



## OCCUPATIONAL HEALTH HAZARDS AMONG VETERINARIANS WORKING IN R & D AND DIAGNOSTIC SECTOR OF KARNATAKA

Dr. Shreyansh Hosure<sup>1\*</sup>, Dr. Satyanarayan K.<sup>2</sup> and Dr. Jagdeeswary V.<sup>3</sup>

<sup>1</sup>PhD Scholar, Dept. of Veterinary and Animal Husbandry Extension Education, CoVAS, Mannuthy, Kerala.

<sup>2</sup>Professor and Head, Dept. of Veterinary and Animal Husbandry Extension Education, Veterinary College Hebbal, Bengaluru.

<sup>3</sup>Associate Professor, Dept. of Veterinary and Animal Husbandry Extension Education, Veterinary College Hebbal, Bengaluru.

\*Corresponding Author: Dr. Shreyansh Hosure

PhD Scholar, Dept. of Veterinary and Animal Husbandry Extension Education, CoVAS, Mannuthy, Kerala.

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### ABSTRACT

The present study aimed to identify the occupational health hazards among veterinarians working in R & D and diagnostic sector of Karnataka and to explore the preventive measures taken by them. An exploratory research design was adopted for the study. Thirty veterinarians working in R & D and diagnostic sector were selected and data collection was done through the structured questionnaire method. The results from the study revealed that majority of respondents exposed to chemical hazards (36.66%) were found to be high whereas biological hazard (43.34%) were found to be medium and physical hazards (50.00%) and self-reported diseases (40.00%) encountered were found to be low. Most of respondents were found to be medium (56.66%) in taking the preventive measures. In spite of having optimal awareness on various occupational hazards, preventive measures taken are improperly practiced. It may be concluded that veterinarians working in R & D and diagnostic sector were exposed to variety of hazardous situations during their practice, hence there is need to educate them during their early years of career.

**KEYWORDS:** Occupational hazards, Diagnostic, Research and development (R&D), and Veterinarians.

### INTRODUCTION

A veterinarian is a practitioner of modern era, uses his or her skills and knowledge for the prevention and treatment of diseases and wellbeing of animals. Such a professional would be called a veterinarian. The different categories of veterinary practice include, large/farm animal medicine, equine medicine, small/companion (pets) animal medicine, lab animal medicine and wild/zoo animal medicine.

Occupational diseases are usually defined as diseases arising out of or in the course of employment. Veterinarians have multitude health problems, the 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.<sup>[1]</sup>

Prevention of zoonotic diseases involves recognition and quarantine of infected animals, personal hygiene, and environmental disinfection.<sup>[2]</sup> The management of occupational health risks in veterinary practices is an important issue and failing in active health risk management systems could be due to lack of training to ensure competence with responsibilities.<sup>[3]</sup> It is important that veterinary personnel make their potential exposure to any infectious agent known to their physicians. An increase in awareness that some of these diseases may be associated with animals could provide a better plan for the prevention and treatment of common and uncommon zoonotic infections.<sup>[4&5]</sup>

Though a few studies on occupational hazards among veterinary professionals in the country have been carried out, information on occupational hazards among veterinarians working in R & D and diagnostic sector of Karnataka is altogether lacking. To address this lacuna, the study was initiated with the following objectives:

1. To identify the occupational health hazards among veterinarians working in R & D and Diagnostic Sector of Karnataka.

- To explore the preventive measures taken by the veterinarians working in R & D and Diagnostic Sector against occupational hazards.

## MATERIALS AND METHODS

An exploratory research design is adopted for the study. A total of 30 veterinarians working in R & D and Diagnostic Sector were selected from Karnataka. A structured questionnaire was prepared and data collection was done through using simple random sampling technique. Collected data were analyzed using statistical tools viz. frequency and percentage. In the study occupational hazards are divided into three types viz. physical hazards, chemical hazards, biological hazards and self reported diseases. Based on the response given by the veterinarians working in R & D and Diagnostic Sector ranking were given to the each of the hazard. Finally all the veterinarians were distributed based on the occupational hazards.

