



UNIVERSITY OF NAIROBI

COLLEGE OF AGRICULTURE AND VETERINARY SCIENCES

**A Survey of Hazards Associated with Animal Handling among Animal Health
Professionals and Care Givers in Nairobi County**

**A project report submitted in partial fulfillment of the requirement for the award of
Bachelor of Veterinary Medicine degree of the University of Nairobi.**

Researcher's Name: Robert Ibesit Omukaga

Registration Number: J30/2033/2010

Supervisor: Dr. Eddy Mosoti Mogo

Table of Contents

DECLARATION	3
DEDICATION	4
ACKNOWLEDGEMENT	5
ABSTRACT	6
CHAPTER ONE	9
1.1 Introduction.....	9
1.2 Problem Statement and Justification.....	10
1.3 Objectives	11
CHAPTER TWO	12
2.1 Literature Review.....	12
CHAPTER THREE	15
3.1 Materials and Methods.....	15
3.2 Data Management	17
CHAPTER FOUR.....	18
4.1 Results.....	18
4.1.1 Demography.....	18
4.1.2 Hazards	18
4.1.3 Action taken after the injury	24
4.1.4 Personal protective equipment	25
4.1.5 Animal type causing Injury.....	26
4.2 Summary of the Risk Factors	27
CHAPTER FIVE	28
5.1 Discussion.....	28
5.1.1 Demographics	28
5.1.2 Animal Type Causing Injury.....	28
5.1.3 Hazards	29
5.1.4 Personal protection.....	31
5.1.5 Risk factors involved	32

5.2 Conclusion	33
5.3 Recommendations.....	33
CHAPTER SIX.....	35
6.1 References.....	35
CHAPTER SEVEN	37
7.1 Appendices.....	37
7.1.1 Appendix 1.....	37
Figure 1: Map of Nairobi County.....	16
Figure 2: Details of the major categories of hazards responsible for most injuries	18
Figure 3: Accident Hazards: Percentage prevalence (vertical axis) vs injuries (horizontal axis	19
Figure 4: Biological hazards; percentage prevalence vs injury type.....	20
Figure 5: Chemical hazards; percentage prevalence vs injury type	21
Figure 6: Action taken after injury.....	24
Figure 7: Use of personal protective equipment	25
Figure 8: Animal type causing injuries	26
Table 1: Physical hazards.....	22
Table 2: Ergonomic, psychosocial and organizational factors.....	23
Table 3: Risk factors involved	27

DECLARATION

I, Omukaga Robert Ibesit do declare that this project report hereby submitted in partial fulfillment of the requirement for the award of the degree of Bachelor of Veterinary Medicine of The University of Nairobi is my own work and has not been submitted by any other person for an award of any degree at any other institution of higher learning.

Signed.....

Date.....

OMUKAGA ROBERT IBESIT - J30/2033/2010

This project has been submitted for examination with my approval as a university supervisor

Signed.....

Date.....

DR. EDDY MOSOTI MOGOA – Department of Clinical Studies, University of Nairobi.

DEDICATION

This project is dedicated to my family who offered me moral, spiritual and financial support, my friends for their social support, my relatives for their constant encouragement and my university, the University of Nairobi, for nurturing me into who I am today. I am glad of you all.

ACKNOWLEDGEMENT

My greatest acknowledgements go to God almighty that, up to this time He has been sincere to me and has never forsaken me. My deepest appreciation also goes to my project supervisor, a man of the people, Dr. Eddy Mosoti Mogo – Department of Clinical Studies, University of Nairobi for his patience, guidance and advice. I am proud and privileged to have had the opportunity to work with him.

There are also a few people in particular whom I would like to thank: Dr Ndeereh of the Kenya Wildlife Service, who aided in collection of wildlife-related data; and Evans Juma for helping me in different analytical skills.

ABSTRACT

Animals of all kinds require some handling at one time or another and have the potential to cause harm to the animal handler during that process. Harm to animal handlers may come in form of physical injuries or through exposure to harmful disease pathogens that some of them may harbor, including zoonotics.

A survey was carried out among animal health professionals and care givers in Nairobi County with the objective of establish the hazards associated with their work and the related risk factors. This study was carried out using questionnaires that were administered to respondents in target institutions, known to have personnel who work with animals. The questionnaires focused on the personal details of the of the respondent, nature of work they performed, animal category they handled, use of personal protective equipment, frequency of handling and the category of the hazards (accidents, physical hazard, biological hazards, chemical hazards, ergonomic, psychosocial and organizational factors), they were exposed to. Data collected was collated and analyzed.

Response rate to the study questionnaires was 76%. Amongst the respondents, 73.68% were male while 15.79% were female. The remaining 10.53% of the respondents did not indicate their gender. The study revealed that accident hazards (cuts, kicks, burns, dog bites, wildlife bites, dust allergies, falls, slips, sprains, needle pricks, scratches, food dust, goring, electric shock and bee stings) were the major hazards personnel were exposed to at 68%. Biological hazards (dust respiratory effects, allergic alveolitis, mucous membrane irritation, zoonosis, occupational eczemas and laboratory animal allergies) contributed 12% to the total hazards reported, chemical

hazards (membrane irritation, pulmonary dysfunction, dermatosis, exposure to carcinogens, exposure to aflatoxins, inhalation of formaldehydes, chemical dermatitis and allergies) 9%, ergonomic, psychosocial and organizational factors (bad fecal smell, musculoskeletal problems, drug addiction, exposure to attacks by cattle robbers and job dissatisfaction) 7% and physical hazards (hair loss, noise stress, exposure to ionizing radiation) 3%. Among the animals causing the injuries, wild animals caused most injuries (51.67%), followed by dogs (16.67%), livestock [cattle, sheep, goats and camels] (15%), laboratory animals (15%), cats (3.33%), and equines (3.33%). Response to the action taken after the injury revealed that 50% of those attacked preferred self medication, 25% went to hospitals, while the other 25% did nothing leaving the injury to resolve on its own. The study also revealed that most animal health professionals were aware of the hazards and most of them used personal protective equipment, with 31.33% using foot protection, 30.12% used gloves, 30.12% used clothing/dust coat, 7.23% used face masks, while 1.20% used none at all.

The study established that several risk factors were involved in exposure to work-related hazards. These included: restraint of animals for various procedures; husbandry practices like feeding, changing of beddings; cleaning of cages; collection of biological samples; administration of substances such as vaccines; animal treatment; animal breeding activities; grooming; conduct of experimental procedures; milking; taking radiographs; and training of security dogs.

It was concluded that animal health professionals and care givers in Nairobi County are exposed to a variety of hazardous situations in the course of their work and need to remain diligent to ensure their health is protected while working with various types of animals. It is recommended that these categories of workers should be well trained (and retrained on a regular basis) on

appropriate techniques of animal handling and care and on the correct use of appropriate personnel protective equipment (PPE).

CHAPTER ONE

1.1 Introduction

Livestock keeping in Kenya is a major agricultural activity. A successful livestock sector requires the support of a robust veterinary service. In Kenya currently, veterinary practice is gaining more importance. Cattle (both indigenous and exotic), goats, sheep, donkeys and camels form the bulk of the country's animal population. Companion animals, including dogs, cats, birds, some reptiles, are also kept in most Kenyan homes. On the other hand, wildlife species, a major resource in Kenya, also get the necessary attention as they earn the country foreign exchange. Although laboratory animals are to be found in a number of biomedical research institutions, it is not uncommon to find them as domestic pets.

