early years of adulthood.

Most health care workers at Letaba Hospital are in their early years of adulthood. The lowest number of health care workers in terms of age are those aged 51 years and above.

Table 4.2: Age distribution of respondents

Age	Frequency	Percentage %
20-30	56	15
31-40	134	36
41-50	104	28
51 and above	80	21
Total	**374**	**100**

4.2.3 Educational level of respondents

Most respondents (54%) have degrees as their highest qualifications. Only a small percentage (13%) held master's degrees as highest qualification. A very few respondents (5%) held other qualifications such as matric and other certificates as shown in Figure 4.1

Most health care workers held a degree qualification, but only few held other qualifications such as matric and other certificates. The activities in Letaba Hospital are therefore carried out by health care workers who meet the minimum South African qualification requirements of a degree.

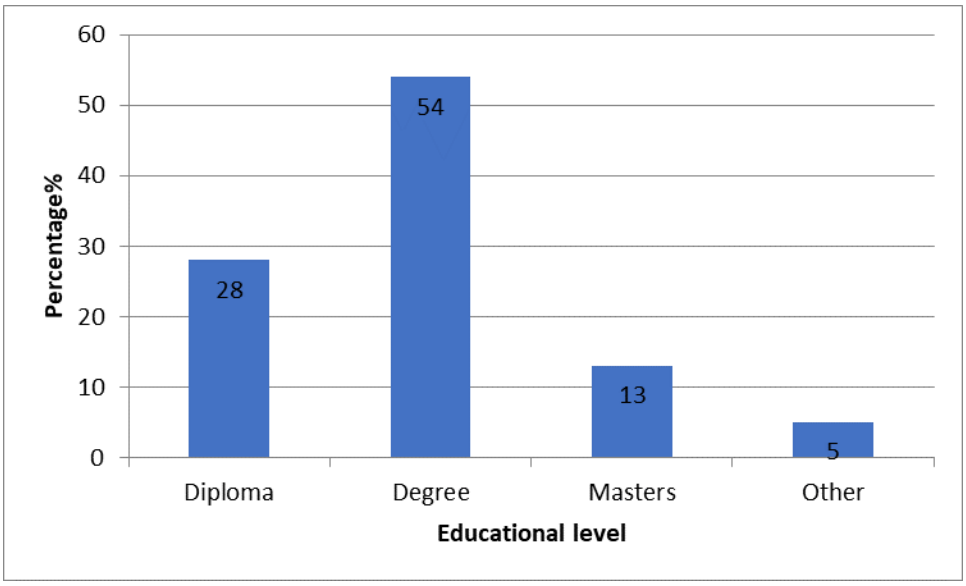

Figure 4.1 Educational levels of respondents

4.2.5 Occupational Rank

Most respondents (58%) in the study were professional nurses followed by doctors (16%). The rest of respondents were medical laboratory technicians, medical laboratory technologists, kitchen workers, cleaners, porters, and ward attendants as shown in Table 4.5 below. Most health workers at Letaba hospital are professional nurses.

These results suggest that most health care workers at Letaba Hospital are nurses who are also experienced and well-qualified. It can therefore be assumed that nurses are likely to provide good quality service if the necessary resources, such as equipment, are available to them.

Table 4.3: Occupational rank of respondents

Group	Frequency	Percentage %
Medical Officers	58	16
Professional nurses	217	58
Medical Laboratory Technicians	03	01
Medical Laboratory Technologists	04	01

Kitchen workers	27	07
Cleaners	12	03
Porters	14	04
Ward attendants	39	10
TOTAL	**374**	**100**

4.3 Type of work and hazards exposed to

4.3.1 Harzadous instruments used whilst working

The study investigated the types of hazards that the health workers are exposed to at Letaba hospital. Respondents were asked to state the type of instrumets they use while performing their daily duties. According to Table 4.8, the majority of professional nurses (N=144) who work in casualty, clinic and hospital wards reported being exposed to needles while giving injections to patients whereas doctors and professional nurses performing operations on patients are second highest (N=80) highest. Porters and Laboratory workers (N=54) reported being exposed to speciment containors. Kitchen workers, doctors and professional nurses who put blood into specimen (N=26) reported being exposed to sharps while performing operations on patients and when cutting food in the kitchen. Cleaners and porters pushing trollies reported no hazardous instruments while performing their duties.

The study shows that majority of doctors and professional nurses are exposed to needles and sharps, with professional nurses being the most exposed group; especially to needles. Exposure to needles and sharps may lead to injuries like skin punctures which can be stressful to them. The study also shows that professional nurses, doctors, porters, laboratory technicians and laboratory technologist are exposed to specimen containers, which places them at the risk of coming into contact with blood which can cause infectious diseases.

Kitchen workers are also exposed to sharps when cutting food in the kitchen. Sharp injuries can cause anxiety and distress and may result in exposure to bloodborne viruses (BBVs) such as HIV or hepatitis B or C. In addition, there is also a risk of other

infections such as tuberculosis, or organisms such as salmonella, or methicillin resistant Staphylococcus aureus (Naresh et al., 2018).

Table 4.4: Type of work and related hazards respondents are exposed to

Type of work	Related hazards	Workers exposed	Frequency
Performing Operations on patients	Sharps and needles	Professional nurses and Doctors	80 (21%)
Giving injections to patients	Needles only	Professional nurses	144 (39%)
Performing operations on patients.	Sharps only	Professional nurses and Doctors	26 (7%)
Putting blood into specimen, taking specimen to laboratory, and receiving specimen in laboratory	Specimen Containers	Professional nurses, Doctors, porters, Laboratory technician and laboratory technologists	54 (14%)
Cleaning and pushing trollies	None	Cleaners and porters	70 (19%)
Total			**374 (100%)**

4.3.2 Chemicals, related hazards and type of work that workers are exposed to

The chemicals, related hazards and type of work workers are exposed to at work are shown in Table 4.9. Most respondents (N=200); who are professional nurses, reported being exposed drugs as they give patients medication in the hospital wards and clinic. Laboratory technicians and professional nurses (N=54) reported exposure to chemicals, drugs and toxic gases while performing laboratory tests, operating the nitrous oxide, and giving patients medication. Laboratory technicians and cleaners (N=18) reported exposure to chemicals as they perform laboratory tests and cleaning.