## RESULTS AND DISCUSSION

### Physical Hazards

The physical hazards encountered by veterinarians working in R & D and diagnostic sector are given in the table 1. All the veterinarians working in R & D and diagnostic sector encountered with sharp injury caused by needles as the major physical hazard followed by handling injury (93.33%), noise (90.00%), injury caused by broken glass (86.66%), injury caused by pipettes (76.66%), slip or fall during work (66.66%), burns (63.33%), injury caused by scalpels (63.33%), flammable injury (56.66%) and electric shock (20.00%).

The R & D and diagnostic sector veterinarians are mostly involved in laboratory research which could have attributed to the injury by needles, broken glass, pipettes, burns and handling equipments. The findings are in partial agreement with Pillai (2011).<sup>[6]</sup>

**Table 1: Physical hazards encountered by veterinarians working in R & D and diagnostic sector.**

| Sl. No. | Physical Hazards                     | Total (n=30) |                 | Rank |
|---------|--------------------------------------|--------------|-----------------|------|
|         |                                      | Encountered  | Not encountered |      |
|         |                                      | F (%)        | F (%)           |      |
| 1       | Sharp injury caused by<br>a) Needles | 30 (100.00)  | 0               | I    |
|         | b) Broken glass                      | 26 (86.66)   | 4 (13.34)       | IV   |
|         | c) Pipettes                          | 23 (76.66)   | 7 (23.34)       | V    |
|         | d) Scalpels                          | 19 (63.33)   | 11 (36.67)      | VII  |
| 2       | Burns                                | 19 (63.33)   | 11 (36.67)      | VII  |
| 3       | Slip / fall during work              | 20 (66.66)   | 10 (33.34)      | VI   |
| 4       | Flammable injury                     | 17 (56.66)   | 13 (43.34)      | VIII |
| 5       | Electrical shock                     | 6 (20.00)    | 24 (80.00)      | IX   |
| 6       | Noise                                | 27 (90.00)   | 3 (20.00)       | III  |
| 7       | Handling injury                      | 28 (93.33)   | 2 (6.67)        | II   |

### Chemical Hazards

The chemical hazards encountered by veterinarians working in R & D and diagnostic sector are given in the table 2. The majority of chemical hazards exposed by veterinarians working in R & D and diagnostic sector were formaldehyde (90.00%) followed by corrosive substances (63.33%), fumigation gas (60.00%), glutaraldehyde (60.00%), dust (60.00%), disinfectants (53.33%), laboratory gases (46.67%), sterilants (40.00%), tissue preservatives (23.34%), cautery fumes (20.00%), pesticides (20.00%), hazardous drugs (13.34%) and ethyl alcohol (6.67%).

Failure to take precautionary measures such as wearing gloves, apron and face mask during handling chemicals, preparation, administration, manufacturing of drugs and disposal of waste chemicals could be the reason for exposure. Non-use of bio-safety cabinets and non-use of air purifier respirators could also be the reasons for exposure.

**Table 2: Chemical hazards exposed by the veterinarians working in R & D and diagnostic sector.**

| Sl. No. | Chemical Hazards        | Total (n=30) |             | Rank |
|---------|-------------------------|--------------|-------------|------|
|         |                         | Exposed      | Not exposed |      |
|         |                         | F (%)        | F (%)       |      |
| 1.      | Tissue preservatives    | 7 (23.34)    | 23 (76.66)  | VII  |
| 2.      | Disinfectants           | 16 (53.33)   | 14 (46.67)  | IV   |
| 3.      | Fumigation gas          | 18 (60.00)   | 12 (40.00)  | III  |
| 4.      | Dust                    | 18 (60.00)   | 12 (40.00)  | III  |
| 5.      | Laboratory gas          | 14 (46.67)   | 16 (53.33)  | V    |
| 6.      | Cautery fumes           | 6 (20.00)    | 24 (60.00)  | VIII |
| 7.      | Pesticides              | 6 (20.00)    | 24 (60.00)  | VIII |
| 8.      | Sterilants              | 12 (40.00)   | 18 (60.00)  | VI   |
| 9.      | Corrosive Substances    | 19 (63.33)   | 11 (36.67)  | II   |
| 10.     | Formaldehyde            | 27 (90.00)   | 3 (10.00)   | I    |
| 11.     | Glutaraldehyde          | 18 (60.00)   | 12 (40.00)  | III  |
| 12.     | Hazardous Drugs         | 4 (13.34)    | 26 (86.66)  | IX   |
| 13.     | Others a) Ethyl alcohol | 1 (3.34)     |             | X    |