All these animals require some handling at one time or another and have the potential to cause harm to the animal handler during that process. In the context of this study, an animal handler is a person who attends to animals in various settings including farms, kennels, pounds, hospitals, wildlife parks / reserves / captive facilities and laboratories. This person carries out a wide range of chores in order to keep the animals healthy and fit for the purpose for which they are being kept, e.g., medical experiments, breeding, production, provide security, or humane purposes. Besides attending to the animals themselves, the animal handler may have additional responsibilities including those of taking care of the facilities where the animals are kept and other various related jobs (<http://www.ilo.org/safework>, 1999).

Harm to animal handlers may come in form of physical injuries or through exposure to harmful disease pathogens that some of them may harbor as these pathogens may be zoonotic. On the other hand, where these animals are housed and / or used in experimental settings, there is also

potential for harm from the equipment used and the environment in which they live. It is also important to note that an animal handler's work sometimes may be monotonous and annoying (<http://www.ilo.org/safework>, 1999).

Indeed, there is evidence to show that animal husbandry and care is associated with injuries that may include burns, crush injuries or lacerations, musculoskeletal injuries (sprains, strains, fractures), those related to kicks, bites, scratches, slip and fall injuries, hearing impairment, skin irritation, respiratory exposures and needle stick injuries (Mogoa, Undated; Berkelman, 2003; Weese and Jack, 2008; Nigam and Srivastav, 2011; Kirui et al., 2013; Kimeli et al., 2014). In Kenya, little is documented on the types and degree of animal related injuries that veterinarians, animal handlers and care givers are exposed to during the course of their work. Recent studies (Kimeli et al., 2014) on needle stick and sharps injuries among veterinary students and another (Kirui et al., 2013) on animal related injuries to veterinarians working in different sectors in Kenya, show that these hazards exist. It is therefore necessary that animal health professionals and animal handlers and care givers know the potential injuries and harm associated with the kind of work they do and how such can be mitigated to ensure that they work safely.

1.2 Problem Statement and Justification

There is evidence that the hazards veterinarians and animal care givers may be exposed to during the course of their duty are numerous. It is also true that a number of reports in the literature have documented some of these cases. Most of the documented cases of hazards associated with animal handling and care among animal health professionals and animal handlers are specific to particular categories of animals / activities and are largely limited to the developed world. For instance, reports on needle stick injuries focus substantially on human medicine where much effort has been devoted to reducing the incidence of these exposures. However, there is no

evidence of this effort in veterinary medicine (Weese and Jack, 2008). This is despite the fact that needle stick injuries can predispose to serious blood borne zoonotic pathogens and thus need to be taken seriously.

In Kenya, little is documented (Kirui et al, 2013; Kimeli et al., 2014;) on the types and degree of animal related injuries that animal health professionals and care givers are exposed to during the course of their work. The coverage of these two studies however, had a limited reach in terms of the range of animal health professionals and care givers included in the studies. This study was designed to establish the extent of the problem among a wide range of animal health professionals involved in animal handling and care so as to establish the extent of exposure of such personnel to the associated occupational hazards.

1.3 Objectives

To carry out a survey of hazards associated with animal handling among animal health professionals and care givers in Nairobi County.

- i. To establish the types of hazards associated with animal handling and care among animal health professionals and care givers in Nairobi County.
- ii. To establish the risk factors associated with the occurrence of the hazards among animal health professionals and care givers in Nairobi County.

CHAPTER TWO

2.1 Literature Review

People who work and interact with animals are at risk of being affected by this interaction, in one way or another. There is real potential for these people to face a number of hazards including physical injuries, whereby the animals may bite, kick, trample, scratch, peck or knock. In adverse cases these injuries have been associated with mortality, zoonotic disease transmission like in cases of rabies and work related trauma among veterinarians (Coleman et al., 2004).

Common injuries associated with animal husbandry and care include burns, crush injuries or lacerations, musculoskeletal injuries (sprains, strains, fractures), kick related injuries, scratches, bites, slip and fall injuries, hearing impairment, skin irritation, respiratory exposures, needle stick injuries, among others (Mogoa, Undated; <http://www.ilo.org/safework>, 1999; Berkelman, 2003; Weese and Jack, 2008; Nigam and Srivastav, 2011; Kirui et al., 2013; Kimeli et al., 2014).. These hazards may be related to: the equipment, materials and practices used in performing routine animal husbandry; animal contact either direct or indirect; or due to techniques or materials (biohazardous substances) that may be used in the course of experimentation, especially in biomedical research settings (Mogoa, Undated; <http://www.ilo.org/safework>, 1999).

When working with animals for instance, veterinarians may often perform procedures that cause pain and distress to the animal. The circumstances of examination or treatment may upset the animal, requiring the veterinarian to physically restrain the animal they are examining. This can expose the veterinarian to attack by the animal. A study done in the United States estimated that more than 4 million dog bites and an average of 15 to 16 deaths from animal related injury occur annually in that country (Ricky and James, 2001).

Similarly, wildlife professionals by virtue of their profession are exposed to various occupational hazards in the course of their work. Wild animals perceive whatever approaches them as either prey or predator and depending on their position in the food chain, can attack with either an intention to predate or survive. As a result therefore these professionals are at a greater risk than that of the general population. They face unique, numerous and diverse hazards that are not only associated with the animals but their work (Nigam and Srivastav, 2011).

Animal health professionals and care givers work with all manner of equipment while providing not only animal health and management services, but also other services in the animal housing facilities, especially in research institutions and farm settings. There is evidence that some hazards these workers are exposed to result from equipment and materials used. Needle-stick injuries for instance have been and still are an inherent risk to animal health professionals during the course of their work (Mogoa, Undated; Berkelman, 2003; Weese and Jack, 2008; Nigam and Srivastav, 2011; Kimeli et al., 2014). In developing countries like Kenya in which zoonotic diseases are endemic, animal health professionals exposed to such needle stick injuries are at real risk of contracting zoonotic diseases. Similarly veterinary vaccines are being used in increasing frequency, however the extent to which veterinary vaccines pose a health hazard to humans is unclear. The increased use of veterinary vaccines may be accompanied by an increase in human exposure to the vaccine strains, thus increasing the potential for adverse effects (Berkelmann, 2003). Needle stick injuries therefore become a point of focus while undertaking vaccination activities.

Animal practitioners may also get injured by machines, be involved in motor vehicle accidents, be burnt or irritated by chemicals used when working with animals or get hearing impairment when working around loud machinery or noisy animals (Mogoa, Undated). Some hazards may

also take the form of allergic reactions or as zoonoses. These may be contracted through contact with animals or animal secretions or waste. Research has shown that of approximately 1700 known human pathogens, 50% are zoonotic. Of the 156 emerging pathogens, 73% are zoonotic (Ricky and James, 2001). Animal health professionals and handlers therefore stand a risk of contracting diseases from infected animals while conducting their routine functions.

CHAPTER THREE

3.1 Materials and Methods

The study was conducted in Nairobi County. With a population of about 3.36 million (estimated in 2011), Nairobi is the second-largest city by population in the African Great Lakes region after Dar es Salaam, Tanzania. According to the 2009 census, in the administrative area of Nairobi, 3,138,295 inhabitants lived within 696 km² (269 sq miles). Nairobi is the 14th largest city in Africa, including the population of its suburbs.

