OCCUPATIONAL HEALTH HAZARDS TO VETERINARIANS

By

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A dissertation submitted to the University of Khartoum in partial fulfillment to the requirement for Master of Tropical Animal Health (MTAH)

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March 2008
DEDICATION

To

My parents

My husband

My sister and brothers

And to

My daughter

Sogya
AKNOWLEDGEMENT

In the name of ALLA the merciful

Firstly thanks to ALMIGHTY ALLA for lightening my way in searching for knowledge.

My gratitude and thanks for my supervisor Prof. Abdelaziz Eltayeb for his guidance and advice throughout the research progress.

My deepest thanks and appreciation to Dr Khitma Hassan Elmalik, head department of Preventive medicine and Public health, Faculty of Veterinary Medicine, University of Khartoum for her encouragement and provision of information.

Also thanks for my colleagues who were helpful in filling questionnaire forms with accurate information.

Finally I am in debt to my husband Dr. Diya Eldeen Seid Ahmed for his unlimited support, patience and help in taking care of our daughter during my study times.
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ABSTRACT

The objective of this study is to delineate the health hazards among veterinarians in their different fields of work and to assess the risks associated to the veterinary profession.

The study also included the various endeavors which are made in order to maintain good health and welfare of veterinarians in their career and to find out what interventions might be most effective at reducing these risks.

Data was collected to reflect the current situation with regard to veterinary services premises in Khartoum State, the laws which regulate the veterinary profession in Sudan and the support provided to veterinarians against occupational health hazards.

The method used to collect data was personal communication with veterinarians. Questionnaire forms were distributed to 100 veterinarians in Khartoum State in different fields of work in both private and public sectors.

Questionnaire findings were analyzed and presented into tables and diagrams to explain the health hazards to which veterinarians were exposed and the precautions undertaken to protect their health.

Results showed that all questionnaire participants agree that the risk of exposure to health hazards is probable.

72% of participants who work in government and semi government hospitals, all who work in private clinics and poultry farms were exposed to bacterial infections.

63% of participants who work in laboratories and all who work in poultry farms were exposed to viral infections.
All participants who work in slaughter houses and 90% of those who work in dairy farms were exposed to traumatic injuries.

Availability of measures of protection was shown at 58% of the participants.

It is concluded that veterinarians are exposed to great risks during the performance of their routine work. The methods of protection given and used are not enough to protect them against zoonotic diseases and other job associated risks.

It is recommended to improve work conditions and educate the principles of occupational health and safety.
ملخص الأطرة

الهدف من هذه الدراسة هو توضيح المخاطر الصحية التي يتعرض لها الأطباء البيطريين في مجالات عملهم المختلفة وتقييم المخاطر المرتبطة بمهنة الطب البيطري.

كذلك تتضمن الدراسة الجهود المختلفة المبذولة للحفاظ على صحة ورفاهية الأطباء البيطريين و إمكانية إيجاد معالجات فعالة للتقليل من المخاطر التي يتعرضون لها.

تم جمع البيانات التي تعكس الوضع الراهن للخدمات البيطرية في ولاية الخرطوم، القوانين التي تنظم مهنة الطب البيطري في السودان والدعم الذي يتلقاه الأطباء البيطريين لحمايتهم من المخاطر الصحية المهنية.

الوسيلة التي استخدمت في جمع المعلومات هي الاتصال المباشر بالأطباء البيطريين.

تم توزيع استمارات الاستبيان على منة طبيب بيطرى في مجالات عملهم المختلفة في كلا القطاعين العام والخاص في ولاية الخرطوم.

تم تحليل نتائج الاستبيان وتقييمها في شكل حاول لتوسيع المخاطر الصحية التي تعرض لها الأطباء البيطريين أثناء فترة عملهم، كذلك الاحتياطات التي يتمكنوا لحماية صحتهم.

