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FACTORS INFLUENCING OCCUPATIONAL HEALTH AND SAFETY PRACTICES AMONG FARM WORKERS AT THE UNIVERSITY OF VENDA FARM

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A mini-dissertation submitted in partial fulfillment of the requirement for the degree:

Masters of Public Health (MPH)

UNIVERSITY OF VENDA

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February 2016



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DECLARATION

I, Gamuchirai Rumbidzai Mtengwa, hereby declare that this mini-dissertation for the Master of Public Health at the University of Venda, submitted by me, has not been submitted previously for a degree at this or any other academic institution, and that it is my own work in design and in execution, and that all reference materials contained herein have been duly acknowledged.

Student.....Mtengwa..... **Date**..20 APRIL 2016.....

G R Mtengwa

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ACKNOWLEDGEMENTS

During the course of the project, a number of people made important contributions through advice and encouragement. My first and foremost thanks go to Professor H.A. Akinsola and Dr. A. K Tugli for supervising my studies. I express my sincerest appreciation to them for providing their maximum cooperation in attending to all questions and facilitating my research. Their willingness to provide and share their experiences in the field of Public Health is greatly appreciated. Without their assistance this study would not have been possible.

I gratefully acknowledge the effort of my respectable and humble sister, Miss O.R.S Mtengwa for her tireless efforts and guidance from the inception of this project up to its completion. Her patience and constructive source of ideas kept alive my motivation and made the completion of this project possible. I would also like to thank Mr. K. Benyi and Mr. E.I. Kehinde for their ideas, moral and technical support. I thank my mother Ms. S.N. Mtengwa and my late father Mr. T.T. Mtengwa for teaching me self-discipline, love, encouragement and their support since birth. Last but not least, I thank my Heavenly Father for giving me spiritual strength, courage, guidance and commitment to do this work. He made it possible for things to happen.

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DEDICATION

I dedicate this mini-dissertation to my late father, Mr Timothy T. Mtengwa.

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LIST OF ACRONYMS

IARC- International Agency for Research on Cancer

ILO- International Labour Organization

OHS- Occupational Health and Safety

PPE- Personal protective equipment

UNEP- United Nations Environmental Programme

WHO- World Health Organization

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ABSTRACT

Background: Agriculture ranks among the most dangerous trades worldwide, with fatal and non-fatal injuries. Farm workers are exposed to hazards ranging from chemical, physical, ergonomic, biological to psychosocial hazards, which lead to disorders like psychiatric disorders and musculoskeletal disorders.

Purpose: The purpose of the study was to explore and explain factors which influence occupational health and safety practices among farm workers at the University of Venda farm.

Methodology: Data were collected from a total population of 11 farm workers at the University of Venda farm. In-depth interviews were conducted through the use of an unstructured interview guide. A voice recorder was utilised to capture all the information given by the participants. Observed actions and non-verbal communication were noted in writing. Data were analysed in narrative form.

Results: The findings of the research revealed that personal, environmental and operational factors influence occupational health and safety practices among farm workers. A lack of work ethics and non-compliance, negative attitudes and behaviour towards rules and regulation, heat stress experienced by farm workers and regular inspections and monitoring were among the factors found.

Conclusion: At the University of Venda farm, unavailability of protective equipment is not the major reason for not following regulations of health and safety in the work place. The working environment, personal and organisational factors influence knowledge, behaviour and application of health and safety measures.

Keywords: Agriculture, factors, farm worker, occupational health and safety practices

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CHAPTER 1: INTRODUCTION

1.1 Background of the study

Contrary to the popular image of fresh air and serene atmospheres, a farm is not a hazard-free work environment. Every year thousands of farm workers are injured and hundreds more die in farming accidents. Agricultural work is among the most hazardous occupations as it ranks among the top jobs in the work injury statistics in the United States. Occupational injuries in the agricultural sector have been reported to be higher than the average accident rate in all other industries taken together (Jung, Kim, Leem, Park, Lee, Lee & Kim, 2011). About 170 000 farm workers are killed each year and millions more are seriously injured in workplace accidents (Rhee, Choe & Kim, 2013; Lower, Frager & Temperley, 2011).

Farm workers are exposed to hazards ranging from; chemical, physical, ergonomic, biological to psychosocial hazards, which lead to disorders and diseases like carcinogenicity (cancer causing), mutagenicity (induce mutations), tetragenicity (affect the feotus), psychiatric disorders and musculoskeletal disorders (El Batami, 2003). In several European countries and the United States, the fatal accident rate in agriculture is double or more than double, the average for all other industries (Forastieri, 2001). In Austria, in the year 2013, 920 accidents per 100 000 employees occurred in the entire agricultural sector, with 14 per 100 000 of them being fatal (Sozial Versicherungsanstal der Bauern, 2013). Proper machine guarding and equipment maintenance according to manufacturer's recommendations can help prevent accidents. In Argentina, agriculture has one of the highest injury rates of all industries, with an incidence rate of 96.3 farm injuries per 1000 injuries recorded in 2012 (Molineri et al., 2015).

According to the South African Compensation commissioner's annual report on occupational accidents (2012), Gauteng had a 32% rate, Western Cape had 21% and KwaZulu-Natal had 19% and these provinces being the most industrialised, and they account for more than 70% of all reported cases. More than 80% of injuries affected men and more than 80% of the cases reported were from urban areas (Jeebhay, 1999). In South Africa, relatively little data is available on farm worker injuries. Although it is recognised that agriculture is one of the major sectors

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contributing to a high fatality rate (Agriculture contributed 16% of fatal occupational injuries in 1994, second only to the transport sector (Jeebhay & Jacobs, 1999).

The World Health Organization (WHO) reports indicate that globally occupational risks account for a number of morbidity conditions including 37% of back pains, 16% of hearing loss, 13% of chronic obstructive lung disease, 11% of asthma, 10% of injuries and 9% of lung cancer. According to the report, mortality is also due to work related injuries causing nearly 310 000 deaths every year, and nearly 146 000 deaths are attributed to work related carcinogens (WHO, 2005).

In the year 2000, in Australia, there were 139 039 non-fatal and 262 fatal work-related incidents that attracted workers' compensation (National Occupational Health and Safety Commission, 2004). In the United States, 500 000 workers are injured on the job, 150 000 of whom suffer permanent work-related disabilities, including maiming, paralysis, impaired vision, damaged hearing and sterility, 100 000 become seriously ill from work-related diseases including black lung, brown lung, cancer and tuberculosis, 14 000 are killed on the job, and 100 000 die prematurely from work-related diseases (Parenti, 1992). In Sweden, 300 workers die each year from work related causes, and 120 000 are hurt at work (The Swedish Institute, 2000).

Occupational health and safety in these countries is taken very seriously, innovative approaches to work place health and safety have been developed. The workplace innovations include aspects of management (absorption of external knowledge), flexible organisation, working smarter, continuous development of skills and competences, networking between organisations and the modernisation of labour relations (including human resource management) and industrial relations (Pot, 2011; Totterdill, 2010; Totterdill et al., 2009). These aspects help lower stress risks, achieve high job autonomy, lower physical workload and help in the continuous development of competences and better labour relations (Pot, 2011; Ramstad, 2009; Westgaard & Winkel, 2011).

The use of protective gear, such as seat belts on tractors and personal protective equipment such as safety gloves, overalls, gumboots, sunhats, aprons, safety glasses and goggles, as well as face guards, could significantly reduce farming injuries. Better safety and health practices reduce

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worker fatalities, injuries, and illnesses, as well as associated costs such as workers' compensation insurance premiums, lost production, and medical expenses (Jeebay, 1999).

A safer and healthier workplace improves morale and productivity. An increase in awareness among farm workers of farming hazards and making a mindful effort to prepare for emergency situations; such as fires, vehicle accidents, electrical shocks from equipment and wires and chemical exposures would go a long way in reducing farm hazards. Minimising hazards can also be done through carefully using agricultural chemicals, as well as tools and equipment in order to maintain good housekeeping practices (Varatuceanu, 2014).