Nairobi is one of the most prominent cities in Africa, both politically and financially. Home to thousands of Kenyan businesses and over 100 major international companies and organizations, including the United Nations Environment Programme (UNEP) and the main coordinating and headquarters for the UN in Africa and Middle East, the United Nations Office at Nairobi (UNON). Nairobi is an established hub for business and culture. The Globalization and World Cities Study Group and Network (GaWC) defines Nairobi as a prominent social centre. The county has both domestic and wild animals. Domestic animals include cattle, sheep, goats, donkeys, horses, camels, pigs, chicken, dogs, cats, wild birds, rabbits, guinea pigs etc. The Nairobi National park is home to many wild animal species. In the county, can also be found, many biomedical research institutions including; the International Livestock Research Institute (ILRI), Kenya Medical Research Institute (KEMRI), Institute of Primate Research (IPR) and University of Nairobi's Veterinary Faculty, among others. Health and management needs of the animals in Nairobi County are provided by many private veterinary practices, owned by both individuals and institutions. Security needs of many individuals and institutions / organizations

are also partly met by the many security firms that own and provide security dogs for this purpose.



Figure 1: Map of Nairobi County.

The study targeted animal health professionals and animal handlers and care givers in both large and small animal practices and those working with wildlife. The study targeted selected institutions of higher learning, those involved in research using animals, those using animals for work purposes, and those working with wildlife. These institutions included: University of Nairobi's Faculty of Veterinary Medicine, University of Nairobi Faculty of Veterinary Medicine Farm, Department of Veterinary Services' Veterinary Laboratories, Kenya Society for the Protection and Care Animals (KSPCA), KK Security Company (A security firm that uses dogs) and Kenya Wildlife Service (KWS).

The study was conducted using questionnaires that were administered to the respondents in the target institutions. The questionnaires consisted of questions seeking information on: personal details of the respondent, nature of work they performed, animal category handled, use of personal protective equipment, frequency of animal handling and categories of hazards (accidents, physical hazards, biological hazards, chemical hazards, ergonomic psychosocial and organizational factors) they were exposed to (Appendix 1). The questionnaire was either filled by the investigator while interviewing the respondents or the respondents themselves went through the questionnaires and filled them.

3.2 Data Management

The data collected from the various respondents in this study was entered into MS Excel program and descriptive statistics generated. Data is presented as percentages of individual outcomes over total respondents in the study.

Data on health related problems and illnesses amongst the sampled animal health practitioners, animal handlers and care givers was collated, summarized and tabulated and pooled data obtained for analysis so as to categorize the problems. The results are reported as percentages and presented in form of pie charts, histograms and bar graphs.

CHAPTER FOUR

4.1 Results

4.1.1 Demography

A total of 50 questionnaires were administered in this study. A total of 38 animal health professionals and handlers responded to the questionnaires, thereby giving a response of 76%. Majority of the respondents opted not to give their personal details thereby making it not possible to report on the details in this section of the questionnaires.

4.1.2 Hazards

From the current study, respondents indicated that they had been exposed to all types of hazards investigated. A considerable number of the respondents had sustained accident injuries (69%); biological injuries (12%); chemical injuries (9%); ergonomic, psychosocial and organizational injuries (7%); and physical injuries (3%) as demonstrated in the figure below.

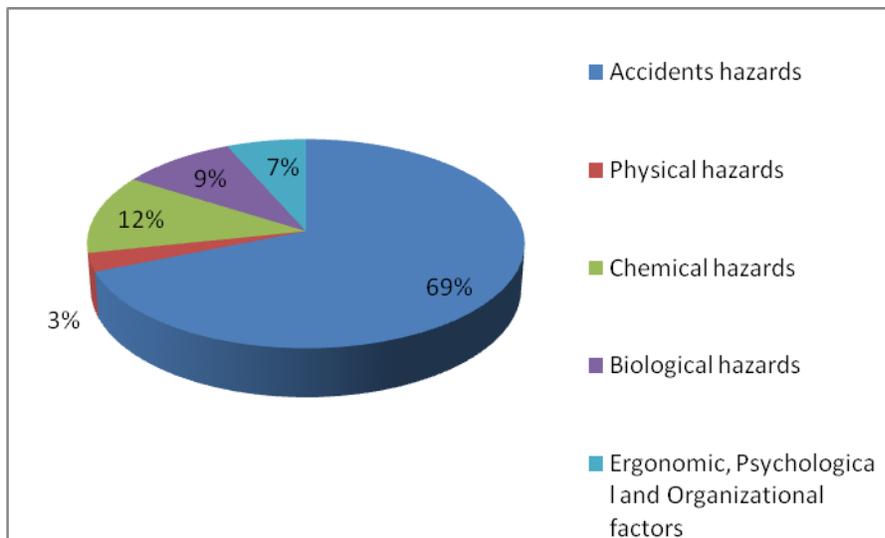


Figure 2: Details of the major categories of hazards responsible for most injuries

The details of the specific type of injuries in different categories of hazards are as given below and presented in Figures 3, 4 and 5 and Tables 1 and 2.