The study shows that few (5%) cleaners and laboratory technicians, are exposed to chemicals which include cleaning chemicals and chemicals used at laboratory. Exposure to some chemicals may lead to damaged skin and eyes. Accidental

exposures to large concentrations can occur through spills or during mixing of incompatible chemicals and can lead to a damaged skin. According to the study conducted by Gorman, Dropkin, Kamen, Nimbalkar, Zuckerman, Lowe, Szeinuk, Milek, Piligian and Freund (2013) in New York, there are a variety of cleaning products that are used during hospital housekeeping activities on floors, windows, bathrooms, carpets, and other surfaces throughout the hospital and waiting areas. The study also shows that majority of respondents, being professional nurses are exposed to drugs whilst at work.

Table 4.5: Chemicals, related hazards and type of work workers are exposed to at work

Type of work	**Related hazards**	**Workers exposed**	**Frequency**
Performing laboratory tests, cleaning	Chemicals	Laboratory technicians and cleaners	18 (5%)
Feeding patients with medication	Drugs	Professional nurses	200 (53%)
Performing laboratory tests, operating the nitrous oxide, giving patients medication	Chemicals, Drugs and Toxic Gases	Laboratory technicians and professional nurses	60 (16 %)
Missing cases			96 (26%)
Total			**374 (100%)**

4.3.3 Body fluids respondents are exposed to whilst at work

According to Table 4.6, most respondents (N=164) who are doctors and professional nurses in the hospital wards, casualty and clinic are exposed to blood whilst performing operations on patients. Other respondents (N=56) reported that they are exposed to blood, sweat and saliva while performing operations, giving injections as well as bandaging patients.

Most doctors and professional nurses are exposed to blood, saliva and sweat when performing operations and giving injections to patients. Most of the psychiatric patients must be forcefully given injection which makes health workers to be exposed to sweat

and saliva when handling them. Health workers who encounter bodily fluids can be at a risk of infectious diseases. According to Yesilgulet al (2018), when the nurses' risk perceptions were analysed in dangerous situations, it was found that the first three dangers were ranked as blood, blood products and diseases contaminated with body fluids (HIV, hepatitis B and C). According to Walton and Rodgers (2017), nursing assistants who assist patients with the daily activities are also at a high risk of coming into contacts with patients' urine, faeces, sweat, and saliva as they assist with toileting, incontinence care, oral care, and bathing in different settings in their workplace.

Table 4.6: Body fluids respondents are exposed to whilst at work

Type of work	**Related hazards**	**Workers exposed**	**Frequency**
Performing Operations on patients	Blood	Professional nurses and Doctors	164 (44%)
Operation, sedating and bandaging	Blood, Saliva and Sweat	Professional nurses and Doctors	56 (15%)
Cooking and taking food to the wards	None	Kitchen workers	84 (22%)
Missing cases			70(19%)
Total			**374 (100%)**

4.3.4 Other hazards that respondents are exposed to whilst at work

Most respondents (N=203) which include workers from all professional categories are exposed to slippery floor walking from section to section and when walking patients to other professionals. The professional nurses (N=99) reported to be exposed to climbing stairs/steps while at work. A total of 44 porters are exposed to uneven floor when they are pushing trolley to and from the wards as indicated in Table 4.12.

The results of this study show that porters are exposed to uneven floors. Porters use trollies to take patients from one section to another, therefore they become exposed to

uneven floor which poses a risk of twisting ankles and falling which can affect their productivity at work. Professional nurses are exposed to climbing stairs/steps and slippery floors when taking patients from one section to another which puts them at the risk of falling. Falling on the steps can cause injuries which can affect the health worker's productivity at work. Porters and cleaners are exposed to both climbing stairs/steps, uneven floors, and slippery floors. According to laboratory technicians and laboratory technologists, they are not exposed to these hazards (uneven floor, climbing stirs/steps and slippery floors). The study conducted by Handsaker, Brown, Bowling, Cooper, Maganaris, Boulton, and Reeves (2014) explains why stair ascent and, particularly stair descent, are such hazardous everyday activities and therefore pose the highest risk for falls. Falls while walking downstairs account for 60% of all fall-related deaths, making this activity 10 times more hazardous than level-ground walking. Thus, the common daily task of negotiating stairs poses a high fall risk for people with diabetes and particularly those with peripheral neuropathy.

Table 4.7: Other hazards respondents are exposed to whilst at work

Type of work	Related hazards	Workers exposed	Frequency
Wheeling patients to other sections. Taking specimens to laboratory	Uneven floor	Porters	44 (12%)
Walking patients to other professionals	Climbing stairs/steps	Professional nurses	99 (26%)
Walking patients to other professionals	Slippery floor	Professional nurses	203 (54%)
Cleaning, pushing trollies, and taking specimen to laboratory	All of the above	Cleaners and porters	18 (5%)
Performing laboratory tests	None of the above	Laboratory Technicians and laboratory technologists	10 (3%)

Total	**374 (100%)**

4.5 Awareness on hazards

4.5.1 Physical hazards

4.5.1.1 Awareness on risk of using needles

Figure 4.2 illustrates the respondents' awareness on the risk of using needles. Most respondents (90%) are aware of the risk of using needles while few respondents (10%) are not aware of the risk of using needles while at work.