1.2 Problem Statement

The idea behind this study came as a result of an observation by the researcher while carrying out research at the University of Venda farm. The researcher observed how farm workers practised little or no occupational health and safety measures. Workers were weeding in the scotching sun without any head gear or sun hats to cover their heads and faces. The researcher asked herself if they knew the risks associated with working in such conditions. This motivated the researcher to conduct this study. The researcher observed that the farm workers were working in ordinary clothes which were not protective in the researchers' opinion. The South African Occupational Health and Safety Act of 1993 section 4 (South Africa, 2004) stipulates the use of personal protective equipment issued by the employer under certain conditions. Farm workers are at high risk of fatal and nonfatal injuries, work related diseases, incorrect handling of pesticides and other chemicals, and this can lead to chemical burns and scabs, noise-induced hearing loss from the operation of machinery, skin diseases and certain cancers associated with chemical use and prolonged sun exposure. This therefore prompted the researcher to find out how occupational health and safety practices are being practiced at the University of Venda farm, what influences occupational health and safety practices, and if these are being practiced at all. According the International Labour Organization (ILO, 2009), the widespread under-reporting of deaths, injuries and occupational diseases in the farming sector means that the real picture of the occupational health and safety issues for farm workers is likely to be worse than that indicated in official statistics.

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1.3 Rationale of the Study

A number of studies have been done on occupational health and safety among construction workers and mine workers, but more still has to be done on farm workers (Hermanus, 2007; ILO, 2003). A similar study was done by Nkuna (2012), and the study evaluated the level of awareness about occupational health and safety practices among workers at the University of Venda. What makes this current study different from Nkuna's (2012) is that it focuses specifically on farm workers because agriculture is a technical field in which a lot of equipment and chemicals are used. Workers are also exposed to animals thus setting them apart from other working environments. This is why further research was needed.

1.4 Significance of the Study

The study findings may help improve the understanding of the health & safety issues by farm workers and what they face on a daily basis. It will also help farm workers understand the importance of ensuring a safe and healthy working environment and also standing up for their rights if standards are not being upheld. The findings of the study may also help the University farm management to develop strategies on occupational health and safety. It may help create awareness within the work-place environment through briefings during occasional meetings. The results of this study may help the university structures review their already existing safety, health and environmental statement of commitment, as well as help other professional bodies address, design and implement occupational health and safety issues in policy development. The results of the research can, therefore, be used as an educational resource or to develop policy interventions and programmes.

1.5 Purpose and objectives of the study

The purpose of the study was to explore and explain the factors which influence occupational health and safety practices among farm workers at the University of Venda farm.

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The study objectives were to explore and describe the following:

i) The Environmental factors influencing occupational health and safety practices among farm workers at the University of Venda farm.
ii) The operational or organizational factors that influence occupational health and safety among the farm workers.
iii) The personal/behavioral/attitudinal factors influencing occupational health and safety practices among the respondents.

1.6 Definition of Terms

Conceptual and operational meanings

- **Occupational health**

Occupational health deals with all aspects of health in the workplace and has a strong focus on primary prevention of hazards (WHO, 2015). In this study occupational health is concerned with the safety, health and welfare of persons engaging in work or employment in a farm setting.

- **Safety practices**

These are methods of performing tasks with minimum health risks to people, equipment, materials and environment (English Collins Dictionary, 2000). In this study, safety practices are methods of hygiene, assembly points, emergency and accident reporting and the use of protective equipment at the University of Venda farm setting.

- **Farm worker**

This is a person working in the agricultural production industry. The work occurs on farms of all sizes, from small, family run businesses to large industrial agriculture operations (Oxford Dictionary, 2015). In this study, a farm worker is a person carrying out agricultural activities on a farm.

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- **Protective equipment**

This refers to equipment worn by workers to minimise exposure to serious workplace injuries and illnesses (Business Dictionary, 2015). In this study protective equipment are materials that are used to protect against injuries and illnesses when performing certain farm operations.

- **Pattern of use**

Pattern of use is a reliable sample of traits, acts, tendencies or other observable characteristics of behaviour (Merriam Webster Dictionary, 2015). In this study, pattern of use refers to the way farm workers behave when performing tasks.

- **Factors**

Factors are considerations in making judgment (Merriam Webster Dictionary, 2015). In this study, factors are operational/ organisational, environmental and personal/ behavioural attributes which influence occupational health and safety practices.

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CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This section presents the global views of the importance and use of protective equipment, as well as the incidence of injuries, disease and illness associated with occupational health among farm workers. Incident and accident reporting procedures, the South African legal framework on Occupational Health and Safety, types of occupational health and safety hazards and the importance of health and safety monitoring were also discussed.

2.2 Worldwide views on occupational health and safety

Without occupational health and safety practices, there would be uncontrollable mortality and less productivity and efficiency. The global burden of occupational injuries and illnesses is substantial, particularly in developing countries. Rates of occupational injury fatalities, for example, are estimated to be at least two to five times higher in the developing regions of the world, compared to North America and Western Europe (Concha-Barrientos et al., 2004). In 1999, the ILO published estimates of occupational accidents that were based on the figures gathered from selected ILO member states. These estimates were based on year 1994 figures. The average estimated fatal occupational accident rate was 14.0/100 000 workers and the number of fatal accidents was 335 000 (Takala, 1999).

Agriculture is associated with a variety of occupational illnesses and injuries. Agricultural workers are at higher risk of death or disabling injury than most other workers. Traumatic injury commonly occurs from working with machinery or animals. Respiratory illnesses and health problems from exposure to farm chemicals are major concerns, and dermatoses, hearing loss, certain cancers, and zoonotic infections are important problems (Von Essen & McCurdy, 1998). Specific cancers and their association with agricultural production include non-Hodgkin's lymphoma, prostate cancer, breast and ovarian cancer, leukemia, multiple myeloma and brain cancers, skin cancer and cancer of the lip (Navaranjan et al., 2013; Mannetje et al., 2008; Fritschi et al., 2005; Duel et al., 2000).

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In agriculture, the major sources of chemical exposures are pesticides, herbicides and fertilisers, vapours, fumes and some organic dusts from grains and even poultry dusts. Some of these chemicals have been known to have health effects, such as carcinogenicity (the ability to cause cancer), mutagenicity (the ability to act on genetic material resulting in alterations), teratogenicity (the ability of substances to act on unborn foetus to produce malformations) psychiatric disorders, and delayed neuropathy (Collotta et al., 2013). Previous research in Tanzania found that 68% of farmers reported episodes of feeling sick after routine application of pesticides, and their pesticide-related health symptoms included skin problems and neurological symptoms (Lekei et al., 2014).

Occupational health and safety practices are essential in agriculture. In the farming industry health and safety practices include wearing protective clothing which includes eye and face protection, hearing protection, respiratory protection, hand protection, head protection, foot protection and clothing protection. The workers' health will not be compromised when they are exposed to flying particles, sparks, high pitch machinery, particulates, vapour, abrasive surfaces, temperature extremes, falling objects, rolling objectives, piercing sharp objects, entanglement, electrical conductors and chemical spills (Raynolds, 2014).

Prevention of injury and disease entry onto the farm can be done only using clean equipment. Implementation of an environmentally sustainable farming system is an overall vital practice. According to Flemming (2006), half of the occupational safety and health issue arises from inadequate design. This may be caused by the design professionals that distance themselves from responsibility due to the lack of safety education and training, lack of safety design tools and their attempt to limit their liability exposure (Gambatese, 1996). Hence, considering safety and health in the design stage are taken into accord.

2.3 South African legal framework on occupational health and safety

The health and safety of employees at the workplace is a vital issue which cannot be overlooked and left to self-regulation by the people involved. Therefore, it is necessary for both employers and employees to know and understand their responsibilities and rights when it comes to occupational health and safety. It is important to determine and establish the application of the legislation which regulates employees' safety and compensation in the workplace in South

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Africa. In South Africa occupational health and safety legislation plays an important role in achieving effective and consistent workplace safety and health. According to the OHS Act of 1993, both employers and employees have a responsibility to ensure a healthy and safe working environment in situations of employment. The employee, according to section 14, has a legal responsibility to take care of the health and safety of himself/herself and of others. According to section 8, employees should comply with the measures the employer has put in place.