أوضحت النتائج أن كل المشاركين في الاستبيان اتفقوا على احتمالية تعرضهم لمخاطر صحية مهنية.

22% من الأطباء البيطريين العاملين في المستشفيات البيطرية الحكومية وشبه الحكومية، كل العاملين في العبادات الخاصة وكل العاملين في مزارع الدواجن تعرضوا لإصابات بكثيرة.

23% من العاملين في المعمل البيطرية وكل العاملين في مزارع الدواجن تعرضوا لإصابات فيروسية.

كل العاملين في المسالخ و9% من العاملين في مزارع الألبان تعرضوا لإصابات كلامية.

58% من المشاركين اتفقوا على أن وسائل حمايتهم متاحة.

تم الاستخلاص إلى أن الأطباء البيطريين معرضون لمخاطر صحية جسيمة عند أداء عملهم الروتيني. كما أن وسائل الحماية المقدمة لهم واستخدامها من قبلهم ليست كافية لحمايةهم من الأمراض المشتركة بين الإنسان والحيوان وغيرها من المخاطر المرتبطة بالمهنة.

تمت التوصية بتحسين بيئة العمل وتعليم مبادئ السلامة والصحة المهنية.
Introduction

Veterinarians and animal health auxiliary personnel who work with animals or come into contact with them during the performance of routine duties face job – associated risks.

In the 20th century, the veterinary profession has been in the forefront of the control and eradication of old and emerging animal diseases.

The close contact of the veterinarians with animals or their products increases the likelihood of their contracting certain zoonotic diseases.
(Occupational Health in Animal Care, Use and research, (www.ivis.org) .Document No.B2519.0706.).

Occupational diseases are usually defined as diseases arising out of or in the course of employment.

Veterinarians have a multitude of health problems a fact which is often forgotten because of the widespread misconception that occupational health is mainly concerned with industry and industrialized countries.

Occupational health is the application of preventive medicine in all places of employment.

One of the declared aims of occupational health is to provide a safe occupational environment in order to safeguard the health of the employees.

The joint ILO/ WHO Committee on occupational health in the course of it's first session, held in 1950 state that occupational health should aim at :

1. The promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations.
2. The protection of workers in their employment form risks resulting form factors adverse to health.
3. The placing and maintenance of the workers in an occupational environment adapted to his physiological and psychological equipment.

The ultimate aim of the previous concepts is the adaptation of the work to man.

The objective of this study is to delineate the health hazards among veterinarians in their different fields of work.

The study will also include the varies endeavors which are made in order to maintain good health and welfare of veterinarians in their career.
CHAPTER ONE
LITERATURE REVIEW

1.1 Definition of the veterinary profession:-

A veterinarian is a person who has graduated from a university–level veterinary school.

Government veterinary officers should be civil servants. Their rights and privileges should be equal to those of other professional civil servants with equivalent educational backgrounds.

1.2 Registration of veterinarians in the veterinary councils:-

All veterinarians should be subject to the jurisdiction of independent veterinary council/board with the powers to implement standards of training, professional competence and ethical standards.

The Law of Sudan Veterinary Council (1995), amendment (2004) has defined the veterinary doctor as any qualified person who has registered according to this law. (A copy of the law is included in appendix).

Veterinarians who are registered in the permanent register are allowed to:-
1. Own clinics, veterinary drugs stores and animal production centers.
2. Issue medical certificates.
4. Claim of any fees that are decided by the Veterinary Council for the services which they offer.

1.3 Various fields of work of veterinarians:-

The number of veterinarians who have been registered in Sudan Veterinary Council up to August 2007 were about 5224. They work in both government and private sector. (The register of Sudan Veterinary Council.).
In Khartoum State, (the location of this study) veterinarians are distributed into the following locations:-

(1) **Federal Ministry of Animal Resources and Fisheries:**-  
It consists of the following six general administrations:-  
   b. Quarantines.  
   c. Planning and Extension.  
   d. Animal production.  
   e. Drugs and Veterinary pharmaceuticals.  
   f. General affairs.  
(Head department of planning and extension, Ministry of Animal Resources and Fisheries.)