The results of this study indicate that most health workers are aware of the risk of using needles whilst at work. Health workers who are aware of the risk of using needles plan for safe handling and disposing of needles before starting a procedure. Health workers who are not aware of the risk of needle prick are likely to avoid/ignore taking possible actions after needle prick. All the workers reported to be aware of the risk of using sharps while at work.

Zhang, Gu, Cui, Stallones and Xiang (2015) explained that needlestick and sharps injuries are a major occupational injury to health care workers worldwide. Needlestick and sharps injuries are a major occupational hazard for health care workers worldwide. Needlestick injuries are the second most common occupational injury identified by the National Health Service (NHS), accounting for 17% of all injuries among health care workers.

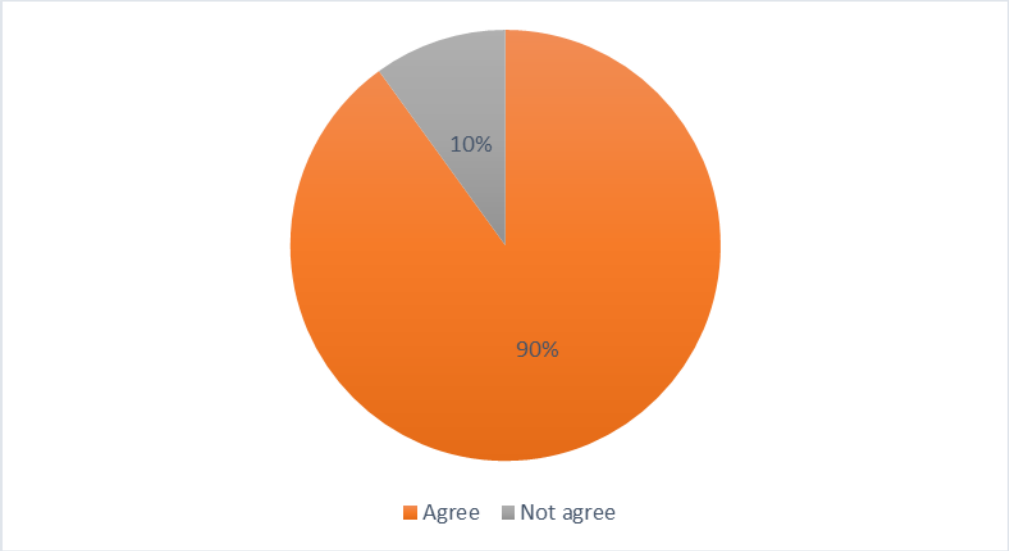

Figure 4.2 Awareness on risk of using needles

4.5.1.2 Awareness on risk of using sharps

Figure 4.3 below illustrates the respondents' awareness on the risk of using sharps. All the respondents (100 %) reported to be aware of the risk of using sharps while at work.

The study shows that all the health workers are aware of the risk of using sharps whilst at work. Health workers who are aware of the risk of using sharps whilst at work practice safe using with the aim of avoiding injuries. Sharp injuries may result in blood-borne pathogens which can be transmitted following an injury. According to the study conducted by Honda, Chompikul, Rattanapan, Wood, and Klungboonkrong (2011), regarding the prevalence of sharp injuries during the 12 months period of the study, 55.5% of the nurses had experience of at least one episode of sharp injuries. Health workers who experience sharp injuries may have to undergo a testing for diseases. According to Adam (2012), the psychological effect of sharp injury on healthcare profession can be significant. The individual may find waiting for test results particularly distressing.

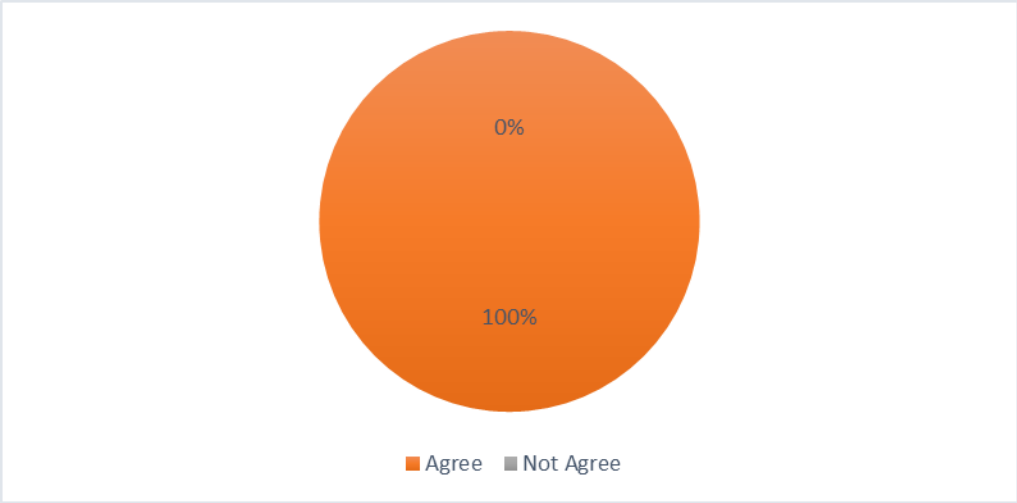

Figure 4.3 Awareness on risk of using sharps

4.5.1.3 Awareness on the risks of slippery/uneven surfaces at work

The respondents' awareness on the risk of slippery/uneven surfaces at work is presented on Figure 4.4 below. Most respondents (97%) are aware of the risk of slippery/uneven surfaces at work while few respondents (3%) are not aware of the risk of slippery/uneven surfaces at work.

Most of the health workers are aware of the risk of using slippery/uneven floors while at work. Slippery and uneven floors pose a risk of falling or twisting legs while moving around from one section to another. Falling while at work can lead to more reported cases of injury on duty. Injured health workers may take sick leaves and be absent from work, which affects the provision of health services. National injury data show that nursing care facility employees are at particularly high risk of a slip, trip, and fall injury resulting in days lost from work when their rates are compared to rates found in all private industry (Bureau of Labour Statistics, 2011).