Within the legislative framework, major Acts such as the OHS Act, No. 85 of 1993 and the Mine Health and Safety Act, No. 29 of 1996 regulate occupational health and safety. The Mine Health and Safety Act applies to mines and quarries or related work, while the OHS Act applies to other industries like factories and offices. These all try to ensure a healthy and safe working environment. In essence, these Acts restate the common law position in obliging employers to take all reasonable and practicable measures to ensure a safe and healthy work environment. Besides the OHS Act and Mine Health and Safety Act which strive to prevent the contraction of diseases, illness and injuries of employees and, therefore, serve as preventative legislation, further legislation has also been passed to deal with the outcome of injuries and diseases, in particular the payment of compensation to the injured employee. The Compensation for Occupational Injuries and Diseases Act, No 130 of 1993 for example, provides for mechanisms for employees to claim compensation when injured or when they become ill as a result of their work. The Act also provides for medical cover.

Optimum health and safety in the work place can only be achieved with legislation that is effective and also by ensuring consistent compliance. According to the Occupational Health and Safety Unit of Department of Labour (2004), occupational injuries, diseases and fatalities continue to plague South Africa. People die from these workplace incidents and succumb due to occupational diseases. Furthermore, these thousands of injuries result in loss of time in the work place. The pain and suffering affects thousands of workers each year, as well as their families, communities and work places.

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2.4 Incident and accident reporting procedures

There must be a process in place to report accidents, incidents and emergencies as well as to assess and track the causes of occupational hazards. The health and safety supervisor is mostly responsible for taking appropriate follow up action, including getting medical attention for the injured, completing an investigation report and recommending appropriate corrective action. Researchers indicate that the under reporting of occupational injuries and fatalities in the agricultural industry is commonplace, with estimates of up to a 77% under reporting rate cited (Earle-Richardson, Jenkins & Slingerland, 2003; Hayden, Gerberich & Maldonado, 1995). Often, employers and workers do not fully understand the importance of reporting injuries. In many instances, employers do not educate workers about the correct rules for reporting injuries and accidents, let alone how to make a claim (Leigh et al., 2004).

In South Africa, according to the OHS Act, No. 85 of 1993, all work-related accidents and incidents must be reported to the immediate supervisor as soon as reasonably practicable after they occur or they should be reported before the end of the working shift in which they occurred. An incident Report Form must be completed by the employee's superior and handed to the employer. The immediate supervisor or manager will investigate the accident or incident in consultation with the work area Health and Safety Representative and the worker or person who was involved in the accident or incident. The investigation should commence as soon as reasonably practicable after the accident or incident occurs or at least within 24 hours of receiving notice of the accident or incident. Depending on the complexity and nature of the accident or incident, the investigation may involve other workers or stakeholders. The immediate supervisor or manager, in consultation with the work area Health and Safety Representative, the person who was involved in the accident or incident and, where relevant, other stakeholders, identifies the corrective and preventative actions required to prevent a recurrence of the event. How people respond to a farm emergency can determine the extent of the injury or even whether the injured person lives or dies (Tettey et al., 2010)

In case of fire emergencies, assembly points and designated safe refuge areas should be available. Individuals who have been trained in the proper use of fire extinguishers and are confident in their ability to cope with the hazards of a fire may use a portable fire extinguisher to fight small, incipient or early-stage, localised fires (WHO, 2004).

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2.5 Economic impact of occupational injuries, disease and illnesses

Farming is the most important sector in developing countries. It provides living or survival mechanisms for a good number of South Africans. Farms in South Africa employ significant numbers of people, including migrant workers from other Southern African countries, mainly Zimbabwe, Mozambique and Lesotho (Crush, 1999).

Occupational injuries, diseases and illnesses ultimately result in economic turmoil through increased medical and welfare costs, unplanned down time of employees taking leaves due to sicknesses. This in turn, results in a decrease in production. The status of Occupational Health and Safety compensations as captured by the Department of Labour's Compensation Fund media statement (2012), showed a dramatic rise in the number of claims paid to service providers. In the year 2008/2009, the amount of claims paid to employees and service providers was R2 175 679 138. This increased in 2009/10 to R2 286 410 189, and in the 2010/11, it skyrocketed to R2, 708 203 689.

Occupational accidents cause direct and indirect or hidden costs for the whole society. The direct costs include workers' compensation claims which cover medical costs and indemnity payments for an injury or illness, while indirect costs are the costs of livelihood lost, lowered productivity, increased absenteeism and morale (Rosenstock et al., 2006). A popular way to demonstrate this is the iceberg model. There are many variations of the proportion of the costs but usually the proportion of indirect costs is much bigger than direct costs. However, these economic calculations are made in industrialised countries that have established specific compensation and social security systems. Often in developing countries, an accident which occurs in the work place does not cause direct costs. Also, in small and middle size enterprises, the proportion of hidden costs is not so big (Andreoni, 1986; Larsson & Betts, 1996). In general, the ILO estimates that 4% of the world's GDP is lost through OSH problems (ILO, 2012).

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2.6 Types of Occupational hazards

2.6.1 Respiratory hazards

Various respiratory disorders occur among agricultural workers (Von Essen et al., 1997). The disorders are a common problem among this group of workers and are a cause of substantial morbidity. These disorders overlap considerably. For example, a worker who has had farmer's lung, may develop a complication of chronic bronchitis. Exposures that play a major role in causing respiratory disorders include grain dust, dust and gases in animal confinement units, mold and thermophilic bacteria in hay and grain, and silo gas. Many of the bio-aerosols inhaled by agricultural workers are rich in endotoxin, which has been associated with both acute and chronic illness. Evidence exists that other substances in the organic dust, including mycotoxins and silica, play an important role as well (Malmberg et al., 1986). Acute respiratory illnesses include organic dust toxic syndrome, a febrile, influenza-like illness that occurs 4 to 12 hours after exposure. This latter illness is self-limiting. This problem develops in about a third of grain and livestock farmers at some time. The syndrome is associated with heavy organic dust exposure, usually to grain dust or a swine confinement building (McCurdy et al., 1996). Its symptoms resemble those of a far less common problem, farmer's lung.

In the early years of pesticide use, research on adverse health effects, most often, focused on acute effects and fatal intoxications. Knowledge on adverse effects was mainly based on toxicological data from animal studies and human case reports. More recently, epidemiological studies have been carried out on a larger scale and cover a diversity of health endpoints such as neurotoxic, immunotoxic, carcinogenic, reprotoxic, and developmental effects. Chronic effects of long-term exposure are usually the focus of these studies. Chronic health effects in humans are most likely to result from excessive pesticide exposure that might occur in occupational settings (Baker et al., 1990; Richter et al., 1992).

A variety of cancers also have been linked to exposure to various pesticides, particularly haematopoietic cancers (Guzelian, 1980) and soft-tissue sarcomas (IARC, 1988). In addition, there have been reports of aplastic anemia and related blood dyscrasias being associated with occupational exposure to pesticides. Endocrine disruption (Rutherford, 1996;

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Colborn et al., 1996) and skin effects such as contact dermatitis and allergic sensitisation (Adams, 1983; WHO/UNEP, 1990) have been frequently observed in pesticide workers after exposure to several pesticides.

Furthermore, immunologic abnormalities and adverse reproductive and developmental effects due to pesticides have also been reported (Repetto & Baliga, 1996). The health effects associated with pesticides do not appear to be restricted to only a few chemical classes (Sesline et al., 1994; Weisenburger, 1993).

The application equipment used in developing countries is poorly maintained and supplies are usually inadequate. Pesticides are often applied with inefficient hand-sprayers, ox-drawn sprayers, or dusting equipment; inadequate protective clothing is used. In addition, many pesticides are applied by people wearing inadequate or unsuitable clothing, which is frequently worn for extensive periods after being contaminated by pesticides. Besides, workers are also exposed as a result of re-entry into sprayed areas. This increases the overall exposure of the individual. Moreover, in hot climates, protective clothing is seldom used. The temperature inside the protective clothing gets so high that the worker suffers. In fact, in many developing countries, the hot climate and the general lack of education make pesticide use dangerous to the operator (Forget, 1991; McConnell & Hruska, 1993).

2.6.2 Dermatological hazards

Farmers are exposed to several skin hazards. The most common type of agriculture-related skin disease is irritant contact dermatitis. In addition, allergic contact dermatosis is a reaction to exposures to sensitisers, which include certain plants and pesticides (Deere & Co, 1994). Other skin diseases include photo-contact, sun-induced damage from ultra-violet radiation and prolonged sun exposure, which result in skin cancer, changes in skin texture, blood vessels and pigment changes, heat-induced and arthropod-induced dermatoses.