(2) **Ministry of Agriculture, Animal Resources and Irrigation (Khartoum State):**-  
The General Administration of Animal Resources consists of the following administrations:-  
   a- Animal health /sections:-  
      1- Epidemiology  
      2- Zoonoses  
      3- Laboratory  
      4- Animal health  
   b- Animal production / sections:-  
      1- Artificial insemination  
      2- Dairy  
      3- Poultry (broiler-layer)  
      4- Hides  
      5- fodder  
      6- Breed improvement  
   c- Quality Control / units :-  
      1- Poultry  
      2- Dairy  
      3- Drugs and Veterinary pharmaceuticals
4- Red meat
5- Veterinary Services Control
6- Veterinary Training Center
7- Fisheries

(Head department of quality control, general administration of animal resources, Ministry of Agriculture, Animal Resources and Irrigation (Khartoum State).

(3) Ministry of Science and Technology:--
Animal resources Research Corporation/ Central Veterinary Research Laboratories

(4) Private sector:--
a. Poultry farms
b. Dairy farms
3. Private clinics
4. Private slaughter houses
5. Pharmacies

1.4 Occupational hazards of veterinarians:--

Occupational environment is the sum of external conditions and influences which prevail at the place of work and which have a bearing on the health of the working population.

In their occupational environment, veterinarians are exposed to varies factors which are adverse to health.

These health hazards may be grouped as under:--

1. Diseases due to physical agents:--
   - Radiation (ultra violet rays).
   - Mechanical factors (injuries and accidents).
   - Inadequate ventilation

2. Toxic hazards due to chemical agents: -
   (Fertilizers, insecticides, pesticides and disinfectants.)

3. Diseases due to biological agents:--
   a- Bacterial infections e.g.brucellosis - anthrax- animal tuberculosis.
   b- Viral infections e.g. rabies - arbo viral infections- avian infeluenza.
c- Rickettsial infections e.g. Q fever.
d- Fungal infections e.g. ring worms.
e- Ecto parasitic infection (bites of ticks and mites).
f- Internal parasitic infection (hydatidosis).

4. **Allergies** e.g. (eczema).

5. **Respiratory diseases** e.g. (Occupational asthma).


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1.5 **Measures for health protection of veterinarians:**

Veterinarians are not able to protect animals unless they protect their own health. Veterinarians face unique risks due to their close contact with animals, so many precautions should be taken by veterinarians during the performance of their routine duties and special care in case of emergencies such as in out breaks of zoonotic diseases.

The measures of prevention of occupational hazards among veterinarians may be grouped under the following heading:-

1. **Personal protection:**

To offer a barrier from environmental and animal exposures, veterinarians should use (PPE) personal protective equipments which protect certain areas of the body that may come into contact with animals.

(Safety, health and welfare at work (biological agents) Regulations, 1994, (www.fao.org).).

The personal protective equipments include the following:-

1. Hands (disposable gloves)
2. Arms (sleeve gloves)
3. Eyes (goggles or safety glasses)
4. Mouth and nose (face masks and face shields)
5. Head (hair bonnet)
6. Feet (shoe covers)
These equipments should be worn and removed correctly in order to prevent contaminations or exposures. 
(Figure 2-5 in appendix show photos of PPE).

2. Personal hygiene:-
Veterinarians should follow the simple rules of hygiene such as hand washing, paring the nails, bodily cleanliness and cleanliness of clothes. 
The use of mild disinfectants is of great value in protection from biological agents contamination.