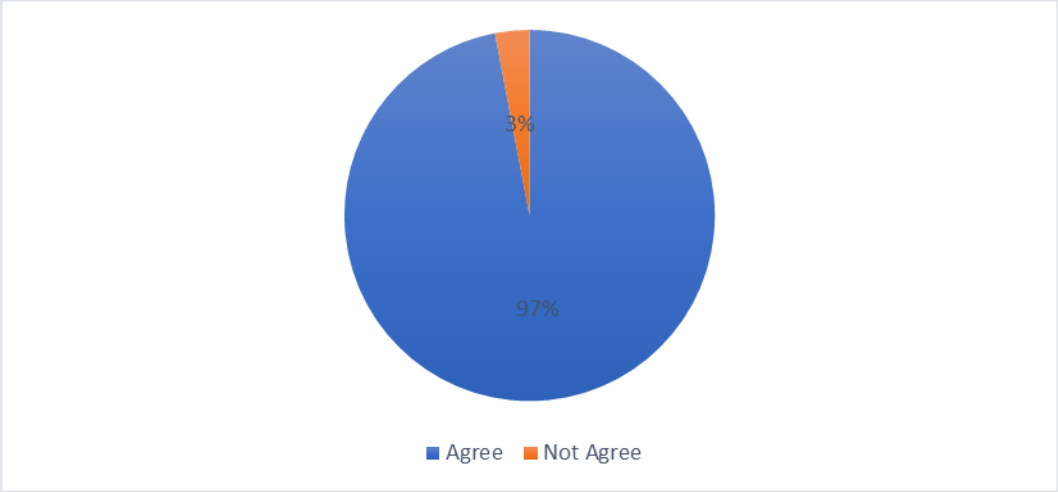

Figure 4.4 Awareness on the risk of slippery/uneven surfaces at work

4.5.1.4 Awareness on the risks of climbing stairs/steps at work

Figure 4.5 below illustrates the respondents' awareness on the risk of climbing stairs/steps at work. All (100%) the respondents reported to be aware of the risk of climbing stairs/steps while at work.

The study shows that all health workers are aware of the risk of climbing stairs/steps while at work. Awareness to risk of stairs/steps reduces the risk of falling and twisting of ankles when utilizing stairs/steps at the workplace. Falling and twisting of ankles may result in long time injuries which may affect services delivery. An injured health worker may have to take a leave of absence from work which opens a gab in service delivery. Health workers use stairs/steps when they move from one section of the hospital to the other. According to Danielsen, Olofsen, and Bremdal (2016), near falls or missteps are initiated by an initial or sudden loss of balance, but do not escalate to a fall due to the individual's ability to regain balance. The fall might have the effect that the individual in question is unable to raise up again in which case the system should signal for assistance.

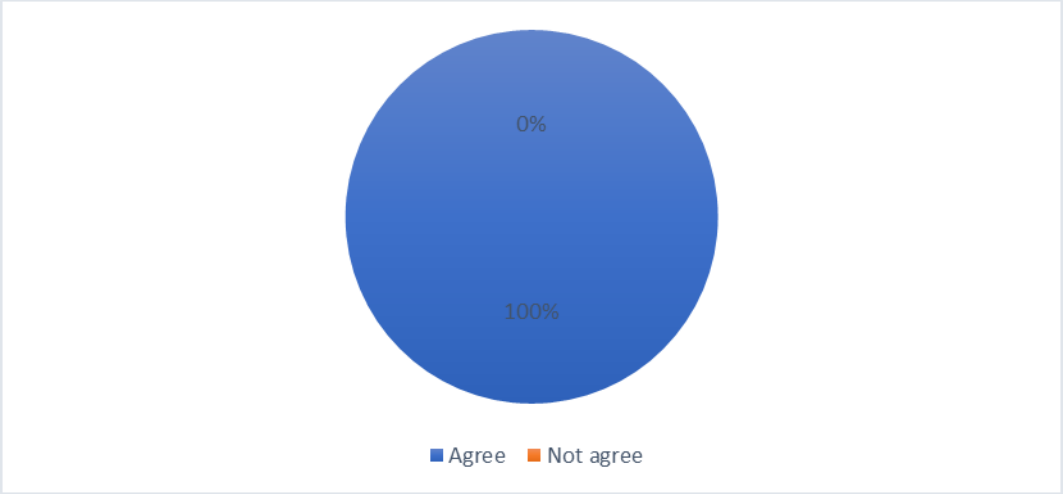

Figure 4.5 Awareness on the risks of climbing stairs/steps at work

4.5.2 Chemical hazards

4.5.2.3 Awareness on using chemicals according to MSDS

The figure 4.4 below shows the respondents' awareness on using the chemicals at their workplace according to the MSDS. Most respondents (83%) are aware of how to use chemicals according to the MSDS while few respondents (17%) are not aware of how to use chemicals at work according to the MSDS.

Most health workers are aware of how to use chemicals according to MSDS. Among the few health workers who do not know how to use chemicals according to MSDS, some use chemicals in their daily working activities, e.g., cleaners. It can be a risk for a health worker to use a chemical without having gone through the MSDS. Misuse of chemicals can lead to skin exposure which can sensitise, irritate, or burn the skin. The MSDS is a useful source of information for the health worker who is called on to treat a patient with exposure to hazardous chemicals. According to Suleiman and Svendsen (2014), inadequate information and risk assessment concerning the products can lead to workers being exposed to hazardous chemicals. As professional cleaners represent a large workforce, and cleaning products are widely used, it is a major public health issue to better understand these exposures (Gerster, Vernez, Wild & Hopf, 2014).