The findings are in partial agreement with Hill *et al.* (1998) who reported that veterinarians were exposed to inhalant anesthetics (91%) followed by formalin, pesticides, disinfectants/sterilants and antineoplastic drugs (48.7%).<sup>[7]</sup>

#### Biological Hazards

The biological hazards came across by veterinarians working in R & D and diagnostic sector are given in the table 3. The bacterial hazards came across by veterinarians working in R & D and diagnostic sectors were *E.coli* and streptococcus (20.00%), staphylococcus (16.67%), salmonellosis and clostridium infection (10.00%), leptospirosis, campylobacteriosis, brucellosis, mycoplasmosis and NDV associated conjunctivitis (3.34%). The viral diseases came across were avian influenza (10.00%), pox virus (6.67%) and rabies (3.34%). The fungal diseases infested were dermatophytosis (20.00%) and candidiasis (3.34%). The parasitic diseases infested were giardia (30.00%), entamoeba (20.00%) and cryptosporidium (6.67%). The arthropod infections were mosquitoes (23.34%) and mites (10.00%).

Handling samples without any protective gloves and consumption of contaminated food and water could be the reasons.

The findings are in line with the findings of Jackson and Villarroel, (2012) revealed that majority of the zoonotic

**Table 3: Biological hazards came across by the veterinarians working in R & D and diagnostic sector.**

| Sl. No. | Biological Hazards                    | Total (n=30) |              | Rank |
|---------|---------------------------------------|--------------|--------------|------|
|         |                                       | Affected     | Not affected |      |
|         |                                       | F (%)        | F (%)        |      |
|         | <b>Bacterial</b>                      |              |              |      |
| 1       | Anthrax                               | 0            | 30 (100.00)  |      |
| 2       | Leptospirosis                         | 1 (3.34)     | 29 (96.66)   | VII  |
| 3       | Campylobacteriosis                    | 1 (3.34)     | 29 (96.66)   | VII  |
| 4       | Tuberculosis                          | 0            | 30 (100.00)  |      |
| 5       | Brucellosis                           | 1 (3.34)     | 29 (96.66)   | VII  |
| 6       | Clostridium infection                 | 3 (10.00)    | 27 (90.00)   | V    |
| 7       | <i>E. coli</i>                        | 6 (20.00)    | 24 (80.00)   | III  |
| 8       | Streptococcus's                       | 6 (20.00)    | 24 (80.00)   | III  |
| 9       | Staphylococcus                        | 5 (16.67)    | 25 (83.33)   | IV   |
| 10      | Mycoplasmosis                         | 1 (3.34)     | 29 (96.66)   | VII  |
| 11      | Salmonellosis                         | 3 (10.00)    | 27 (90.00)   | V    |
| 12      | Shigellosis                           | 0            | 30 (100.00)  |      |
|         | <b>Viral</b>                          |              |              |      |
| 1       | Lymphocytic choriomeningitis virus    | 0            | 30 (100.00)  |      |
| 2       | Hanta virus                           | 0            | 30 (100.00)  |      |
| 3       | Herpes B                              | 0            | 30 (100.00)  |      |
| 4       | Herpes simplex                        | 0            | 30 (100.00)  |      |
| 5       | Pox viruses                           | 2 (6.67)     | 28 (93.33)   | VI   |
| 6       | Rabies                                | 1 (3.34)     | 29 (96.66)   | VII  |
| 7       | Avian influenza                       | 3 (10.00)    | 27 (90.00)   | V    |
| 8       | Swine influenza                       | 0            | 30 (100.00)  |      |
| 9       | Others                                |              |              |      |
|         | a) NDV associated conjunctivitis      | 1 (3.34)     | 29 (96.66)   | VII  |
|         | <b>Fungal</b>                         |              |              |      |
| 1       | Dermatophytes                         | 6 (20.00)    | 24 (80.00)   | III  |
| 2       | Blastomycosis                         | 0            | 30 (100.00)  |      |
| 3       | Pneumocystis                          | 0            | 30 (100.00)  |      |
| 4       | Others                                |              |              |      |
|         | a) Candidiasis                        | 1 (3.34)     | 29 (96.66)   | VII  |
|         | <b>Parasitic</b>                      |              |              |      |
| 1       | Giardia                               | 9 (30.00)    | 21 (70.00)   | I    |
| 2       | Cryptosporidium                       | 1 (3.34)     | 29 (96.66)   | VII  |
| 3       | Entamoeba (gastrointestinal diseases) | 6 (20.00)    | 24 (80.00)   | III  |
| 4       | Toxoplasmosis                         | 0            | 30 (100.00)  |      |
| 5       | Tapeworm infection                    | 0            | 30 (100.00)  |      |
|         | <b>Arthropods</b>                     |              |              |      |
| 1       | Mites                                 | 3 (10.00)    | 27 (90.00)   | V    |
| 2       | Mosquitos                             | 7 (23.34)    | 23 (76.66)   | II   |
| 3       | Fly                                   | 0            | 30 (100.00)  |      |
| 4       | Lice                                  | 0            | 30 (100.00)  |      |