The skin can be burned in several ways. Burns can result from dry fertilizer, which is hygroscopic and attracts moisture (Deere & Co, 1994). When on the skin, it can draw out moisture and cause skin burns. Liquid anhydrous ammonia is used for injecting nitrogen into the soil, where it expands into a gas and readily combines with moisture. If the liquid or gas contacts

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the body, especially the eyes, skin and the respiratory tract, cell destruction and burns can occur, and permanent injury can result without immediate treatment.

Tobacco croppers and harvesters can experience green tobacco sickness when working with damp tobacco. Water from rain or dew on the tobacco leaves probably dissolves nicotine to facilitate its absorption through the skin. Symptoms of Green tobacco sickness include headaches, pallor, nausea, vomiting and prostration. These manifest themselves following the worker's contact with wet tobacco leaves. Other insults to the skin include arthropod and reptile stings and bites, and thorn punctures, which can carry diseases (Deere & Co, 1994).

2.6.3 Mechanical hazards and thermal stress hazards

Sprains and strains are a significant problem among agricultural workers. Agricultural workers are exposed to several mechanical and thermal stresses that result in injury. Many of these problems result from handling heavy loads, repetitive motion, poor posture and dynamic motion. In addition, agricultural vehicle operators are exposed to whole-body vibration (Meridian Research Inc., 1994). The use of ageing machines with inadequate safety engineering constitutes a constant source of hazards as operations involving high numbers of disturbances, for example machinery breakdowns, have a higher accident probability (Suutarinen, 2003). According to Loringer and Myers (2008), between 1992 and 2005, a total of 1412 workers died from tractor over-turns on farms in the United States.

Agricultural workers are exposed to temperature extremes. In tropical and sub-tropical zones and during the summer in the temperate zones they may be exposed to hot and humid environment. Heat stress and stroke are hazards under these conditions. Conversely, in temperate zones in the winters they may be exposed to extreme cold and possible frostbite or death from hypothermia (Meridian Research Inc., 1994).

2.6.4 Behavioural hazards and working conditions

Some aspects of farming can cause stress among farmers. These include isolation, risk taking, patriarchal attitudes, pesticide exposures, unstable economies and weather, and immobility. Problems associated with these circumstances include dysfunctional relationships, conflicts,

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substance abuse, home violence and suicide. Most suicides associated with depression on farms, in North America, involve victims who are married and are full-time farmers, and most use firearms to commit suicide. The suicides tend to happen during peak farming periods (Boxer, Burnett & Swanson, 1995). Farm workers should know and agree to working times, that is, maximum working times per day, night shifts, meal breaks and daily and weekly rest periods, maternity leave, annual leaves and sick leaves and working during the weekends so as to be physically and mentally fit to handle the pressures of their jobs.

2.7 Classification of protective equipment and clothing

Workers can be exposed to a large number of hazards that pose danger to their health and wellbeing. Many occupational injuries occur because workers are not wearing any protection while others result from wearing improper or poorly fitting protection. Employers must make sure that their employees wear appropriate protective clothing and that the selected form of protection is appropriate to the work being performed and that it properly fits each worker exposed to the hazard. The United States Department of Labour (1997) classified protective equipment into six categories:

- **Eye and face protection,** for example prescription lenses, safety spectacles, goggles, welding shields, laser safety goggles, respirators and face shields for protection against dust, dirt, metal or wood chips, chemical splashes, gases and radiant energy.

- **Foot and leg protection,** for example leggings, metatarsal guards, toe guards, safety shoes, gumboots and foundry shoes for protection against barrels and rolling tools, sharp objects, slippery surfaces and electrical hazards.

- **Hand and arm protection,** for example leather gloves, aluminized gloves, synthetic gloves, fabric gloves butyl gloves, arm shields and natural rubber gloves for protection against slipping, chemicals, heat, cold, cuts, sparks and rough objects.

- **Body protection,** for example laboratory coats, overalls, vests, jackets, aprons, surgical gowns and full body suits for protection against temperature extremes, hot splashes, hazardous chemicals, cuts, flames and abrasions.

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- **Head protection,** for example protective helmets, sun hats and hard hats for protection against falling objects, shock, heat, bumps and electrical conductors.

- **Hearing protection,** for example earplugs and earmuffs for protection against noise, chemicals and coldness.

2.8 Importance of protective equipment to maintain health and safety

The use of protective equipment and clothing is an important means of preventing work injuries, diseases and illnesses. It protects the wearer from harm at the workplace, which can involve life-threatening situations. Protective clothing has to fulfill the highest safety standards. Protective equipment is designed to protect the head, face, nose, eyes, ears, hands, arms and feet (Pilusa, 2008). The appropriate clothing is to be provided by the employer and worn by the employee as stated in the Occupational Health and Safety Act of 1993 Section 8. Depending on the hazard or workplace conditions, the Occupational Health and Safety Act recommends the use of engineering or work practice controls to manage or eliminate hazards to the greatest extent possible (Department of Labour, 2004). For example, building a barrier between the hazard and the employees is an engineering control; and changing the way in which employees perform their work is a work practice control.

When engineering, work practice and administrative controls are not feasible or do not provide sufficient protection, employers must provide protective equipment to their employees and ensure that it is used. Section 6 of the South African amended Mine Health and Safety Act No. 29 of 1996 stipulates that "Every manager must ensure that sufficient quantities of all necessary personal protective equipment is available so that every employee who is required to use that equipment is able to do so." The Act also stipulates that workers should use protective equipment in the required manner and ensure adequate maintenance of the equipment.

Protective clothing is specifically designed for a particular work environment and also made with a specific type of material that will withstand a particular condition. The best approach is to maintain a safe work environment and eliminate any potential hazards.

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2.9 Health and safety monitoring

Health and safety monitoring is used to promote safety and identify workers who have an increased risk of developing an occupational disease. Occupational health and safety is usually done in different ways, namely monitoring health outcomes, describing the workplace environment and describing the infrastructure and the level of prevention. Risk assessment tools and methodologies are also part of occupational health and safety, and these include checklists, guides, handbooks, brochures and pamphlets, as well as preventative maintenance, which is meant to check what is being done and what is not being done, for example, servicing crucial equipment. The most common procedures and methods used in health and safety monitoring are described by the ILO (1983) as follows:

- **Regulations-** these include mandatory prescriptions regarding working conditions, maintenance, machine guarding, testing the duties and obligations of employers and employees, the training of employees, medical supervision and the medical examination of employees and first aid stations.
- **Standardization-** this includes the authorisation of standards that guide workers in the management of equipment, safe and hygienic practices, the use of protective devices and clothing and the acceptance of set procedures for under taking tasks.
- **Inspection-** this refers to the procedures that management uses to become aware of what is actually happening in the workplace and the enforcement of mandatory regulations that govern procedures and the safe use of machines.

2.10 Theoretically based literature review

Theoretical or conceptual literature refers to published materials dealing with the theory or model that underlies a research topic area. It includes concept analysis, models, theories and the conceptual framework that support a research topic. Theoretical sources are described and summarized to reflect the current understanding of the problem being investigated and to facilitate developing the study's framework (Akinsola, 2005).

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2.10.1 The Epidemiological Triad

In this study, the epidemiological triad model was used to predict and describe the challenges faced by farm workers regarding occupational health and safety practices. According to Acutt and Hattingh (2011), the causes of accidents are described by the epidemiological triad. Attitude and emotions have a strong influence on human behavior. A constructive and cooperative worker may be willing to maintain safety, but a negative and hostile worker may be prone to act in a reckless manner. The researcher chose this model because it emphasizes that the kind of interaction that exists between the human being as a host, the operations as an agent and the environment in which the operations take place, indicates how close the relationship between well-being and degree of safety in a work place is. If one of these three factors, the host, agent and environment, is the source of a problem, accidents that harm not only employees but also the community will occur.

For example, if a human suffers from a physical problem such as extremely poor eye sight, the agent may be adversely affected resulting in operations not being carried out or procedures not being followed and the safety of the worker threatened. If lighting is inadequate, the worker who is the host cannot see properly and, therefore, cannot perform procedures effectively. This means that equipment cannot be used according to normal standards of use and may result in accidents (Acutt & Hattingh, 2011). Early identification of problems among farm workers is invaluable because it might prevent injury and death that are caused by accidents. Sometimes, if a worker does not understand the language spoken in a work place, he/she may misinterpret safety instructions. This was not the case at the University of Venda farm where the dominant language is Tshivenda.