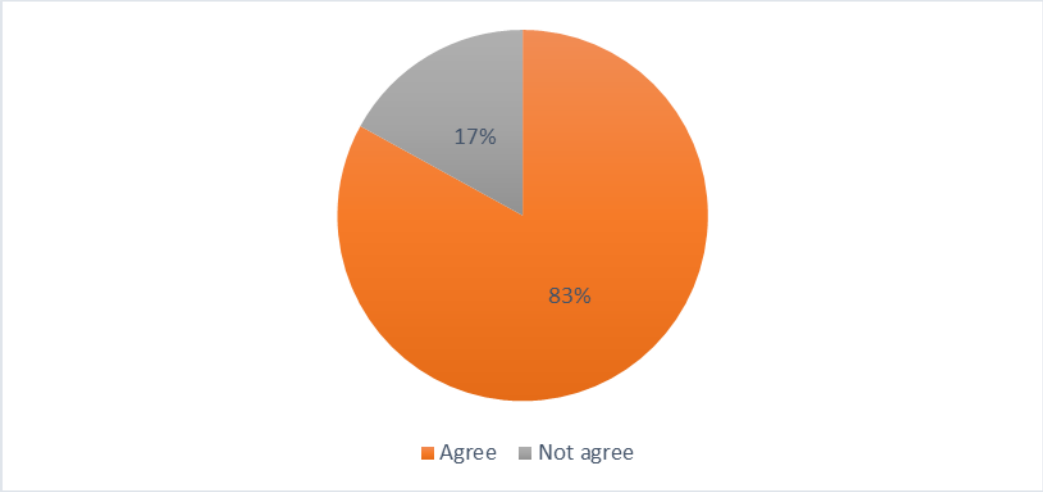

Figure 4.4 Awareness on using chemicals according to MSDS

4.5.2.4 Awareness on toxic gases used at work

The Figure 4.5 below shows the respondents' awareness on the toxic gases available at their workplace. The results show that most of the respondents (80%) are not aware of the toxic gases that are available at their workplace while few respondents (20%) are aware of the toxic gases that are available at their workplace.

The study shows that majority of health workers are not aware of the toxic gases that are available at their workplace which put them in a risk of utilizing toxic gases without knowledge. Toxic exposures are most likely to occur via inhalation, direct contact with the skin or eyes, and/or ingestion, for which inhalation with associated fatalities is the most reported (Gorguner & Akgun, 2010). Exposed health workers might not be able to render health services until they receive medical attention, and this may result in gab in service delivery. Liu, Song, Hu, Yan, and Zhu, (2019) Identified surgical smoke as one of the toxic gases present in an operating room, which is the gaseous by-product produced by heat generating devices in various surgical operations. There are many disadvantages of surgical smoke, such as hindering the vision of the surgeon, producing an unpleasant odour, and releasing hazardous chemicals that include mutagens and carcinogens into the environment of operating room.

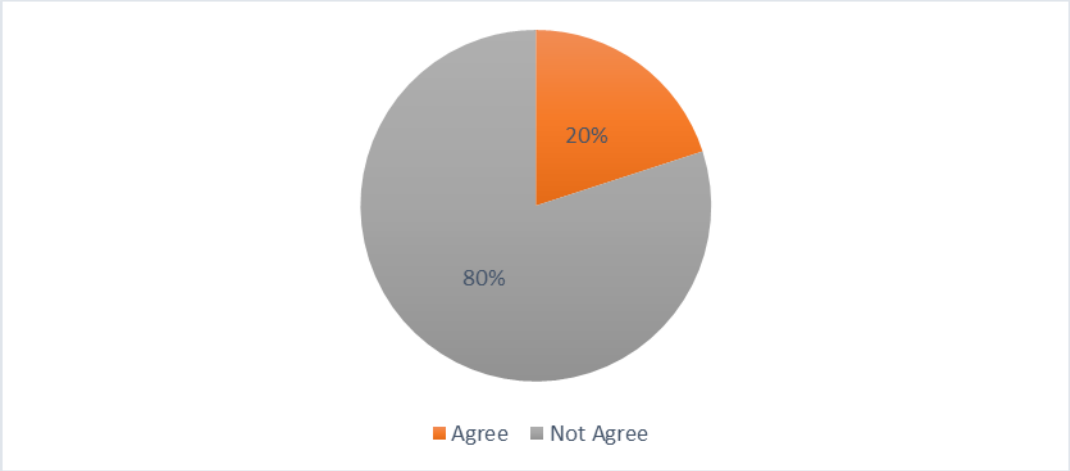

Figure 4.5 Awareness on toxic gases used at work

4.5.3 Biological hazards

4.5.3.1 Awareness on the risk of coming into contact with bodily fluids

Figure 4.7 below illustrates the respondents' awareness on the risk of encountering bodily fluids while at work. Most respondents (97%) are aware of the risk of encountering bodily fluids while at work while few respondents (3%) are not aware of the risk of coming into contact with bodily fluids while at work.

Most health workers in the study are aware of the risk of encountering bodily fluids. Encountering bodily fluids can result in a risk of getting infectious diseases. Being exposed to a patient's blood can be stressful to a health worker, more especially when the status of HIV and other diseases are not known.

According to Naresh et al (2018), biological hazards are infectious agents transmitted to others via contact with infectious patients or their bodily fluids (e.g., bacteria, viruses, and fungi). The study conducted by Nwankwo, Karanja and Vasanthakaalam (2018) in Rwanda indicated that findings from some studies on different cadres of health care workers showed higher prevalence of exposure to blood or other body fluids. Common influencing factors include, personal behavioural factors, environmental and organizational managerial factors.