Accident hazards

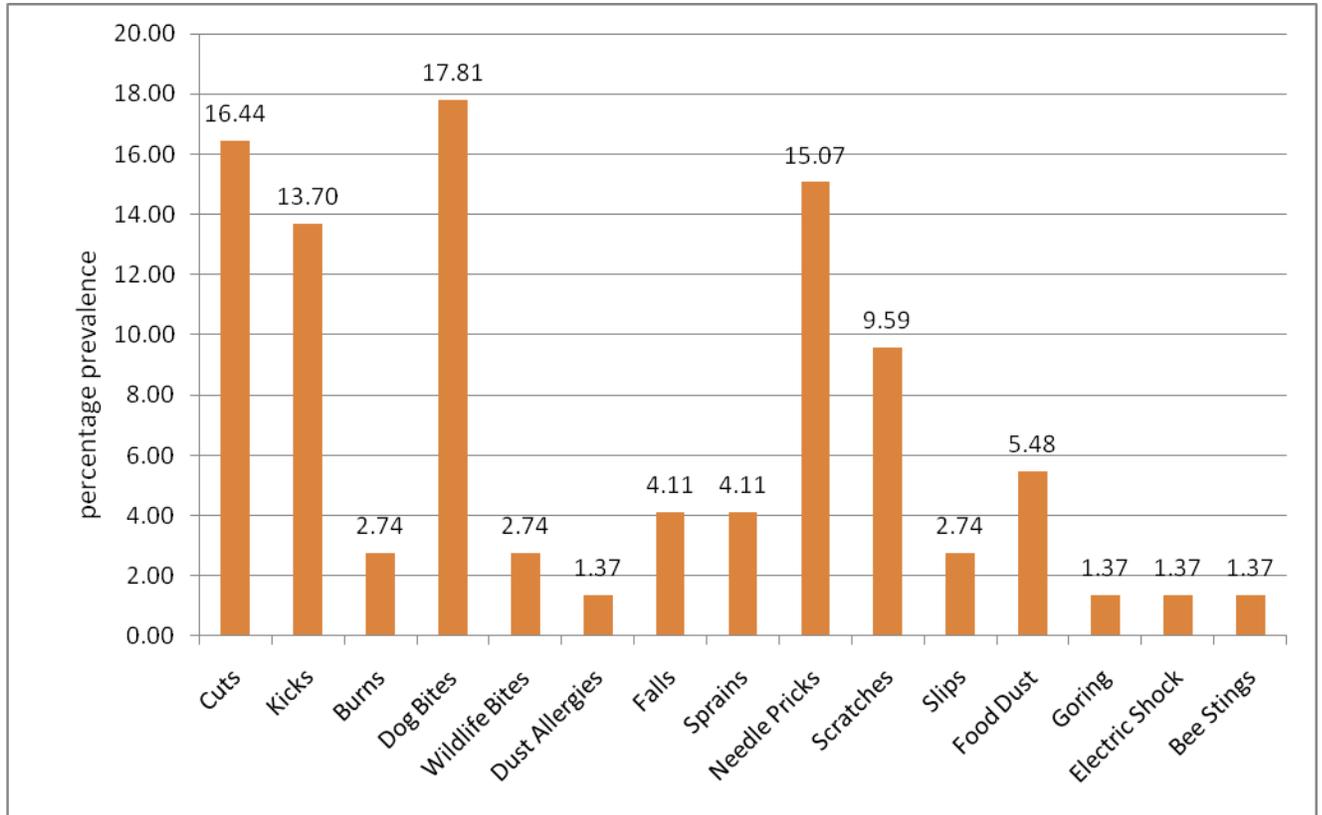


Figure 3: Accident Hazards: Percentage prevalence (vertical axis) vs injuries (horizontal axis)

From Figure 3 above representing the accident injuries reported, dog bites contributed 17.81% of the total injuries reported which formed the majority of the accident injuries. Other injuries in descending order were; cuts at 16.44%, needle pricks (needle stick) at 15.07%, kicks from bovines and equines at 13.70%, scratches from cats and laboratory animals at 9.95%, dust from animal food at 5.48%, falls at 4.11%, sprains at 4.11%, burns at 2.74%, wild animal bites at 2.74%, slips at 2.74%, dust allergies at 1.37%, goring at 1.37%, electric shock at 1.37% and bee stings at 1.37%

Biological Hazards

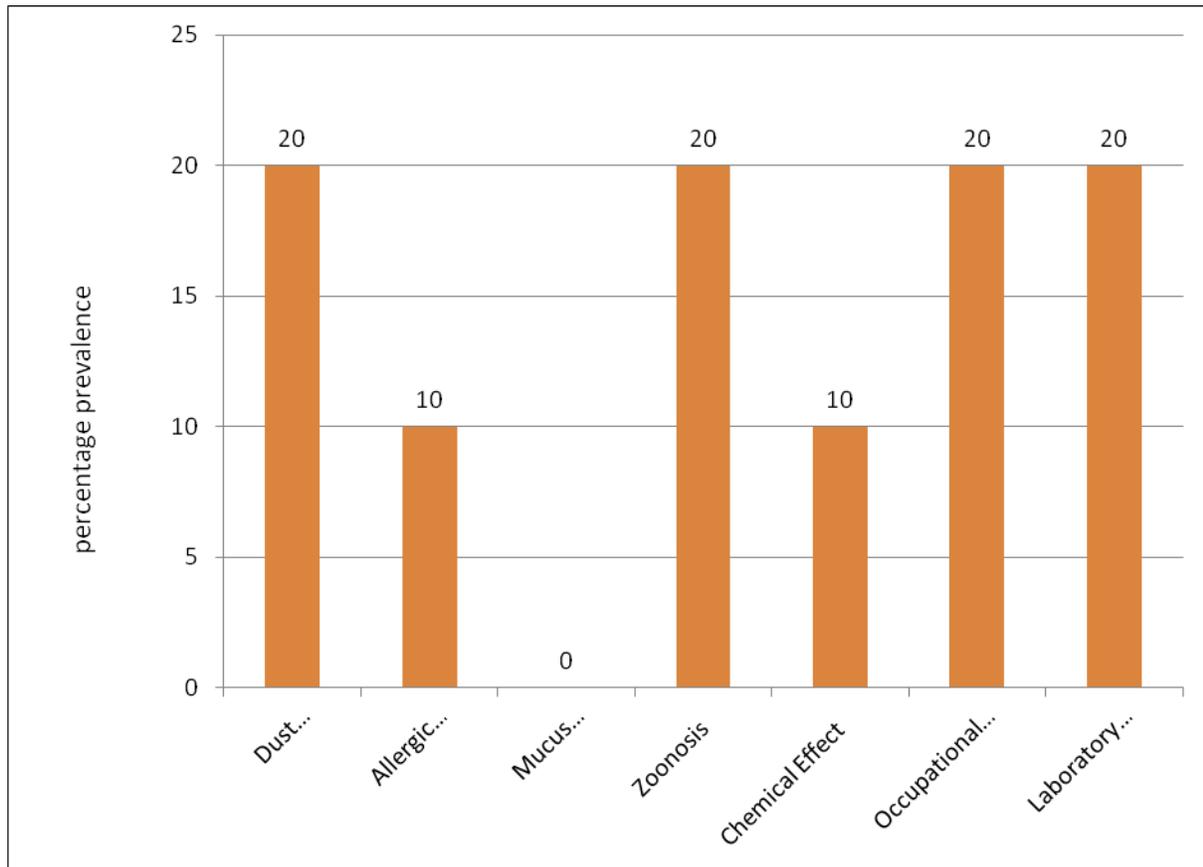


Figure 4: Biological hazards; percentage prevalence vs injury type

Among the biological hazards (Figure 4), dust respiratory effects formed 20% of the total injuries suffered in this category. The dust mainly originated from animal feed such as dry hay and farm machinery where animal feed is processed. A similar percentage was also reported for hazards such as zoonosis (20%), occupational eczemas/contact dermatitis (20%), laboratory animal allergies (20%), allergic alveolitis mainly due allergens from animal fur especially laboratory animals (10%), chemical effects (10%).