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CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter focuses on the research method that was used in the study. It outlines the nature of the study. The chapter focuses on study design, the target population, the setting in which the study was conducted, the sampling method, and sampling procedure used. In addition, the chapter also focuses on the instrument and method that the researcher used to collect data, as well as the measures taken to ensure trustworthiness of the data collection instrument. Data analysis and how ethical issues were observed to ensure safety of the participants are also discussed in this chapter.

3.2 The study design

A qualitative exploratory study was employed in this study. In-depth interviews were used to explore environmental, personal and operational factors regarding occupational health and safety practices among the study group. This specific design enabled the researcher to get a better understanding of the health and safety practices through first-hand experiences, truthful reporting and quotations of actual conversations since the researcher's aim was to understand how the participants derive meaning from their surroundings and how their understanding influences their behaviour, knowledge and even perceptions of occupational health and safety. The advantage of the selected design, in relation to the study, is that it gave the participants the platform to express their feelings, attitudes and behaviour which influence practices of occupational health and safety. The strength of qualitative research is its ability to provide complex textual descriptions of how people experience a given research issue (Mack et al., 2005).

Qualitative research involves looking deeply at a few things rather than looking at the surface of many things and it, therefore, involves studying and looking at few individuals, sometimes just one person (Litchman, 2009). According to Burns and Groove (2009), the number of participants in the study is adequate when saturation of information is achieved in the study area. A total population sample of 11 participants was selected as the sample size.

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3.3 Area of study

The University of Venda farm at the University of Venda was the location of the study, and it is located in Thohoyandou in Limpopo Province. The farm was established in 1982. The Limpopo Province is the administrative Centre of Vhembe District Municipality and Thulamela Local Municipality. Thohoyandou is situated in the south of Vhembe District, on the main road between Louis Trichardt and the Kruger National Park. The farm has employed 11 permanent skilled registered male and female workers and 11 general workers. The predominant language spoken by farm workers is Tshivenda. Some of the activities done at the farm include operating machinery, planting, spraying of pesticides and herbicides, irrigation, weeding, cow milking, harvesting, caring for livestock and cleaning of animal pans and other activities, as well as administration.

3.4 Study population and sampling

3.4.1 Population

According to Khothari (2011), population refers to the items under consideration in the field inquiry. It refers to persons who possess specific characteristics or traits in which the researcher is interested and from whom the sample will be drawn. For the purpose of this study, target population meant all the farm workers, men and women at the University of Venda Farm.

3.4.2 Sampling

A non-probability purposive sampling method was employed in this study to select farm workers. The purposive sampling method enabled the researcher to utilise her knowledge about the target population and its elements to handpick the elements to be included in the sample (Burns & Groove, 2005). Purposive sampling helped the researcher to focus on key informants who are particularly knowledgeable of the issues under investigation.

The selection of the participants was based on the following inclusive criteria:

- Participants who have permanent employment at the University farm;
- Participants of both sexes, male and female;

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- Participants who are directly involved in farm work activities; and
- Participants who have worked for at least one year at the University farm.

3.5 Data collection method

An interview guide was used in this particular study. Interviewing is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, programme or situation (Boyce & Neale, 2006). Suitable arrangements and appointments were made with the participants to agree on time that was convenient for them to carry out the interviews. The researcher traveled from Louis Tritchardt to the University of Venda farm for approximately 8 working days for data collection. In-depth, face to face individual interviews were conducted and these were done at the farm sheds and took approximately 45 minutes for each interview. The questions were open-ended and field notes were noted in writing and a voice recorder was used to capture all verbal information of the participants. Assistance was required for data collection, where an individual held and operated the voice recorder while the researcher asked questions and wrote down field notes. The voice recorder was checked before use and its utilisation was explained to participants (Polit & Beck, 2007). Assistance was also required in the form of a language expert who translated the English questions to the farm worker's native language, Tshivenda, that was for those who were not comfortable with English. The interview guide was semi structured and included the following sections:

- Personal data of informant, that is, age.
- Personal factors influencing occupational health and safety practices, that is, Can you please explain why it is important for you to practice safety?
- Environmental factors influencing occupational health and safety practices, that is, what is the nature of your tasks and what dangers are you exposed to?
- Operational factors influencing occupational health and safety practices, that is, what steps are followed in the handling of chemicals and/or operating of machinery?

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3.6 Measures to ensure trustworthiness

The following four principles were applied, in order to ensure trustworthiness in the study: truth value, consistency and applicability (Brink, 2006).

3.6.1 Credibility

This is a criterion that explains how one can establish confidence in the truth findings of a particular inquiry (Neuman, 2000). Credibility was ensured by lengthy contact time and engagement of the researcher with the participants and persistent observation to get in-depth understanding of the issues at hand. Prolonged interaction was ensured by allocating enough time for the in-depth and face to face interviews. In the study, non-verbal communication was noted in writing. Credibility was also ensured by categorizing data and themes during data analysis, and also ensuring that relevant data was not excluded or irrelevant data included.

3.6.2 Dependability

This emphasises on the need for the researcher to take note of any changes that may occur in the context of the research. Dependability involves appropriateness of inquiry, decision and methodological changes. The process must be reviewed constantly to ensure that an inquirer's bias does not influence the inquiry (Lincoln & Guba, 1985). In order to address the dependability issue more directly, a dense description of the research method process within the study was done. This will enable future researchers to repeat the work but not necessarily to gain the same results. Using observations and in-depth interviews ensured dependability.

3.6.3 Transferability

This involves demonstrating the applicability of the results of the study in different contexts. According to Lincoln and Guba (1985), the description of data gathering must be inclusive enough to enable findings to be transferred to other situations. In this study, transferability was enhanced by providing what is often referred to as thick description, which was ensured by an accurate, adequate and rich detailed description of research findings and the assumptions that were central to the research.

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3.6.4 Confirmability

When it comes to confirmability, there is need to demonstrate that the data and the interpretations drawn are rooted in circumstances and conditions outside the researchers' own imagination and that these are coherent and logically assembled (Ghauri, 2004). This strategy was ensured by taking field notes and preserving data recorded during the interviews.

3.7 Data analysis

To begin with, the study researcher ensured that all field data including notes, comments, and recordings were recovered from the interviewers. Robert and Green (2002), argue that data analysis entails reading descriptive data, making notes on the patterns found in the data and developing some descriptive categories. Data were analysed thematically. This involved the researcher categorizing the data into codes, themes and sub-themes. The voice recorder was connected to a computer in order to carefully listen to the interviews with the help of a translator since some of the interviews were in Tshivenda and the researcher is non-Venda speaking. Data analysis took approximately 15 days. Cresswell (2003) affirms that data analysis involves making sense out of the text. Data were analysed in narrative form using the following steps of data analysis by Cresswell (1994):

- The researcher read through all transcripts carefully and wrote down some ideas as they came to mind.
- The researcher picked one interview at a time went through it to find out what it was about. The researcher did not think of substance of the information, but rather its underlying meaning.
- When the researcher completed the task for several informants, a list of all topics, unique topics and leftovers was made.
- The researcher took the list and went back to the data. The researcher abbreviated the topic as codes and wrote the codes next to the appropriate segments of the text.
- The researcher found the descriptive wording for the topics and turned them into categories and then reduced the total list of categories to show interrelationships.

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- The researcher made a final decision on the abbreviation of each category and alphabetised the codes.
- The researcher assembled the data material belonging to each category in one place and performed preliminary analysis.
- The researcher recorded the existing data.

3.8 Ethical considerations

According to Katzenellenbogen et al. (1997), ethical issues usually are more complex in occupational epidemiology than in general epidemiology. Therefore, the question of confidentiality should be addressed adequately before conducting a study, since there is a higher possibility of victimisation of workers or discrimination against those respondents participating in a survey.

- **Permission to conduct the study**

The proposal was submitted to the School of Health Sciences Higher Degrees Committee for evaluation. Thereafter, the proposal was submitted to the Higher Degrees Committee of the University of Venda for approval (SHS/15/PH/16/1908). Following approval, the proposal was submitted to the University Research and Ethics Committee, in order to obtain an ethical clearance. A verbal approval was sought from the authorities of the School of Agriculture and the farm manager, in order to have access to the farm workers.