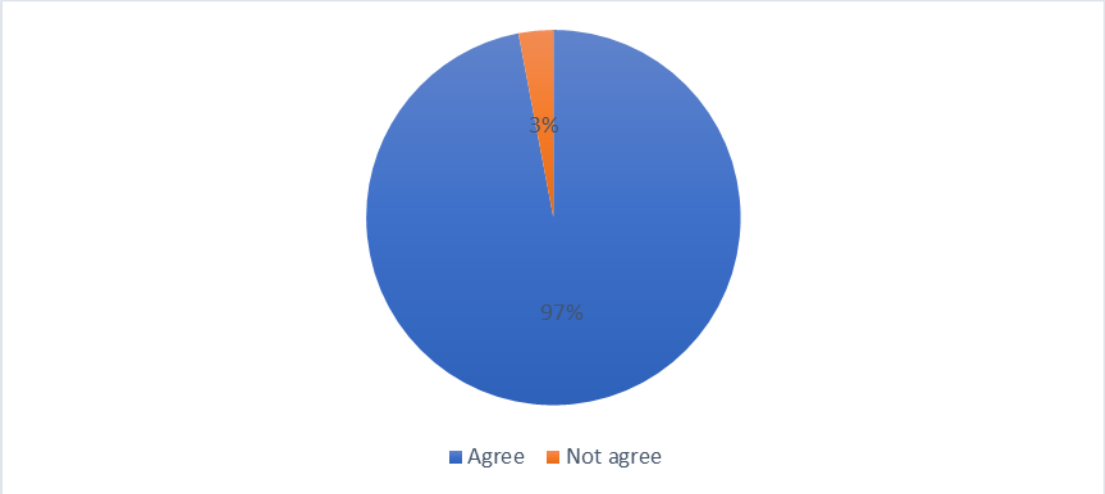

Figure 4.7 Awareness on the risk of coming into contact with bodily fluids

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The previous chapter focused on the presentation and interpretation of the study findings. This chapter provides the summary of findings, conclusion, limitation, and recommendations.

5.2 Aim of the study

The aim of the study is to identify the occupational hazard exposure amongst health workers at Letaba Hospital. The results of this study showed that this aim was achieved, as indicated in chapter four of this study.

5.3 Objectives of the study

- To identify the type of work and related hazards that health workers are exposed to at Letaba Hospital. The results from this study showed that the main occupational physical hazard among health workers at Letaba Hospital include injuries caused by needle prick, using sharps, slippery/uneven surfaces and climbing stairs/steps. Chemical hazards include chemicals used by cleaners and laboratory technicians and the drugs used by professional nurses. The biological hazards include splash of blood and saliva from patients

- To find out if health workers at Letaba Hospital are aware of the occupational hazards at the workplace. The results of this study show that majority of the respondents are aware of the risk of using needles and walking on slippery/uneven surfaces at work. All the workers are aware of the risk or sing sharps as well as that of climbing stairs/steps at work. Most respondents are not aware of the risk of using toxic gases at work.

5.4 Summary

The study focused on physical hazards, biological hazards, and chemical hazards. The structured questionnaires which consisted of closed-ended questions were self-administered to the health workers. The results of the study indicated that the main occupational physical hazard exposure among health workers at Letaba hospital include needles and sharps, with professional nurses more exposed to needles. Most of health care workers are aware of the risk of using needles and sharps

The result of the study shows that health care workers, particularly nurses and medical doctors, in the wards, casualty and clinic are exposed to body fluids. Nurses are reported to highly exposed to drugs on their daily activities when feeding patients with medication.it is also reported that porters, cleaners, nurses, laboratory technicians and laboratory technologies are also exposed to uneven floors, climbing stairs/steps, and slippery floors. Laboratory workers are also reported to be more exposed to specimen containers which contain patient's blood.

Health workers at Letaba Hospital lack knowledge on the toxic gases available at their workplace. However, they are aware of the risk of using toxic gases whilst at work. The study shows that health workers are aware of using chemicals according to the MSDS. The results of the study also indicated that majority of health workers are aware of the risk of encountering bodily fluids whilst at work. The study made recommendations to the hospital and to the future researchers which need to be addressed.

5.5 Conclusion

Chapter five discussed the summary of the study, the review of objectives and their achievements, the limitations, and recommendations of the study.

5.6 Recommendations

This study makes the following recommendations:

5.6.1 Recommendations for practice

The study results showed that doctors and nurses experience injuries and exposure to blood during patients' operation and when using injections. The splash of blood and injuries can also be stressful to health workers; therefore, the hospital should develop efficient strategies to protect workers from occupational exposure to blood and other bodily fluids. The study also recommends a point person to be available in each department to be contacted immediately when an incident occurs.

5.6.2 Recommendations for management

The hospital management should make available adequate resources to render and up-to-date educational training for all the health workers on occupational hazards available on their respective workstations more specially about the toxic gases as majority of health workers lack knowledge on the toxic gases available at the hospital. It is important for all the health workers to be aware of the occupational hazards available at their workplace.

5.6.3 Recommendation for education and training

The education and training universities should include contribute to training of employees in hospitals by establishing workshops that will collaborate with the relevant departments.

5.6.4 Recommendations for research

Further, research should be conducted in other hospitals in Limpopo regarding occupational hazards exposure amongst health workers which should also include pharmacy workers who deal with drugs.

5.7 Limitation of the study

- Some of the respondents who are exposed to drugs as health workers in the hospital are pharmacy workers and they were not included in the study.

- Some respondents completed their questionnaires in the presence of the researcher which might have made them to give answers uncomfortably.

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Appendix 1: Questionnaire for Health Workers

Occupational Hazard Exposure Amongst Health Workers at Letaba Hospital, Mopani District, Limpopo Province.