Chemical hazards

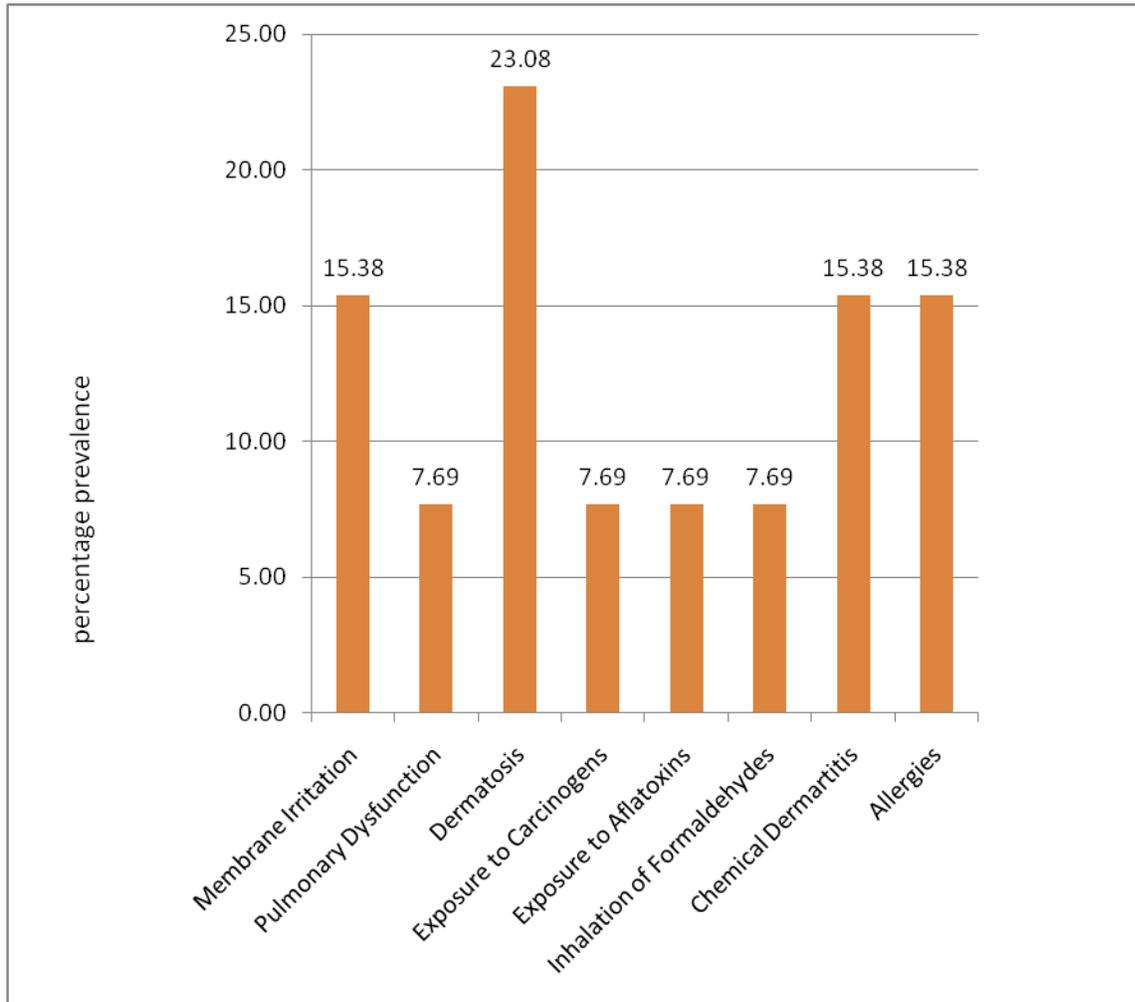


Figure 5: Chemical hazards; percentage prevalence vs injury type

Analysis of the chemical hazards revealed dermatitis due to contact with chemicals such as pesticides to be the most prevalent (23.08%), the other hazards in this category in descending order were membrane irritation by formaldehydes (15.38%), chemical dermatitis (15.38%), chemical allergies such as asthma (15.38%), exposure to carcinogens (15.38%), pulmonary dysfunction (7.69%), exposure to aflatoxins (7.69%), and inhalation of formaldehydes (7.69%).

Table 1: Physical hazards

Major hazard	Injury Type	Employee Category				Pooled Data	%
		Vets	Vet P/professional	Lab Technicians	Animal Handlers		
Physical Hazards	Hair Loss	0	1	0	0	1	33.33
	Noise Stress	1	0	0	0	1	33.33
	Exposure to X-rays	0	0	1	0	1	33.33
Totals		2	1	0	0	3	

Injuries due to physical factors are given in Table 1. Physical hazards noticeably formed a lesser part of the total number of the injuries reported. Only three injury types were reported on the physical hazards with only one respondent reporting in each injury type. Hair loss due to exposure to ionizing radiation (33.33%; overall 2.6%) was reported by one respondent working in an x-ray room. The other injuries reported in this category included noise stress due to loud farm machinery and loud animals (33.33%; overall 2.6%) and exposure to ionizing radiation such as x-rays (33.33%; overall 2.6%).

Table 2: Ergonomic, psychosocial and organizational factors.

Major hazard	Injury Type	Employee Category				Pooled Data	%
		Vets	Vet P/profession	Lab Technicians	Animal Handlers		
Ergonomic, Psychological and Organizational factors	Bad Fecal smell	0	0	1	2	3	42.86
	Musculoskeletal problems	0	0	0	1	1	14.29
	Drug Addiction	1	0	0	0	1	14.29
	Exposure to attacks by cattle robbers	1	0	0	0	1	14.29
	Job dissatisfaction	1	0	0	0	1	14.29

Injuries due to ergonomic, psychosocial and organizational factors are given in Table 2. Bad fecal smell leading to job dissatisfaction (42.86%, overall 0.08%) formed a major part of the ergonomic, psychosocial and organizational factors. The other injury types reported in this category included; musculoskeletal problems (14.29%, overall 0.03%), drug addiction (14.29%, 0.03% overall), exposure to attacks by robbers (14.29%, 0.03%) and job dissatisfaction (14.29%, overall 0.03%). Among those who reported drug addiction gave beer as one of the drugs when a client offered to pay you in a bar for the services rendered. Robbery mainly occurred as a result of late working hours in insecure areas.

4.1.3 Action taken after the injury

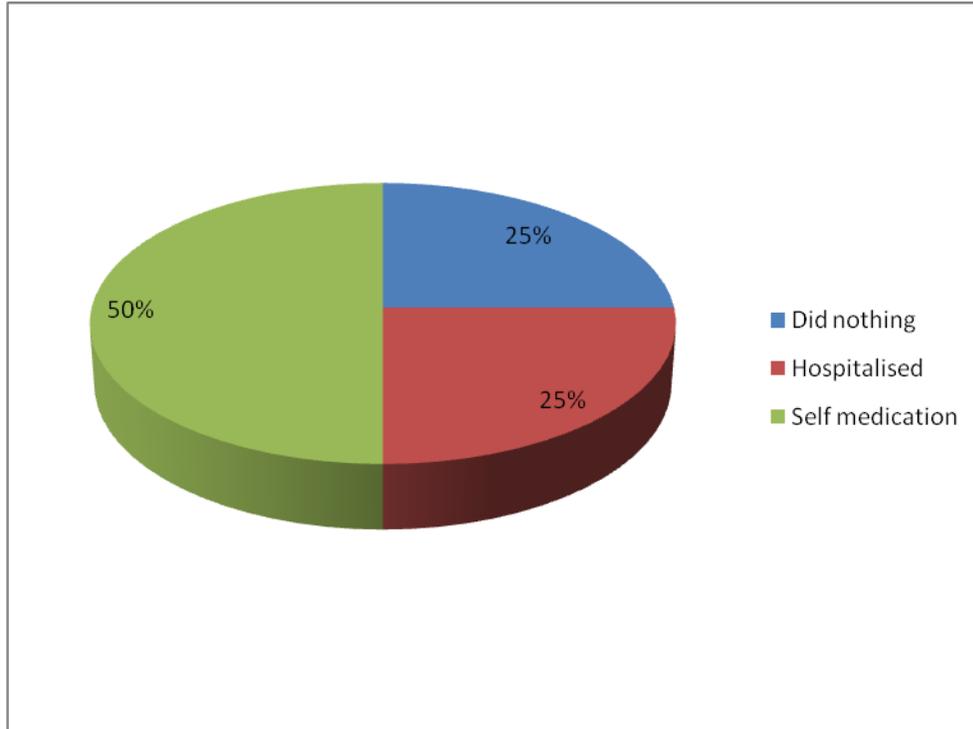


Figure 6: Action taken after injury.