- **Informed consent**

Once permission was granted, and the contact details of the participants were provided, farm workers were issued with a consent form. The farm workers were requested to give consent to be part of the study. The researcher explained to the participants the purpose and objectives of the research, and how it may benefit them as workers. All participants signed a consent form as a way of accepting responsibility to take part in the study. The researcher informed the participants that they were not obliged to participate and that the decision to be included or not to be included in the study was sorely theirs.

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- **Confidentiality, autonomy and Anonymity**

Confidentiality means that no information provided by a person should be divulged or made available to other people (De Vos, Strydom, Fouché & Delport, 2006). Participants were informed that privacy, autonomy and confidentiality would be strictly maintained. Neuman (2000) refers to confidentiality as the ethical protection of the subject by holding research data in confidence, or keeping them secret from the public. The participants were informed that all the information obtained was to be treated as strictly confidential, and all taped information would be destroyed after the publication of the results. Participants were also informed that their participation is voluntary, and that they were allowed to withdraw at any time they feel like doing so. They were shown the on and off button on the voice recorder in case they had information they wished to share or disclose but were not comfortable having it recorded.

- **Protection from harm**

Participants were informed that the results were to be used for research purposes only. The research participants were not exposed to any physical or psychological harm and were not victimized.

- **Right to privacy**

To ensure privacy, the identities of the participants were protected by ensuring that their names were not requested when recording the interviews; only a number was required in place of their name. The researcher ensured that the voice data was secured in a locked cabinet. The research report was presented in a way that nobody will be aware of responses to the questions of a particular participant (Leedy & Ormrod, 2005).

3.9 Dissemination of the results

The study will be submitted to the Library of the University of Venda, the management at the University of Venda farm, the Department of Labour, and the Department of Health in Vhembe District in Thohoyandou. It is also foreseen that National and International conferences and

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seminars will be attended and an article will be published in a relevant journal to make it more available to a wider audience.

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CHAPTER 4: THE RESULTS

4.1 Introduction

This chapter presents the findings of the study according to themes and sub-themes.

4.2 Themes and Sub-Themes

Three major themes emerged from the data collected, and the researcher coded sub-themes under each theme (Table 4.1). The major themes were (i) personal factors influencing occupational health and safety, (ii) environmental factors influencing occupational health and safety, and (iii) organisational factors influencing occupational health and safety. From the major themes, the sub-themes emerged as presented below.

Table 4.1: Themes and sub-themes

Main Theme	Sub-Themes
1. Personal factors	1.1 Lack of work ethic and non-compliance
	1.2 Experience on the job
	1.3 Negative attitudes and behaviour towards rules and regulations
2. Environmental factors	2.1 Availability of protective equipment
	2.2 Heat stress experienced by farm workers
	2.3 Lack of proper farm logistics
	2.4 Physical arrangement of work area and equipment
3. Operational factors	3.1 Regular inspections and monitoring

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4.2.1 Theme 1: Personal factors influencing occupational health and safety

The farm workers described personal issues related to their work. This theme emerged from the data analysis. Sub-themes that emerged from the personal experiences described by the farm workers are as follows: Lack of work ethic and non-compliance, experience on the job, negative attitudes and behaviours towards rules and regulations.

4.2.1.1 Sub-Theme 1.1 Lack of work ethic and non-compliance

Health and safety practices have an ethical component. Personal beliefs often line up with codes of conduct in the work place. During the interview, some of the farm workers showed a lack of work ethic and compliance to safety regulations. Their responses showed that they do not take safety very seriously; that they are involved in other activities out of work and often report late for work. The following were some of the responses from the farm workers:

- *(Participant number 2) "……Sometimes I'm too tired and arrive late for work so l end up not fetching my work clothes"*
- *(Participant number 5) "I have been working here for a very long time and l have never had any health problems even when l don't use or wear safety equipment so l don't always use them"*

The interview revealed that the participants have a negative attitude towards health and safety, are non-compliant, negligent and unprofessional in the work place. The farm workers also showed no sensitivity regarding the consequences of not putting health and safety first even though they know what the regulations say. During the interviews, the researcher observed that some of the participants appeared carefree and unconcerned.

The farm workers showed that they were well aware of what is required of them in-terms of health and safety practices. According to the OHS Act of 1993, both employers and employees have a responsibility to ensure a healthy and safe working environment in situations of

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employment. According to section 14, the employee has a legal responsibility to take care of the health and safety of himself/herself and that of others. Section 8 states that employees should comply with the measures the employer has put in place. According to Krause (2007) a culture that truly values ethical behaviour must be adhered to by men and women committed to principle for its own sake, not solely for the purpose of compliance.

4.2.1.2 Sub-Theme 1.2 Experience on the job

Most of the farm workers rely on the time they have been on the job to determine the importance of using safety equipment. If they had never needed medical attention after non-compliance to the use of safety equipment, they look at it as unimportant. The following responses from participants reflect this:

- *(Participant number 5) "I have been working here for a very long time and l have never had any health problems even when l don't use or wear safety equipment so l don't always use them"*
- *(Participant number 1) "I'm the main supervisor, I teach others how to use safety equipment and I'm very knowledgeable of safety measures, so I think l know it all"*

It seems when workers have been in a job for a long time, they feel they have seen it all, done it all and experienced it all to the extent that they see or feel that there is no new information that they may need to know on health and safety in the work place. From the researcher's observation, during interviews, some participants seemed over confident when asked about the importance of practicing health and safety measures. Overall, some participants assumed they knew everything and could take short-cuts. This poses a danger in the work place because there is continuous new knowledge emerging, so one can never really know everything.

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4.2.1.3 Sub-Theme 1.3 Negative attitudes and behaviour towards rules and regulations

During the interviews, it was revealed that certain behaviours influenced occupational health and safety practices. Most of the farm workers are knowledgeable when it comes to health and safety, but have a negative behaviour towards it and sometimes tend not to use the knowledge and skill (Hayden, 2013).

- *(Participant number 3) "Venda is sometimes very hot so putting on a work-suit is very uncomfortable so sometimes I would rather use my lighter clothes for work"*
- *(Participant number 7) "some of these protective clothes like gumboots and safety shoes are very heavy so ever since I got mine I haven't worn them, I just use these light shoes"* (from observation the participant wore canvas shoes)

It seems farm workers do as they please or what works for them, thus neglecting the regulations that clearly stipulate safety first. Following work place rules and regulations is important to ensure uniformity and consistency in the operational procedures of everyday tasks. However, it also seems that there are some manufacturing issues when it comes to protective equipment. Farm workers may have a negative attitude towards protective clothing because of the way it is made. Protective clothing may not be adaptable or suitable to the working environment.

4.2.2 Theme 2: Environmental factors

Farm workers described dominant stories related to their work environment. Sub-themes that emerged from the environmental factors influencing occupational health and safety practices are availability of protective clothing, heat stress experienced by farm workers, lack of proper farm logistics, and the physical arrangement of work and equipment.

4.2.2.1 Sub-Theme 2.1 Availability of protective equipment

Most of the workers emphasised that the farm was fully equipped with safety and protective

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equipment. They expressed knowledge of the use of most of the equipment that is available for specific farm operations. The participants also pointed out that new equipment came through on a regular basis. From the researcher's observation one could tell and feel their enthusiasm on the subject matter. The following are some of the comments from the farm workers:

- *(Participant number 6) ".....there is so much equipment that we must use here on the farm For example, I work with fertilizers and chemicals so I have to put on a respirator, work-suit, rubber gloves and gumboots."*

- *(Participant number 4) "When I first came here I was shown a variety of different equipment used for various tasks and I was told they are used here on the farm even though I don't know or use them."*

More often than not, workers resort to alternatives when equipment is not available but it is evident that the University tries to provide its workers with the right safety equipment for the tasks performed on the farm. This is in line with the stipulation of the OHS Act, No. 85 of 1993, Section 14. When workers are provided with the safety materials they need, they have no excuse but to work better.