INSTRUCTIONS

- Answer all questions
- Mark the most relevant answer with a tick

SECTION A: DEMOGRAPHIC DATA

1. Gender

    1. Male [ ]

    2. Female [ ]

2. Age_____ years

3. What is your maximum educational level?

    1. Diploma [ ]
    2. Bachelor's Degree [ ]
    3. Master's Degree [ ]
    4. Other (specify) _____ [ ]

4. Marital status
    1. Married [ ]
    2. Never married [ ]
    3. Divorced [ ]
    4. Widowed [ ]

5. Occupational rank?
    1. Nurse [ ]
    2. Doctor [ ]
    3. Medical Technologist [ ]
    4. Medical Technician [ ]
    5. Porter [ ]

6. Ward Attendant [ ]
7. Cleaner [ ]
8. Kitchen Worker [ ]

6. How long have you been working at Letaba? _____

SECTION B:

TYPE OF WORK AND HAZARDS EXPOSED TO

1. Which section of the hospital are you working at?
    1. Medical Laboratory [ ]
    2. Clinic [ ]
    3. Hospital ward [ ]
    4. Casualty [ ]
    5. Kitchen [ ]
    6. Mortuary [ ]
2. Which instruments do you use whilst working?
    1. Needles and sharps [ ]
    2. Needles only [ ]
    3. Sharps only [ ]
    4. Specimen containers [ ]
    5. None [ ]
3. Which chemical substances do you use whilst working?
    1. Chemical [ ]
    2. Drugs [ ]
    3. Toxic gases [ ]
    4. Chemicals, drugs and toxic gases [ ]
    5. None
4. Which body fluids are you exposed to whilst working?
    1. Blood [ ]
    2. Saliva [ ]

3. Sweat [ ]

4. Blood, Saliva and Sweat [ ]

5. None [ ]

5. Which of the following are you exposed to whilst working?

1. Noise [ ]

2. Heat [ ]

3. Too much light [ ]

4. Freezing/cold area [ ]

5. None of the above [ ]

6. Which of the following are you exposed to whilst working?

1. Uneven Floor [ ]

2. Climbing stairs/steps [ ]

3. Slippery floor [ ]

4. All of the above [ ]

5. None [ ]

DURATION AND FREQUENCY OF EXPOSURE

1. How long and how many times are you exposed to noise?

a). Whole day weekly [ ]

b). Whole day less than a week [ ]

c). Half day weekly [ ]

d). Half a day less than a week [ ]

2. How often are you exposed to body fluids?

a). Whole day weekly [ ]

b). Whole day less than a week [ ]

c). Half a day weekly [ ]

d). Half a day less than a week [ ]

3. How often are you exposed to heat at work?

a). Whole day weekly [ ]

b). Whole day less than a week [ ]

c). Half a day weekly [ ]

d). Half a day less than a week [ ]

4. How often are you exposed to cold temperature at work?

a). Whole day weekly [ ]

b). Whole day less than a week [ ]

c). Half a day weekly [ ]

d). Half a day less than a week [ ]

5. How often do you walk on slippery floors at work?

a). Whole day weekly [ ]

b). Whole day less than a week [ ]

c). Half a day weekly [ ]

d). Half a day less than a week [ ]

6. How often do you walk on uneven floors at work?

a). Whole day weekly [ ]

b). Whole day less than a week [ ]

c). Half a day weekly [ ]

d). Half a day less than a week [ ]

7. How often do you climb stairs/steps at work?

a). Whole day weekly [ ]

b). Whole day less than a week [ ]

c). Half a day weekly [ ]

d). Half a day less than a week [ ]

8. How often do you bend and twist whilst working?

a). Whole day weekly [ ]

b). Whole day less than a week [ ]

c). Half a day weekly [ ]

d). Half a day less than a week [ ]

SECTION C

AWARENESS ON HAZARDS

No	Questions	Answers			
		Strongly Agree	Agree	Not agree	Strongly not agree
1	I am aware of the level of noise at my workplace!				
2	I am aware of the risks of using needles!				
3	I am aware of the risks of using sharps!				
4	I am aware of how to use chemicals at work according to MSDS!				
5	I am aware of the toxic gases we use at work!				
6	I am aware of the risks of using toxic gases at work!				
7	I am aware of the risks of coming into contact with bodily fluids at work!				
8	I am aware of the risks of using slipper/uneven surfaces at work!				
9	I am aware of the risks of climbing stairs/steps at work!				
10	I am aware of the risks related to heat exposure at work!				

Appendix 2: Request to collect data at the Department of Health

Box 6301
Giyani
0826
02 May 2019

The Head of Department
Limpopo Department of Health
Private Bag X9302,
POLOKWANE
0700

Re: Request to conduct research on Occupational Hazard exposure Amongst Health workers at Letaba Hospital

My name is CYRIA NYAMBI, a Public Health Masters student at the University of Limpopo (Turfloop Campus). I am conducting a study on Occupational Hazard Exposure amongst Health Workers at Letaba Hospital.

I hereby apply to be granted permission to conduct this research at Letaba Hospital under the Department of Health. To ensure confidentiality, privacy and anonymity of the participants there will be no names and identities provided. Anonymity and confidentiality will be ensured by providing neither the names nor the identifying information of the participants in the research project.

The method of data collection to be used is semi structured questionnaire and will consist of types of hazards exposed to, the frequency and awareness to hazards.