Among those injured, 50% reported to have self medicated themselves mostly through oral medication, disinfection of wounds or massaging of the area affected. Twenty five percent of those affected reported to have gone to hospitals, mainly due to major ailments while the other 25% reported to have done nothing, opting to leave the injury to resolve on its own (Figure 6).

4.1.4 Personal protective equipment

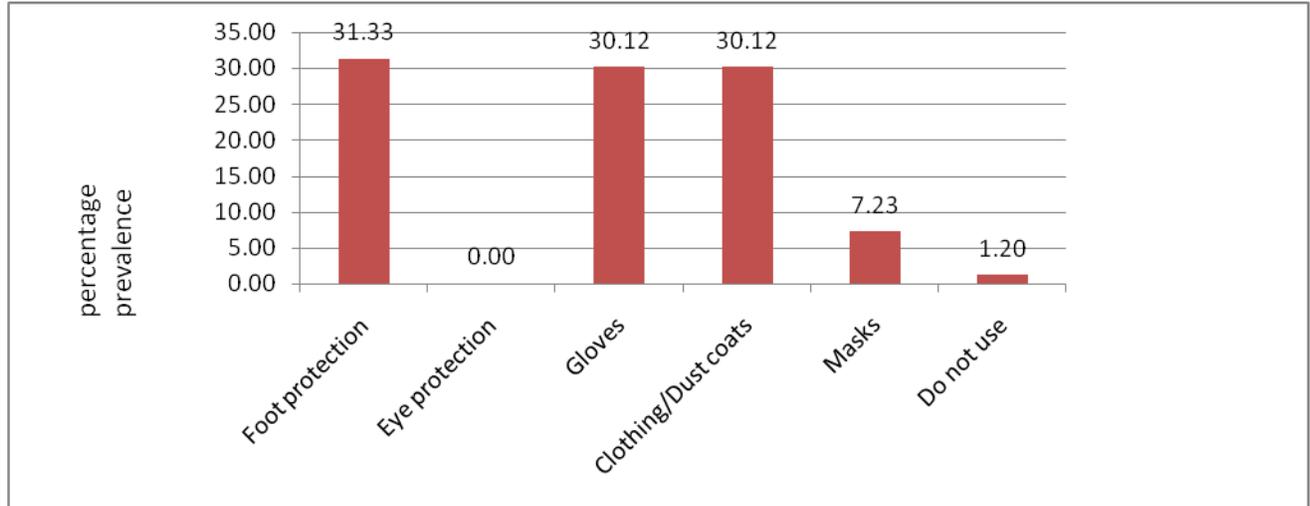


Figure 7: Use of personal protective equipment

Figure 7 gives details of use of personal protective equipment in the course of work in the current study. About 31% of the respondents reported to use foot wear such as gumboots, about 30% used gloves, about 30% used dust coats, and about 7% used face masks, especially when working in feed stores while 1.20% did not use any personal protection equipment.

4.1.5 Animal type causing Injury

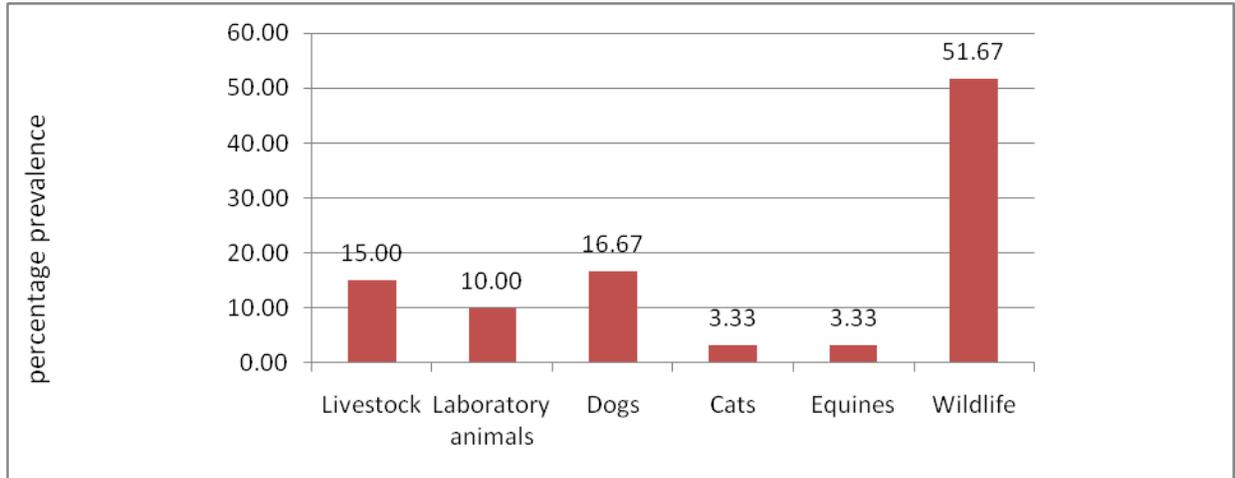


Figure 8: Animal type causing injuries

Figure 8 shows the animal categories causing injuries to personnel in this study. Wild animals caused most injuries at 51.67%, resulting from bites and scratches. Dogs caused 16.67% of the injuries reported mainly due to dog bites. Livestock injuries due to goring or kicks amounted to 15% of the injuries reported. Scratches and bites by laboratory animals were at 10%. Others were cats 3.33% resulting mainly from scratches and kicks from equines resulted to 3.33% of the injuries.

4.2 Summary of the Risk Factors

Table 3: Risk factors involved

Risk Factor	Percentage prevalence (%)
Animal restraint	15.13
Husbandry practices (feeding, cleaning, etc.)	15.13
Collection of samples	14.47
Administration of substances	13.16
Treatment	11.84
Breeding	10.53
Grooming	8.55
Experimental procedures	5.26
Milking	3.29
Taking radiographs	1.97
Other (e.g., training of dogs)	0.66

These risk factors that influenced the exposure to the hazards identified in this study included: restraint of animals for various procedures (15.13%); husbandry practices including feeding, changing of beddings cleaning of cages etc, (15.13%); collection of samples (14.47%); administration of substances such as vaccines, (13.16%); treatment (11.84%); breeding (10.53%); grooming (8.55%); conduct of experimental procedures (5.26%); milking (3.29%); taking radiographs (1.97%); and training of security dogs (0.66%).

CHAPTER FIVE

5.1 Discussion

5.1.1 Demographics

An analysis of the data obtained suggested that not all groups targeted in this study responded to questionnaires, thus the response rate of 76% obtained. Another feature that emerged is that most respondents did not prefer to give their personal details. This trend is similar to findings in a previous survey (Fluidsurveys.com, 2014) where a response rate of 24.8% is expected when the survey targets the general public as opposed to the expected 90% when internal surveys are conducted. The response rate normally is dependent on the length of the questionnaire and the technicality of the questions.

5.1.2 Animal Type Causing Injury

In the current study, wild animals were the most risky to handle and topped the list of animals that caused the most hazards. This comes with no surprise because these animals rarely interact with humans and any encounter has a high chance of becoming chaotic (Nigam and Srivastav, 2011). Dogs came second and this is in line with a study done in the US which indicated that dog bites caused the most animal attack injuries (Ricky and James, 2001). Awareness of the type of the animal handled and setting working protocols for various species and/or situations giving due emphasis to personal safety would help in reducing and preventing occupational injuries and illnesses among animal health professionals and handlers (Nigam and Srivastav, 2011).