3. Vaccination:-
Immunizations where available play an important role in protection of veterinarians against certain zoonotic diseases.
The use of pre exposure vaccines in cases of high probability of exposure to infectious diseases is an effective method to safeguard veterinarians health e.g. yellow fever vaccination when entering zones of yellow fever. The use of post exposure vaccine is of effective value in case of rabies.
CHAPTER TWO
MATERIALS AND METHODS

2.1. Period of study :-
(February 2007- March 2008).

2.2. Location of study :-
Locations where veterinarians work in both government and private sector in Khartoum State.

2.3 Target population of study :-
Veterinarians.

2.4 Data collection and analysis :-

2.4.1 Data collection :-
Data were collected by personal communication with authorized persons and from the records of the following sources:-

a- Federal Ministry of Animal Resources and Fisheries
b- Ministry of Agriculture, Animal Resources and Irrigation.
c- Sudan Veterinary Medical Association.
d- Sudan Veterinary Council.
e- Food and Agriculture Organization.
f- Ministry of Health /Department of Occupational health.

Books, reports and the results of using internet searching engines were additional sources of information.
2.4.2. Questionnaire:-

Sampling:-
A questionnaire was designed and distributed to 100 Veterinarians in Khartoum State.
The individuals under study had been chosen by random selection.

Questions:-
The questions included in the questionnaire covered the health hazards to which veterinarians are exposed during the course of employment and the protective measures undertaken by them.
(A copy of the questionnaire is included at the end of this chapter)

2.4.3 Data tabulation:-
Data taken from the questionnaire forms were analyzed to explain the results.
The results were presented as figures and percentages in tables and diagrams.
Date: -                                                                                                             Form No:-

Name: -
Sex: -
Age: -

Date of graduation: -
Date of employment at present post: -

Field of work: -
   A. Animal health
      Epidemiology and control of infectious diseases: -
      1. governmental and semi governmental clinic
      2. private clinic
      3. central veterinary research laboratories
Which section?
   B. Animal production
      1. dairy farm
      2. poultry farm
      3. slaughter house
         I. meat
         II. bi products
         III. hide industry

Probability of risk exposure at your work: - Yes No

What type of risk you have been exposed to? Please, specify and comment

Bacterial infection
Viral infection
Fungal infection
Rickettsial infection
Fever of unknown etiology
Ecto parasitic infection
Traumatic injury
Allergies
Pesticides
Radiation

The route of infection suspected: -
Digestive
Respiratory
Contact
Are there measures of protection available: - Yes No
If yes please specify
CHAPTER THREE
RESULTS

3.1. The numerous fundamentals which provide support to protect veterinarians against occupational risks they face:-

a- Federal Ministry of Agriculture and Animal Resources:-
Which give the following :-

1- Assurance of protection(50 SD.G) included in the basic salary.
2- Free pre and post exposure vaccines in case of outbreaks of zoonotic diseases and also rabies vaccine.
3- Personal protective equipments are available depending on the nature of work missions.
4- Special amount of money for milk to those who have contact with radiation.

b- Sudan Veterinary Medical Association :-
Which give financial support to any veterinarian who is registered in the Veterinary Council.
This support is given through the social office in case of both occupational and other diseases.
A document from the Ministry of Health/Department of Occupational health is requested to prove the occupational associated diseases.
It offers help in the expenses of treatment inside and outside country depending on the case.
The maximum level of social support in the budget of the association is 1000 SD.G per year.

c- Sudan Veterinary Council:-
The rules and regulations of Sudan Veterinary Council preserve the rights of veterinarians as civil servants but no support is provided to them in case of occupational risks.
3.2. Analysis of the questionnaire findings:-

Total number of veterinarians questioned :-
100

Duration of the questionnaire :-
From 8/1/2008 to 19/2/2008

Sex:-
Males:- 49       Females:- 51

Range of date of graduation:-
From 1979 to 2004

Range of date of employment at present post :-
From 1982 to 2007

Fields of work:-
Animal health:- 58                Animal production:- 42

Number of veterinarians in each field of work:-
1-  Government and semi government hospitals:- 29
2-  Private clinics:- 10
3-  Laboratories:- 19
4-  Dairy farms:- 10
5-  Poultry farms:- 10
6-  Slaughter houses:- 22