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4.2.2.2 Sub-Theme 2.2 Heat stress experienced by farm workers

During the interviews, most of the participants mentioned heat as one of the major problems they face when executing their duties. They pointed out that the heat causes dehydration, discomfort, especially when they are wearing protective clothing, as well as excessive tiredness which makes it difficult for them to execute their duties. If they do, they risk their health when they subject themselves to the heat. At core temperatures beyond 38-39 degrees Celsius, there is an increased risk of heat exhaustion and beyond these temperatures, heat stroke can occur with an eventual failure of the central nervous thermoregulatory system (Jay & Kenny, 2010). Health consequences range from dehydration, injuries and heat fatigue to a higher burden of respiratory and cardiovascular disease, cataract, kidney failure, weakening of the immune system and death (WHO, 2012). Some of the farm workers had the following to say:

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- *(Participant number 4) "Work-suits are a bit bulky and uncomfortable especially when I work outdoors in the sun, I sometimes experience headaches and eye problems"*
- *(Participant number 9) "Farm work is very hard because we work outdoors and the temperatures here are abnormally high"*
- *(Participant number 11) "When it's too hot, wearing a work-suit is daunting, so I just use my lighter clothes"*

Similar studies indicate that heat can cause workers to take off their protective clothing because it causes a lot of discomfort. This may pose a great health risk due to exposure. Protective clothing can create a serious heat stress problem, as it can have no or low moisture permeability and high insulating properties. Such properties inhibit sweat evaporation and normal heat dissipation, thus increasing internal body and skin temperatures and causing excessive sweating. Protective clothing (both impermeable and semipermeable) also often adds bulk and weight, particularly if a closed circuit breathing apparatus is included. Thus, protective clothing increases the metabolic cost and thermal load of performing a task (Bishop *et al*., 2013).

4.2.2.3 Sub-Theme 2.3 Lack of proper farm logistics

During the interviews, it became apparent that the farm workers are given multiple tasks per day, thus making it a bit strenuous to change their protective gear with every task within a day. The farm workers end up using the same protective clothing for every task, leading to lack of standard. Every task requires a specific protective garment. It is not ideal for farm workers to use a "one size fits all" approach because there are health risks in not being fully protected for the task at hand. One participant commented as follows:

- *(Participant number 2) "……going up and down to change garments takes too much time and energy. Sometimes I work in the field which is quite a distance from the locker rooms and the next work station."* (The participant pointed in the distance which was the direction of the field).

It seems logistics at the farm are a bit poor because protective clothing should be conveniently accessible for each task. In this case, if a worker is too tired to collect equipment which is located

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at the other end of the farm, it compromises the level of efficiency and quality of performance and this can lead to accidents and low work output.

4.2.2.4 Sub-Theme 2.4 Physical arrangement of work area and equipment

Farm workers pointed out that some of the equipment, which includes knapsack sprayers for the spraying of pesticides and grinding machines for processing animal feed, are designed for particular heights and sometimes may not be adjustable to suit different individuals. This, therefore, compromises on health and safety. One farm worker had this to say:

- *(Participant number 10) "……the knapsack sprayer can be very heavy and as short as I am I end up bending to accommodate the weight and more often than not it results in a back ache."(*The participant arched her back demonstrating how she would bend with a knapsack sprayer on her back)

Work-related disorders, especially low back pain and musculoskeletal problems are prevalent among farmers (Earle-Richardsona *et al*., 2005). It is important for farm authorities to check equipment and workers' postures in the work place because this will help identify health and safety hazards. This can be done by talking to employees and seeking their views, walking around the workplace to see if any ergonomic hazards can be spotted and reviewing any accidents or reporting of ill health. The researcher's observation during the interview revealed that the participants seemed discouraged about using certain equipment due to the effects it has have on her health, especially her posture. Poor ergonomics lead to frustrated and fatigued workers who might not perform efficiently. When the job task is too physically taxing on the workers, they may not perform their job the way they were trained (Middlesworth, 2015). The majority of agricultural duties create some awkward body postures, which should be assessed throughout ergonomic evaluation. Many farm activities especially in developing countries are done manually. Manual handling is also identified as one of the main risk factors for musculoskeletal disorders (Vyas, 2012).

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4.2.3 Theme 3: Operational factors

Participants pointed out that there were regular inspections and monitoring when it came to general orderliness of the farm site. Equipment is also checked frequently. Regular inspections and monitoring emerged as a sub-theme from operational factors which influence occupational health and safety.

4.2.3.1 Sub-Theme 3.1 Regular inspections and monitoring

During the interview the farm workers pointed out that there was consistency in the monitoring and inspection of workers and the farm area. Some expressed satisfaction over how hazards are spotted before they happen. Very often, injuries occur which could have been avoided through early identification and inspection occur. Farm workers pointed out how a hazard can be identified before an injury has occurred. The following are some of the responses from the farm workers:

- *(Participant number 9) "equipment is usually arranged in order. There are labels on shelves where chemical containers are kept, functional and broken equipment is separated……among us there are people who have the know-how to repair and to identify faulty equipment."*
- *(Participant number 3) "……equipment is replaced regularly, I recently got a new work suit and gumboots."* (The participant directed the researchers attention to the gumboots he was wearing)
- *(Participant number 7) "we don't struggle to find equipment; our work-suits, gumboots and raincoats are kept in personal lockers."*
- *(Participant number 8) "no serious accidents have ever occurred to me."*

Assessing people's abilities and limitations, their jobs, equipment and working environment and the interaction between them is important to design a safe, effective and productive work system.

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CHAPTER 5: DISCUSSION, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter presents the discussion of the study findings, recommendations and conclusions.

5.2 Discussion

This study, on the factors influencing occupational health and safety practices among farm workers at the University of Venda farm has revealed a number of personal, environmental and operational factors which influence occupational health and safety practices among the farm workers. The findings pertaining to both personal and operational themes which emerged revealed that it is important for both employers and employees to be familiar with and understand their responsibilities and rights with regard to health and safety in the work place as stipulated in the OHS Act of No. 85 of 1993 (South Africa, 2004). The employee, according to section 14, has a legal responsibility to take care of the health and safety of his/her and that of others. According to section 8, employees should comply with the measures the employer has put in place. It is apparent that the farm workers at the University of Venda are not fully aware of this provision in the Act. The application and use of health and safety equipment is not uniform across the board and this poses a health hazard to the less knowledgeable employees.

The findings of the study revealed that the participants have a negative attitude towards health and safety, and are non-compliant and unprofessional in the work place. Some participants argued that they had been working at the farm for a long time and had never had any health problems even when they did not use or wear protective gear. This may indicate low morale and poor communication within the work place. However, human behaviour is complex and it is well known that not only knowledge is needed to change behaviour (Kollmus & Agyeman, 2002). A cross-sectional survey of 1102 farmers in Australia indicated that the Victorian grain farmers who were frequent users of a variety of pesticides were non-compliant. The study showed that the wearing of protective equipment while handling pesticides was poor and many individual farmers did not use protective equipment at all. Personal protective equipment use across all pesticide classes was poor, indicating the possibility of clinically significant pesticide exposure

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among many farmers. The results showed that non-use of protective equipment was frequently reported by between 10 and 40% of the farmers (Mc Farlene, 2007).

In addition, the farm workers can be exposed to an array of hazards that can be dangerous to their health. It is evident that workers at the University of Venda farm are not aware of the repercussions of not using the right attire to protect themselves from hazards associated with particular tasks. Reference was made to mostly the work-suit and gumboots. Other protective equipment that is required on the farm include eye and face protection, foot and leg protection, hand and arm protection, head and hearing protection and other body protection equipment which was not emphasised in the findings. It shows that the farm workers do not know or are not familiar with health and safety practices. Depending on the nature of tasks that they are involved in at the farm, this may pose a health risk. The farm workers are not aware of the consequences of not thoroughly protecting themselves when performing certain tasks. According to a study done in Indonesia, many farmers behave in an unsafe manner and do not use personal protective equipment during activities like spraying of pesticides (Yuantari *et al*., 2013).

Moreover, Launiala (2009), points out that attitude is interwoven with a person's knowledge, beliefs and values and oscillates between positive and negative. There is also a direct relationship between knowledge and behaviour, since knowledge is one factor that influences practice. However, this relationship is not always obvious. In some settings, though the workers are knowledgeable about the harmful effects of the agents they are working with, this does not necessarily equate to increased utilisation of protective equipment. This is apparent in the responses of some of the farm workers who say they do not use some protective equipment because it is too heavy for them. Others believed that since they had been working at the farmfor sometime they knew everything.