5.1.3 Hazards

Literature has it that animal health practitioners and handlers may be exposed to various work related injuries in the course of their work (Mogoa, Undated; Berkelman, 2003; Weese and Jack, 2008; Nigam and Srivastav, 2011; Kirui et al., 2013; Kimeli et al., 2014). These may vary from physical, chemical, biological, accidental, and ergonomic, psychosocial and organizational factors. The findings in the current study confirm the foregoing.

The data obtained on injuries to animal health practitioners and handlers while handling animals reaffirms that there is need to lay emphasis on restraint procedures when working with various animals and the importance of knowing the behavior of various animals and most critically, the important place of personal protective equipment in handling various animals.

Accident hazards formed the major part of the various hazards reported (69%). These resulted from attacks by animals themselves. The reason for this may be due to the poor handling and restraint of the animals while conducting especially painful procedures. These procedures may expose the practitioner or the handler to an attack by the animal (Ricky and James, 2001), especially dog bites, kicks by horses and cattle, scratches by cats and scratches and bites by laboratory animals. Though allergic reactions were minimal, these are existent and need to be taken seriously as part of the hazards in the profession. They are normally overlooked as specific diagnosis of allergens amongst animal health professionals and handlers are seldom carried out (Nigam and Srivastav, 2011). Most allergic reactions were expressed as; respiratory, enteric and skin disorders, eye, nose and throat irritation and dermatitis.

On the other hand, most accident hazards can be reduced by application of appropriate safety measures. Italian researchers reported that, needle stick injuries for instance were attributable to

incorrect needle handling by healthcare workers that could have been prevented while 24% of the remaining injuries could have been prevented through the use of safety devices (Weese and Jack, 2008).

Biological hazards were expressed in form of dust respiratory effects, allergic alveolitis, mucous membrane irritation, zoonoses, chemical effect, occupational eczemas and allergies. Allergic reactions formed a major part (20%) either as contact dermatitis or laboratory animal allergy as much as zoonoses. Zoonoses are not uncommon among animal health professionals and handlers. The finding in this study is supported by previous reports that seropositivity against e.g., brucellosis can be as high as 27.7%, among veterinary workers (Nigam and Srivastav, 2011). It has also been reported that animal associated allergy affects an estimated 10-30% of the individuals working with laboratory animals (Mogoa, undated). This was again confirmed in this study owing to the number of persons who reported to have suffered from laboratory animal allergies (20%). These hazards however could be prevented through use of personal protective equipment such as gloves, dust coats, foot wear and face masks. Vaccination of personnel against certain zoonotic diseases can also be adopted.

Physical hazards were few but the gravity of these hazards must not be taken for granted. The low number of the hazards reported in this category could be attributable to lack of awareness of the existence of these hazards amongst the workers, like exposure to ionizing radiation while taking x-rays. Hazards such as noise stress when working around loud machinery or noisy animals exist in literature (Mogoa, undated). Hearing impairment while working around loud machinery or noisy animals is part of the common hazards associate with husbandry and care of animals. Use of protective clothing like leaded gowns in areas with ionizing radiation and use of

ear muffs in noisy places can help reduce exposure to these hazards. However, some animal health workers and handlers reported becoming adapted to noise stress after sometime.

Similarly ergonomic, psychosocial and organizational hazards were few, but it must be kept in mind that the effects they cause are far much severe and may cause loss of lives. These hazards can result from poor design of the working environment and conditions and long working hours. These result in repeated micro-injuries that over time assume severe proportions, resulting in conditions like spondylitis (Nigam and Srivastav, 2011). Some hazards reported in this study such as job dissatisfaction due to factors such as bad fecal smell or poor working conditions, may not only affect the health of practitioner or handler but also the productivity of the employee. Improvement of the working conditions significantly reduces these hazards.

The hazards personnel are exposed to while working with animals are numerous and diverse. Most animal health professionals ignore these risks and tend to avoid using personal protection despite the awareness of the repercussions. In this survey, the data collected indicated that 50% of those affected seek self medication without putting into consideration the risks involved. Only 25% sought medical attention in hospitals, whereas 25% opted to do nothing. This trend is similar to that reported by Nigam and Srivastav, (2011). Health checkups are important to maintain health among professionals and needs to be emphasized.

5.1.4 Personal protection

It's important to take appropriate protective measures when handling animals. Data obtained in the current study clearly shows that most animal health professionals and handlers use at least one or more protective equipment. However, a certain small number does not use any PPE at all. This number poses a challenge if zoonotic diseases are present. It is therefore important to

reinforce good practices among this group. This will help safeguard both personal health as well as that of the people around these workers. It also helps to control transmission of diseases from sick to healthy animals.

5.1.5 Risk factors involved

From the study it was established that several risk factors were involved, with different levels of their contribution to exposure to the hazard. These risk factors included: restraint of animals for various procedures; husbandry practices; feeding, changing of beddings cleaning of cages etc; collection of samples; administration of substances such as vaccines; treatment of animals against various ailments; animal breeding; grooming; experimental procedures; milking; taking radiographs; and training of security dogs The listed risk factors are day to day activities animal health professionals and handlers are involved in. Most of these activities can only be performed when the operator is in close contact with the animal. On the other hand, some of these activities may provoke or irritate the animal. This therefore exposes the animal health practitioner or the handler to a higher risk of an attack by the animal. However it must also be noted that some of the risks did not directly involve the animals per se. Some risks related to the duration someone has been in practice. The total number of hazards one was exposed to for instance, directly related to the number of years in the practice. The more the years the more the hazards suffered. Other risks were related to the social set up. For instance, drug addiction to for example alcohol, involved social settings where the client preferred to pay for the services received in a bar. Proper knowledge of the risks associated with exposure to these hazards and how to avoid them will play a major role in decreasing the injuries suffered.

5.2 Conclusion

Working with animals, poses a potential threat to the health and welfare of the animal health professionals and the handlers. Making available the information of how to avoid these occupational hazards, availing the information on zoonotic diseases and how to avoid them, and setting standard safety guidelines of how to use equipment such the needles will help reduce these hazards. It's important for this professionals and handlers to give this issue the attention it deserves if any better results are to be realized

5.3 Recommendations

In an attempt to reduce the level of exposure of personnel to hazards associated with working or handling animals, the following recommendations should be considered:

- Appropriate personal protective equipment (such as gloves, overalls, gumboots, dust coats, face masks, goggles, gloves and any other) deemed necessary to help prevent the impact of the injury as well as zoonotic diseases, should be available and correctly used by the personnel.
- Optimal creation of awareness on the hazards as well as their impact on the population should be conducted. The awareness should target all the persons that deal with animals.
- Improved safe handling practices and safety precautions should be developed and implemented to address and prevent occupational hazards. Working protocols for various species and/or situations giving due emphasis to personal safety should be developed and adhered to by anyone handling animals.
- The manufacturer's safety guidelines on how to handle various types of chemicals should be strictly followed to avoid the occurrence of chemical hazards.

- Medical checkups on animal health personnel and handlers should be routinely / regularly conducted to ensure their good health. Similarly, medical attention should be considered in cases of any exposure to a hazard.
- Safety guidelines when handling equipment for veterinary use should be strictly followed. In case improved, safer equipment is available, they should be used.
- In cases where vaccines for certain zoonotic diseases are available, these should always be administered to the personnel and animals involved.