Probability of risk exposure at work:-
All those questioned answered YES.
The relationship between the field of work and the risk exposed to:

**Table (1):** The relationship between the field of work and the risk exposed to

<table>
<thead>
<tr>
<th>Field of work</th>
<th>Major type of risk</th>
<th>Number of veterinarians questioned</th>
<th>Number of veterinarians exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government &amp; semi-government hospitals</td>
<td>Bacterial infections</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td>Private clinics</td>
<td>Bacterial infections</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Laboratories</td>
<td>Viral infections</td>
<td>19</td>
<td>12</td>
</tr>
<tr>
<td>Dairy farms</td>
<td>Traumatic injuries</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Poultry farms</td>
<td>Bacterial infections &amp; viral infections</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Slaughter houses (meat-broiler-hides)</td>
<td>Traumatic injuries</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

**Suspected routes of infection:**

Shown at the following table:

**Table (2):** Suspected routes of infection

<table>
<thead>
<tr>
<th>Suspected route of infection</th>
<th>Number of veterinarians suspected this route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digestive</td>
<td>26</td>
</tr>
<tr>
<td>Respiratory</td>
<td>67</td>
</tr>
<tr>
<td>Contact</td>
<td>96</td>
</tr>
</tbody>
</table>

**Availability of measures of protection:**

Number of veterinarians answered YES: - 58
Number of veterinarians answered NO: - 42

**The measures of protection available include the following:**

2. Vaccination of the workers.
3. Implement of husbandry methods.
3.3 Types of risk:-

100 veterinarians were asked about the probability of exposure to risk at their work, all of them answered yes. Questionnaire participants were exposed to one or another of the following types of risk as shown in the following table.

**Table (3):- Descending order of types of risk**

<table>
<thead>
<tr>
<th>Type of risk</th>
<th>Percentage of veterinarians exposed to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial infections</td>
<td>59%</td>
</tr>
<tr>
<td>Viral infections</td>
<td>56%</td>
</tr>
<tr>
<td>Traumatic injuries</td>
<td>46%</td>
</tr>
<tr>
<td>Allergies</td>
<td>42%</td>
</tr>
<tr>
<td>Fever of unknown etiology</td>
<td>32%</td>
</tr>
<tr>
<td>Fungal infections &amp; pesticides</td>
<td>23%</td>
</tr>
<tr>
<td>Rickettsial infections</td>
<td>21%</td>
</tr>
<tr>
<td>Ecto parasitic infections</td>
<td>17%</td>
</tr>
<tr>
<td>Radiation</td>
<td>13%</td>
</tr>
</tbody>
</table>
Figure (1):- Descending order of types of risks

Percentage of veterinarians exposed to
3.4 Explanation of the results of each type of risk:-

3.4.1 Bacterial infections:-

59% of participants were exposed to different bacterial infections. The most common infectious agent was brucella among veterinarians who work in dairy farms and slaughter houses. In one of the cases the infection was transmitted to the veterinarian’s family. Sickness absenteeism is an important problem in case of undulant fever because of the long course of treatment.

**Table (4):** Bacterial infections in each field of work

<table>
<thead>
<tr>
<th>Field of work</th>
<th>Number of veterinarians questioned</th>
<th>Number of veterinarians exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government and semi</td>
<td>29</td>
<td>21</td>
</tr>
<tr>
<td>government hospitals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private clinics</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Laboratories</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Dairy farms</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Poultry farms</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Slaughter houses</td>
<td>22</td>
<td>7</td>
</tr>
</tbody>
</table>
3.4.2 Viral infections:-

56% of participants were exposed to different viral infections.

Rabies was common among veterinarians who work in veterinary hospitals and clinics.