According to the South African Weather Service, temperatures in Thohoyandou range between averages of 22.9 degrees Celsius in winter and 32 degrees Celsius in summer. These high temperatures are confirmed by the responses of the farm workers. The farm workers explained that farm work is usually hard and uncomfortable as the majority of their work is conducted outdoors. Their attitude towards work in this case is determined by the environment, echoing the concept of the epidemiological triad which states that the kind of interaction that exists between human beings as hosts, the operations as agents and the environment in which the operations take

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place, indicates how close the relationship between well-being and degree of safety in a work place is. If one of these factors, the host, agent and environment, is the source of a problem, accidents may occur. Farm workers are exposed to a high risk of experiencing adverse health effects caused by solar ultra violet radiation. When preventative measures are not adequately adopted outdoor workers, in particular those undertaking highly intensive and physical activity under the sun are susceptible to heat stress during heat waves (Xiang *et al*., 2014). The findings show that the farm workers at the University of Venda found protective clothing to be bulky and uncomfortable especially in hot weather and this came out strongly in most responses.

The responses by the farm workers about protective equipment being bulky and uncomfortable in the hot environment of Venda can be considered as a positive feedback because manufacturers may consider also making provisions for those working in hot environments and design protective equipment that is less bulky and of lighter weight without compromising on standards. If the manufacturers take heed, their profits may increase and if the farm management deals with the issue, they might get greater production and higher morale out of the workers as well as curb work related tensions. Workers will excel and be happier, thus there will be less room for injuries.

According to Zhang *et al*. (2010), protective garments for hot and warm environments have already been designed. Cooling is supplied via either cooled liquid or cooled gas, with light tubes attached to the garments. Typically, the cooling garments are in the form of vests and cooling caps are also available (Wickwire *et al*., 2009). One constraint may be that the University of Venda market may not be a viable market for manufacturers since it is small and is more of a small holder subsistence farming community. Manufacturers may feel that they can do without its business. In this case the farm management itself may need to look into how it can improve things.

The issue of protective equipment among farm workers needs to be carefully reviewed. The use of protective equipment by farmers was found to be very low in a cross-sectional study on Gambian agriculture. A significant number of farmers were observed inhaling smoke and dust during regular work processes. When asked why gloves, masks and respirators were not being used, the main reasons cited by many farmers were that they did not fit properly and were

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unsuitable to wear (Kuye *et al.*, 2007). The issue of suitability of protective clothing seems to be a problem, not only at the University of Venda farm, but also in other countries in Africa.

The study findings under the main theme operational factors, showed that although there are regular inspections and monitoring at the farm there are different designations. This, therefore, limits the type of equipment that one is exposed to because the allocation of duties. It is evident that there is no standard procedure that teaches all farm workers about all farm equipment. Aslam *et al.*, 2009 highlighted the need for training for farm personnel, in order for them to be familiar with health and safety issues concerning all workers. This allows workers to help each other when the need arises and also to be fully aware of all farm activities requiring careful attention for health and safety. The use of PPEs requires behavioural changes from the workers. A lack careful attention is the main weakness, since behavioural changes are difficult to achieve. To maximize such changes, new workers should undergo induction training to inculcate good work habits and more experienced workers ought to receive regular refresher training to eliminate bad habits that might have developed over time (University of Capetown Personal Protective Equipment Programme, 2009).

The findings of this study revealed that the participants had a negative attitude towards protective equipment. They however agreed that it was necessary to wear and use protective gear where they work. The farm workers expressed how hard it is to work in the hot outdoor environment. The findings of the study can also be applicable to other industries other than the agricultural industry, for instance, the issue of heat stress experienced by workers. The construction industry also faces similar challenges. A study in Taiwan and Thailand indicated that construction workers suffered from severe heat strain because of physically demanding work and hot conditions at construction sites as they work outdoors and are exposed to the sun (Lin & Chan, 2009; Bates & Schneider, 2008).

The mining industry also faces related challenges when it comes to workers and heat stress. Donoghue's, (2004) findings on heat stress being a factor that influences occupational health and safety practices among workers supports the researcher's findings. Heat stress has been reported for surface miners in the United States of America. The high proportion of surface mine workers experiencing symptoms of heat illness is a significant health and safety concern for the mining

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workforce and highlights that heat exhaustion maybe occurring at a much higher incidence than reported.

5.3 Conclusions of the study

Based on the results of the study, the following conclusions are drawn:

- The study discovered that environmental factors such as high temperatures influence the use of health and safety equipment among farm workers at the University of Venda farm.

- Personal factors such as non-compliance, negative attitudes and behaviour are some of the reasons why farm workers at the University of Venda are not all complying with health and safety rules.

- The working environment that is availed by management influences knowledge and application of health and safety measures.

- Unavailability of protective equipment is not a major reason for not following health and safety regulations in the work place.

- The farm has not prioritised giving each and every farm worker adequate training of health and safety measures.

- Inspections and monitoring are conducted regularly at the farm and makes it easier to identify any health hazards

5.4 Recommendations

Based on the study conclusions, the following recommendations are made:

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- **Recommendations for the farm management**

1. The farm management should adequately train every incoming staff member before he/she resumes duty.

2. The provision of alternative preventative measures such as sun-screen lotions that prevent Ultra-violet radiation on the skin or lighter but safe protective clothing should be provided to farm workers by the farm management.

3. The farm management should provide new information relating to illnesses, diseases and consequences of not using protective equipment correctly.

4. The farm management should work hand-in hand with health and safety inspectors and health professionals to get the latest information on health and safety practices that can be adopted.

5. The farm management should enforce strict measures that leave farm workers with no choice but to wear protective clothing in order to avoid situations that may lead to health hazards.

- **Recommendations for farm workers**

1. Farm workers should be responsible for each other's safety and point out where there is need for improvement.

2. Farm workers should prioritise health and safety measures for their own good and for the sake of productivity in their work environment.

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APPENDICES

Appendix 1

INTERVIEW GUIDE QUESTIONS

1. Can you please explain why it is important for you to practise safety?

2. What is the nature of your task and what dangers are you exposed to?

3. What steps are followed in the handling of chemicals and/or in operating machinery?

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Appendix 2

CONSENT FORM

I, Gamuchirai Rumbidzai Mtengwa, a Masters student majoring in Occupational and Environmental health in the Department of Public Health at the University of Venda am carrying out a research study entitled: "*Factors influencing occupational health and safety practices among farm workers at the University of Venda Farm*". I am inviting you as informants to voluntarily participate in this study. You are free to opt out at any stage with no consequences. The information collected from you would be strictly for study purposes and it will be private and confidential according to research ethics at the University of Venda.

Signature of researcher

Signature of respondent

Date

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Appendix 3

C. LETTERS OF CORRESPONDENCE

See attached

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NAME OF RESEARCHER/INVESTIGATOR:
Ms GR Mtengwa

Student No:
11629709

PROJECT TITLE: **Factors influencing occupational health and safety practices among farm workers at the University of Venda farm.**

PROJECT NO: SHS/15/PH/16/1908

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Prof HA Akinsola	University of Venda	Supervisor
Dr A Tugli	University of Venda	Co-Supervisor
Ms GR Mtengwa	University of Venda	Investigator - Student

ISSUED BY:
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE

Date Considered: August 2015
Decision by Ethical Clearance Committee Granted
Signature of Chairperson of the Committee: .....
Name of the Chairperson of the Committee: Prof. G.E. Ekosse

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UNIVERSITY OF VENDA

OFFICE OF THE DEPUTY VICE-CHANCELLOR: ACADEMIC

TO : MR/MS GR MTENGWA

SCHOOL OF HEALTH SCIENCES

FROM: PROF J.E. CRAFFORD

DEPUTY VICE-CHANCELLOR: ACADEMIC

DATE : 02 NOVEMBER 2015

DECISIONS TAKEN BY UHDC OF 29TH OCTOBER 2015

Application for approval of Master's research proposal in Health Sciences: **GR Mtengwa (11629709)**

Topic: "Factors influencing occupational health and safety practices among farm workers at the University of Venda farm."

Supervisor:	UNIVEN	Prof. HA Akinsola
Co-supervisor:	UNIVEN	Dr. A Tugli

UHDC approved Master's proposal

Prof J.E. CRAFFORD

DEPUTY VICE-CHANCELLOR: ACADEMIC

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