If the entire above are implemented, a drastic reduction in the number of hazards will be realized.

CHAPTER SIX

6.1 References

1. Berkelman, R.L (2003): Human Illness Associated with use of Veterinary Vaccines. *Clinical Infectious Diseases* 2003; 37: 407-414.
2. Coleman, Paul G., Eric M. Fevre and Sarah Cleaveland (2004): *Emerging infectious Diseases* Vol.10, No.1, London school of hygiene and Tropical medicine, London, England.
3. Fluidsurveys.com/university/response-rate-statistics-online-surveys-aiming/
4. International Hazard Datasheets on Occupation (1999). Animal Handler. http://www.ilo.org/safework/cis/WCMS_193149/lang--en/index.htm
5. Kimeli P., Kirui G., Mwangi W.E., Mogoia E.M., Kipyegon A.N., Juma P., Mulei C.M. (2014): Needle stick and Sharps Injuries (NSIs) among final year Bachelor of Veterinary Medicine Students at The University of Nairobi. *Proceedings of The Kenya Veterinary Association 48th Annual Scientific Conference, 23rd to 26th April 2014, Boma Inn, Eldoret, Kenya.*
6. Kirui Gilbert, Thaiyah Andrew Gitau, Mulei Charles Matiku, Nguhiu-Mwangi James and Mogoia Mosoti G. Eddy (2013): Animal-Related Injuries to Veterinarians Working in Different Sectors in Kenya. 1st One Health Conference, 22-26 September 2013, Hilton Hotel, Addis Ababa, Ethiopia
7. Mogoia, E (Undated): Hazards in Animal and Vaccine Production Facilities.
8. Nigam, P and A. Srivastav (2011): Assessing Occupational Hazards Among Indian Wildlife Health Professionals. *Veterinaski Arhiv* 2011; 81 (6), 731-741.

9. Ricky L.L and James L. H. (2001): *Wilderness and Environmental medicine*, 12, 168-174.
North Carolina Department of Health and Human Services, Section of Human Ecology and Epidemiology, Raleigh, NC.
10. Weese J. Scott and Jack, Douglas C. (2008): Needle stick injuries in veterinary medicine.
Can Vet J 2008;49:780–784.

CHAPTER SEVEN

7.1 Appendices

7.1.1 Appendix 1: Survey of Hazards Associated with Animal Handling among Animal Health Professionals and Handlers

*My name is **Robert Ibesit Omukaga**. I am a 5th Year Veterinary Student at the Faculty of Veterinary Medicine, University of Nairobi. This survey is for my student project, which is part of the requirements for the award of my degree. Kindly assist to complete the following questionnaire as completely as possible. Your views will be kept in complete confidence. Thank you for your support.*

Name (Optional) _____ Sex _____ Age _____

Nature of work _____ Duration in the job _____

Animal Category(ies) handled:

Animal category	Activities for which handled	Personal Protective Equipment (PPE)	Frequency of handling			
			Daily	Weekly	Monthly	Infrequently
Livestock (cattle, sheep, goats, camels, birds)						
Laboratory rodents						
Laboratory rabbits						
Laboratory birds						
Dogs						
Cats						
Equines						
Non-human primates						
Captive wildlife species						
Free-ranging wildlife species						

Others:						
Others:						

Activities for which animals are handled:

1. Restraint (for routine management)	5. Treatment	9. Taking radiographs			
2. Administration of substances	6. Husbandry practices e.g. feeding, changing of beddings, cleaning of cage	10. Milking			
3. Collection of samples	7. Experimental procedure	11. Other			
4. Grooming	8. Breeding	12. Other			
Category of hazard	Nature of hazard	No.	✓	Specifics of hazard	Consequence/Action taken
Accident hazards	Falls from horses and other riding animals				
	Slips, trips and falls (on slippery surfaces, stairs, etc.)				
	Struck by falling objects during handling				
	Electric shocks caused by defective or incorrectly operated equipment				
	Cuts and pricks caused by sharp objects including hypodermic needles, broken glass and syringes etc.				
	Bites, goring and/or being attacked by domestic or wild animals				
	Kicks, fractures, bites, scratches and stings caused by laboratory animals, domestic animals, honeybees, zoo animals, and other animals				
	Burns from hot metal objects (e.g., while branding farm animals)				
	Fires caused by flammable materials				
	Explosions of animal-food dust / air mixtures				
Physical hazards	Exposure to ionizing radiation emitted by veterinary X-ray equipment and from laboratory animals investigated or treated with radioisotopes and from their secretions.				
	Health problems (e.g., rheumatic, etc.) due to specific				

	conditions existing in the animal quarters, such as high humidity, winds, concrete floors, etc.				
	Exposure to excessive noise, heat stress				
	Exposure of skin and eyes to UV radiation used for sterilization and other purposes in laboratories and animal quarters				
	Cold or heat stress and exposure to frequent abrupt temperature changes (when entering or leaving climate conditioned rooms)				
Chemical hazards	Intoxication due to contact with chemicals, such as solvents, strong acids and alkalis, detergents, etc.				
	Dermatoses due to contact with chemicals, such as pesticides, acaricides, solvents, detergents, deodorants, animal medications, etc.				
	Inhalation of formaldehyde vapours leading to membrane irritation, skin irritation, asthma and potentially sino-nasal carcinoma				
	Systemic and gastrointestinal effects caused by exposure to cytotoxic agents (esp. in laboratory animal handlers)				
	Exposure to various carcinogenic, mutagenic and teratogenic agents (esp. in laboratory animal handlers)				
	Latex gloves associated latex sensitization leading to dermatitis, asthma or anaphylaxis				
	Allergies due to contact with formaldehyde and other allergenic substances				
Biological hazards	Infection due to contact with sick or pathogen-carrying animals, or from exposure to airborne pathogens, resulting in development of communicable diseases (zoonoses)				
	Laboratory-animal allergies (including: occupational asthma, allergic alveolitis, bronchitis, pneumonitis, rhinitis, skin rashes, etc.) and diseases of the airways.				

	Pulmonary dysfunctions in animal confinement workers caused by various etiologic agents, including hydrogen sulphide toxicity, bronchitis, non-allergic asthma, organic-dust toxic syndrome, mucus membrane irritation, and by bioaerosols and endotoxins.				
	Dust and endotoxin-related respiratory effects in animal-feed handlers.				
	Exposure to carcinogenic aflatoxins (causing primary liver cancer), in animal-feed workers				
	Acute health effects caused by various flea-control products used by animal handlers				
	Occupational eczemas and contact dermatitis				
	Various septic infections				
Ergonomic, psychosocial and organizational factors	Musculoskeletal problems in animal handlers				
	Danger of developing addiction to drugs, facilitated by easy availability of animal medications.				
	Job dissatisfaction related to the working environment (dirt, smells, etc.) and to the mainly physical character of work				
	Exposure to attacks by cattle robbers, valuable-pet thieves, etc.				
	Exposure to violence on the part of extremist groups (claiming to be "struggling for animals' rights", etc.)				

Adapted from: *International Hazard Datasheets on Occupation (1999). Animal Handler.* http://www.ilo.org/safework/cis/WCMS_193149/lang--en/index.htm