Veterinarians who work in laboratories were at risk of handling samples in cases of zoonotic diseases e.g. 1 last suspicion of rift valley fever (October-December 2007), veterinarians who processed serum of suspected animals had different allergic responses e.g. 2 Last out break of avian influenza in 2006 veterinarians who work in poultry farms were at great risk as well as laboratory workers.

**Table (5):- Viral infections in each field of work**

<table>
<thead>
<tr>
<th>Field of work</th>
<th>Number of veterinarians questioned</th>
<th>Number of veterinarians exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government and semi government hospitals</td>
<td>29</td>
<td>20</td>
</tr>
<tr>
<td>Private clinics</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Laboratories</td>
<td>19</td>
<td>12</td>
</tr>
<tr>
<td>Dairy farms</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Poultry farms</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Slaughter houses</td>
<td>22</td>
<td>4</td>
</tr>
</tbody>
</table>
3.4.3 Fungal infections:-

23% of participants were exposed to fungal infections, especially those who work in hospitals and laboratories.

Table (6):- Fungal infections in each field of work

<table>
<thead>
<tr>
<th>Field of work</th>
<th>Number of veterinarians questioned</th>
<th>Number of veterinarians exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government and semi-government hospitals</td>
<td>29</td>
<td>11</td>
</tr>
<tr>
<td>Private clinics</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Laboratories</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Dairy farms</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Poultry farms</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Slaughter houses</td>
<td>22</td>
<td>4</td>
</tr>
</tbody>
</table>
3.4.4 Rickettsial infections :-

21% of participants were exposed to rickettsial infections. Veterinarians who work in anti mortem inspection of live cattle and sheep were exposed to Q fever.

Table (7):- Rickettsial infections in each field of work

<table>
<thead>
<tr>
<th>Field of work</th>
<th>Number of veterinarians questioned</th>
<th>Number of veterinarians exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government and semi government hospitals</td>
<td>29</td>
<td>13</td>
</tr>
<tr>
<td>Private clinics</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Laboratories</td>
<td>19</td>
<td>4</td>
</tr>
<tr>
<td>Dairy farms</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Poultry farms</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Slaughter houses</td>
<td>22</td>
<td>4</td>
</tr>
</tbody>
</table>
3.4.5 Fever of unknown etiology:-

32% of participants were exposed to fevers of unknown etiology. Veterinarians who work in dairy farms were at risk of such fevers.

Table (8):- Fever of unknown etiology in each field of work

<table>
<thead>
<tr>
<th>Field of work</th>
<th>Number of veterinarians questioned</th>
<th>Number of veterinarians exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government and semi government hospitals</td>
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<td>Laboratories</td>
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<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Slaughter houses</td>
<td>22</td>
<td>4</td>
</tr>
</tbody>
</table>
3.4.6 Ecto parasitic infections:

17% of participants were exposed to ecto parasitic infections such as bites of ticks and mites, specially those who work in anti mortem inspection.

Table (9):- Ecto parasitic infections in each field of work

<table>
<thead>
<tr>
<th>Field of work</th>
<th>Number of veterinarians questioned</th>
<th>Number of veterinarians exposed</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Poultry farms</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Slaughter houses</td>
<td>22</td>
<td>4</td>
</tr>
</tbody>
</table>
3.4.7 Traumatic injuries:-

46% of participants were exposed to traumatic injuries.

All veterinarians who work in slaughter houses were exposed to mild to severe traumatic injuries e.g. wounds-cut of finger- loss of one eye.

90% of veterinarians who work in dairy farms were exposed to traumatic injuries e.g. kicks of cows.

Table (10):- Traumatic injuries in each field of work

<table>
<thead>
<tr>
<th>Field of work</th>
<th>Number of veterinarians questioned</th>
<th>Number of veterinarians exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government and semi government hospitals</td>
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<td>9</td>
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<tr>
<td>Poultry farms</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Slaughter houses</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>
3.4.8 Allergies:-

42% of participants developed allergic responses such as skin, eye and upper respiratory tract allergies.