infections reported were dermatophytes (54.1%), giardiasis (8.8%), cryptosporidiosis (4.7%), salmonellosis (3.4%), brucellosis (1.4%) and leptospirosis (0.7%).<sup>[8]</sup>

#### Other hazards (self-reported diseases)

The self-reported diseases encountered by veterinarians working in R & D and diagnostic sector are given in the table 4. The self-reported diseases encountered by veterinarians working in R & D and diagnostic sector were strain in arms (93.33%) followed by back pain (90.00%), allergy (86.66%), joint pains (76.66%),

gastrointestinal problems (73.33%), bronchitis (60.00%), hypertension (56.66%), asthma (36.67%) and headache (6.67%).

Working long hours in the research laboratories and handling equipments could have resulted in back pain and strain in arms. The work pattern in the laboratories usually needs a quick and alert movement taking the reading and performing various operations, simultaneously. The allergy may be due to exposure to chemicals and use of latex surgical gloves or powder within the gloves. Increased gastrointestinal problems

could be due to untimely food habits and work related stress.

A study of veterinarians by Reijula *et al.* (2003) pointed out that the five most common diseases were back

related injury (39%), atopic dermatitis in the hand or elbow (36%), gastrointestinal diseases (32%), allergic rhinitis (29%) and strain in upper arm (25%), whereas Jeyaretnam and Jones (2000) reported that strain in arms was seen only in 28 per cent of the respondents.<sup>[9&10]</sup>

**Table 4: Other hazards (self-reported diseases) encountered by the veterinarian working in R & D and diagnostic sector.**

| Sl. No. | Self-reported diseases    | Total (n=30) |                 | Rank |
|---------|---------------------------|--------------|-----------------|------|
|         |                           | Encountered  | Not encountered |      |
|         |                           | F (%)        | F (%)           |      |
| 1       | Back pain                 | 27 (90.00)   | 3 (10.00)       | II   |
| 2       | Gastrointestinal problems | 22 (73.33)   | 8 (26.67)       | V    |
| 3       | Allergy                   | 26 (86.66)   | 4 (13.34)       | III  |
| 4       | Strain in arms            | 28 (93.33)   | 2 (6.67)        | I    |
| 5       | Bronchitis                | 18 (60.00)   | 12 (40.00)      | VI   |
| 6       | Asthma                    | 11 (36.67)   | 19 (63.33)      | VIII |
| 7       | Hypertension              | 17 (56.66)   | 13 (43.34)      | VII  |
| 8       | Joint pains               | 23 (76.66)   | 7 (23.34)       | IV   |
| 9       | Others                    |              |                 |      |
|         | a) Headache               | 1 (3.34)     |                 | IX   |

#### Preventive measures taken against occupational hazards

Preventive measures taken by veterinarians working in R & D and diagnostic sector are given in the table 5. All the veterinarians working in R & D and diagnostic sector had adopted hand wash, sanitation, use of mask, wearing apron and gloves as the major preventive measures followed by proper bio-waste management (96.66%), using appropriate handling technique (93.33%), taking

vaccination against rabies (90.00%), use of bio-safety cabinets (76.66%), wearing hair/shoe covers (73.33%), taking vaccination against tetanus (63.33%), use of ventilated hoods (46.66%), vaccination to animals (33.34%), wearing goggles (30.00%), HEPA filter respirators (30.00%), use of face shield (26.67%), taking vaccination against influenza (20.00%), use of respirators (20.00%) and use of downdraft tables (6.67%).