Yours faithfully

_____ Date_____
Mr. Nyambi C
(Masters Student)

_____ Date_____
Mr. Kekana M.P
(Supervisor)

Appendix 3: Time frame

February 2019	Research proposal writing
April 2019	Submission to supervisors and presentation
June 2019	Submission to University of Limpopo School of Health care Sciences Research Committee
July 2019	Final proposal submitted with all corrections made Submission to SREC
July 2019	Final proposal submitted with all corrections made Submission to TREC
Sept 2019	Submission to Limpopo Department of Health
Sept 2019	Data collection
Oct 2019	Data Analysis
Oct 2019	Writing research report
Nov 2019	Submission to supervisor

Appendix 4: Budget

ITEM	COSTS
Telephone cost	R 400
Travelling	R 2500
Accessing literature	R300
Printing of questionnaires	R250
Language editing	R1 500
Printing: 4 copies at R180-00 each	R 720
Binding:4 copies at R60-00 each	R 240
Total costs	**R5910**

Appendix 5: Consent Form

PART A:
Informed consent

Participant consent form

(For each participant, please read and understand the document before signing)

Research title: Occupational Hazard Exposure Amongst Health Workers at Letaba Hospital, Mopani District, Limpopo Province

Introduction

This is an invitation to participate in the study as a volunteer. This is to help you decide if you would like to participate and should there be any questions, please feel free to ask the researcher.

The purpose of the study

The purpose of the study is to identify the occupational hazard exposure amongst health workers at Letaba Hospital, Mopani, Limpopo.

The sample of this study will be selected from Health Workers at Letaba Hospital

Before the study you will need to complete:

- This consent form and
- Short biographical information request

During the study you are free to withdraw from the study without giving a reason, and that participation is voluntary.

The aim of the study is to identify the occupational hazard exposure amongst health workers at Letaba Hospital, Mopani, Limpopo.

The study will take 2 months to complete.

Has the study received ethical approval?

This study will commence upon approval from the Turfloop Research Ethics Committee and Limpopo Department of Health.

Rights of participants of the study

Participation is voluntary and you have a right to refuse participation in the study. Refusal to participate will not in any way influence any future relationships with the Department or the interviewer.

Are there any risks

There are no risks attached.

Discontinuation of participants in the study

No pressure will be exerted on the participant to consent to participate in the study and the participant may withdraw at any stage without penalization.

Any financial arrangements

There are no financial resources that participants can benefit from the study, and the researcher is not going to receive any incentives.

Confidentiality

All information provided to the research team will be treated as confidential.

PART B:

Informed consent form to be signed by the participants

I hereby confirm that I have been informed by the investigator, **Nyambi Cyria,** about the nature, conduct, benefits, and risks of this study. I have also read the above information regarding this study.

I may withdraw my consent as well as my participation in the study and declare that I had enough opportunity to ask questions and therefore declare myself prepared to participate in the study.

Participant Name _____

Participant signature _____

Date _____

Investigator's name _____

Investigator's signature _____

Date _____

I, Nyambi Cyria, herewith confirm that the above participant has been informed fully about the nature of the study.

Witness name _____

Witness signature _____ **Date** _____

Appendix 6: Ethics clearance Certificate

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 3935, Fax: (015) 268 2306, Email: anastasia.ngobe@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE

ETHICS CLEARANCE CERTIFICATE

MEETING: 05 November 2019

PROJECT NUMBER: TREC/481/2019: PG

PROJECT:

Title:	Occupational Hazard Exposure Amongst Health Workers at Letaba Hospital, Mopani District, Limpopo Province.
Researcher:	C Nyambi
Supervisor:	Mr MP Kekana
Co-Supervisor/s:	N/A
School:	Health Care Sciences
Degree:	Master of Public Health

PP. [signature]
PROF P MASOKO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:

i) **This Ethics Clearance Certificate will be valid for one (1) year, as from the abovementioned date. Application for annual renewal (or annual review) need to be received by TREC one month before lapse of this period.**

ii) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee, together with the Application for Amendment form.**

iii) **PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.**

Finding solutions for Africa

Appendix 7: Permission to conduct research in department facilities

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

Department of Health

Ref : LP – 2019-12- 001
Enquires : Ms PF Mahlokwane
Tel : 015-293 6028
Email : Kurhula.Hlomane@dhsd.limpopo.gov.za

Nyambi C

PERMISSION TO CONDUCT RESEARCH IN DEPARTMENTAL FACILITIES

Your Study Topic as indicated below;

Occupational Hazard Exposure amongst health workers at Letaba Hospital, Mopani District, Limpopo Province.

1. Permission to conduct research study as per your research proposal is hereby Granted.
2. Kindly note the following:
   a. Present this letter of permission to the institution supervisor/s a week before the study is conducted.
   b. In the course of your study, there should be no action that disrupts the routine services, or incur any cost on the Department.
   c. After completion of study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
   d. The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
   e. The approval is only valid for a 1-year period.
   f. If the proposal has been amended, a new approval should be sought from the Department of Health
   g. Kindly note that, the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated

Head of Department **Date** 10/02/2020

Private Bag X9302 Polokwane
Fidel Castro Ruz House, 18 College Street. Polokwane 0700. Tel: 015 293 6000/12. Fax: 015 293 6211.
Website: http/www.limpopo.gov.za

The heartland of Southern Africa – Development is about people!

Appendix 8: Editor's letter

onpoint
Language Solutions

0832561666 | 0724522222
emmanuelsikitime@gmail.com
Makwarela Stand 3151
P.O Box 632 Sibasa, 0970

Proof reading | Editing | Copy writing

This serves to confirm that I, Mr. ET Sikitime, attached to onpoint language solutions have proofread a mini dissertation titled: OCCUPATIONAL HAZARD EXPOSURE AMONGST HEALTH WORKERS AT LETABA HOSPITAL, MOPANI DISTRICT, LIMPOPO PROVINCE.

BY

NYAMBI C

[redacted]

Editorial work focused mainly on technical precision and common errors relating to syntax, diction, word order and formulation of ideas. Corrections and suggestions were made for the student to effect before submission.

Signature

Date 5/12/2020

Ext: 015 962 8288
Email: Emmanuel.sikitime@univen.ac.za
BA (ed), BA (Hons) English, Univen, BA Communication Science UNISA, MA (SLS) Stellenbosch University, PhD Candidate (Univen)

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