Veterinarians who work in hospitals and laboratories were the most at such risks.

Allergens were undetected in all cases.

Table (11):- Allergies in each field of work

<table>
<thead>
<tr>
<th>Field of work</th>
<th>Number of veterinarians questioned</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Government and semi government hospitals</td>
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<td>17</td>
</tr>
<tr>
<td>Private clinics</td>
<td>10</td>
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<tr>
<td>Laboratories</td>
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<td>Dairy farms</td>
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<tr>
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<td>3</td>
</tr>
<tr>
<td>Slaughter houses</td>
<td>22</td>
<td>5</td>
</tr>
</tbody>
</table>
3.4.9 Pesticides:

23% of participants were exposed to the risk of pesticides.

Table (12):- Pesticides at each field of work

<table>
<thead>
<tr>
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<th>Number of veterinarians questioned</th>
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<td>Slaughter houses</td>
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<td>4</td>
</tr>
</tbody>
</table>
3.4.10 Radiation:-

13% of participants were exposed to radiation. E.g. 1 veterinarians who work in Central veterinary research laboratories use RIA (Radio Immune Assay) method. E.g. 2 veterinarians who work in hides were at risk of exposure to Cr +6.

Table (13):- Radiation at each field of work

<table>
<thead>
<tr>
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</tbody>
</table>
CHAPTER FOUR
DISCUSSION

4.1 Suspected routes of infection:-

The routes of infection in all types of risk was suspected by veterinarians according to the causative agent of the risk and the probability of its mode of transmission.

96% of participants suspected contact to be the route of infection, 67% respiratory system and 26% of digestive system.

This result confirms that direct contact of veterinarians with animals, their exposures and contaminants is a real threat for their health.

4.2 The availability of protection methods:-

58% of participants agreed that protection measures were available while 42% of them answered not available. 42% is a high percentage to work without protection in work environment rich in hazards.

Personal protective equipments (PPE) refers to a variety of implements provided to and used by veterinarians to offer a barrier from environmental and animal exposures.

Burden of employee protection falls largely on the individual veterinarian. In the USA, PPE standards are put by (OSHA) Occupational safety and health Administration. It is also certified by (NIOSH) National institute of occupational safety and health as part of the U.S. Department of health and Human services and should be provided by the employee and selected based on hazards of the work place. (Occupational Health in Animal Care, Use and research, (www.ivis.org). Document No.B2519.0706).

In Sudan PPE either available, not available or available but not used. (Head department of quality control, general administration of animal resources, Ministry of Agriculture, Animal Resources and Irrigation (Khartoum State).)
4.3. Medical evaluation and preventive medicine/Comparison between the system in USA and Sudan:-

In the USA, medical surveillance issues include immunizations, zoonosis surveillance, allergy monitoring, medical record-keeping, serum banking and scheduled health evaluation.

Immunizations are available for veterinarians based on risks and exposures, including tetanus, rabies and others.

In Sudan, Occupational Health Department as a part of Ministry of Health provides nothing for veterinarians. The document required to prove occupational diseases is given as routine work without following up the case.
(The general secretary of Sudan Veterinary Medical Association.).

Lack of periodic health system for personnel, limited access by veterinarians to health services and the absence of medical histories are real problems of occupational health for veterinarians. More specifically, veterinarians may not be receiving the appropriate vaccinations warranted by their work duties, they may be ill-trained in practices related to the prevention of zoonotic diseases exposure and there may be inadequate testing for some emerging zoonotic diseases e.g. avian influenza.

Further comparison is made in The USA. All licensed veterinarians in North Carolina were surveyed to evaluate inadvertent or adverse exposures they had experienced in their practice. Their use of exposure monitors and personal protective equipment was also assessed. Exposures were evaluated by gender, age and type of practice.

67.8% Of the respondents had sustained a major animal related injury and 8.2% had been hospitalized for a work-related injury. Adverse symptoms due to pesticide exposure occurred in 11.4% of respondents. A zoonotic infection was reported by 35.2% of practitioners, and animal allergies occurred in 20.3%. The use of personal monitors and protective equipment such as film badges, gloves, scavenging glass systems and seat belts were evaluated.

Recommendations are offered to decrease the risks that may occur in a veterinarian's daily practice.
In spite of the differences in the climate and work environment and conditions between Sudan and USA, the health hazards associated to the veterinarian’s practices seem to be similar. But the rates of exposures are different. E.g. animal related injuries were higher in the study made in North Carolina than in this study.

In this study exposure was evaluated only by type of practice, gender and age were not considered in the evaluation.

An Australian study, which began in 2001, surveyed all veterinarians who had graduated since 1960 on a range of occupational hazards. It found that in the past 12 months, 40% of vets suffered up to five dog bites and up to five cat bites. One in five suffered injuries other than bites, mainly from lifting or being kicked by heavy animals such as horses or cattle. Half of the vets surveyed suffered from an ongoing injury, while over half sufferer from chronic stress.

In addition to investigating injuries and stress, the study also looked at the rate of cancer and reproductive problems that could be linked to the occupational use of x-rays, anaesthetics and drugs — although these results are still to be finalized.


4.5. Recommendations:-

It is recommended that:-

1- Teaching the principles of occupational health and safety to veterinary schools students as a part of preventive medicine courses.

2- Education of all veterinarians regarding :
   Zoonoses, microbiologic, physical, chemical hazards, handling fetuses and after births, proper disposal of dead animals, personal hygiene and health issues.

3- Coordination between Sudan Veterinary Council and Sudan Medicine Council to regulate occupational health and safety programs.

4- Inform veterinarians about occupational health and safety programs to encourage their participation. This can be done by the following mechanisms:-
   a- Employee orientation and meetings.
   b- Signs and themed posters.
c- News letters.
d- Bulletins.
e- Email announcements.

5- Activation of the role of Occupational health Department in Ministry of Health to take care of all professions.

6- Setting of laws by the Ministry of Labor to improve work conditions and preserve employees rights.

7- Evaluation and improvement of work environment in all veterinary premises.

8- More studies are needed in occupational hazards among veterinarians, as this study is the first in the field of veterinary researches in Sudan. Future studies will be useful if it include veterinarians in all states of Sudan and auxiliary personnel in the veterinary profession.

9- Coordination between Faculty of Medicine, Faculty of Public health and Faculty of Veterinary Medicine/Sciences to encourage research in occupational health.

10- Increase financial support given for treatment of occupational diseases.

11- Create follow-up programs of employee’s health and keep medical record for each.

12- Vaccination should be available and compulsory for all veterinarians in case of zoonotic diseases out breaks.
REFERENCES

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- Head department of planning and extension, Ministry of Animal Resources and Fisheries.
- Head department of quality control, general administration of animal resources, Ministry of Agriculture, Animal Resources and Irrigation (Khartoum State).
- Ricky L Langley MD, MPH, Assistant Clinical Professor, Division of Occupational and Environmental Medicine, Department of Community and Family Medicine, Duke University Medical Center, Durham, NC 27710
  William H. Pryor DVM, MS, Professor, Department of Comparative Medicine, East Carolina University School of Medicine, Greenville, NC, 27858

- The general secretary of Sudan Veterinary Medical Association.


- The register of Sudan Veterinary Council.


Figure (2): Facility personnel wearing a powered air-purifying respirator (PAPR) to prevent exposure to aerosols. The use of the PAPR requires fit testing.
Figure (3): Personal protective clothing
Figure (4): Protective clothing in virology laboratory
Figure (5): protective clothing in dairy farm