**Table 5: Preventive measures taken by veterinarians working in R & D and diagnostic sector.**

| Sl. No. | Preventive measures                             | Total (n=30) |            | Rank |
|---------|---|--------------|------------|------|
|         |   | Taken        | Not taken  |      |
|         |   | F (%)        | F (%)      |      |
| 1       | Hand wash                                       | 30 (100.00)  | 0          | I    |
| 2       | Sanitation                                      | 30 (100.00)  | 0          | I    |
| 3       | Vaccination to animals                          | 10 (33.34)   | 20 (66.66) | IX   |
| 4       | Use of mask                                     | 30 (100.00)  | 0          | I    |
| 5       | Use of face shield                              | 8 (26.67)    | 22 (73.33) | XI   |
| 6       | Wearing gloves                                  | 30 (100.00)  | 0          | I    |
| 7       | Wearing apron                                   | 30 (100.00)  | 0          | I    |
| 8       | Goggles   | 9 (30.00)    | 21 (70.00) | X    |
| 9       | Wearing hair/shoe covers                        | 22 (73.33)   | 8 (26.67)  | VI   |
| 10      | Taking vaccination against                      |              |            |      |
|         | a) Rabies                                       | 27 (90.00)   | 3 (10.00)  | IV   |
|         | b) Tetanus                                      | 19 (63.33)   | 11 (36.67) | VII  |
|         | c) Influenza                                    | 6 (20.00)    | 24 (80.00) | XII  |
| 11      | Use of respirators                              | 6 (20.00)    | 24 (80.00) | XII  |
| 12      | Use of Bio-safety cabinets                      | 23 (76.66)   | 7 (23.34)  | V    |
| 13      | Use of downdraft tables                         | 2 (6.67)     | 28 (93.33) | XIII |
| 14      | Use of ventilated hoods                         | 14 (46.66)   | 16 (53.33) | VIII |
| 15      | HEPA filter respirators                         | 9 (30.00)    | 21 (70.00) | X    |
| 16      | Using appropriate handling techniques           | 28 (93.33)   | 2 (6.67)   | III  |
| 17      | Following proper Bio-waste management practices | 29 (96.66)   | 1 (3.34)   | II   |

It is a well known fact that hand wash is a routine activity followed by everyone. Sanitation and use of personal protective equipments were the necessary precautions taken by the respondents to keep away from the risky conditions. Personal vaccination was done to protect themselves against hazardous diseases. The findings are in partial agreement with Jackson and Villarroel (2012).<sup>[11]</sup>

#### Distribution of veterinarians working in R & D and diagnostic sector based on the occupational hazards

The results from the table 6 revealed that majority of physical hazards (50.00%) and self-reported diseases (40.00%) encountered by veterinarians working in R & D and diagnostic sector were found to be low, whereas the chemical hazards (36.66%) were found to be high and biological hazard (43.34%) were found to be medium.

Most of R & D and diagnostic sector veterinarians were found to be medium (56.66%) in taking the preventive measures.

**Table 6: Distribution of veterinarians working in R & D and diagnostic sector based on the occupational hazards.**

| Sl. No. | Occupational hazards                   | Category | Respondents |       |
|---------|--|----------|-------------|-------|
|         |  |          | F           | %     |
| 1       | Physical Hazards                       | Low      | 15          | 50.00 |
|         |  | Medium   | 10          | 33.33 |
|         |  | High     | 5           | 16.67 |
| 2       | Chemical Hazards                       | Low      | 8           | 26.68 |
|         |  | Medium   | 11          | 36.66 |
|         |  | High     | 11          | 36.66 |
| 3       | Biological Hazards                     | Low      | 11          | 36.66 |
|         |  | Medium   | 13          | 43.34 |
|         |  | High     | 6           | 20.00 |
| 4       | Other hazards (self-reported diseases) | Low      | 12          | 40.00 |
|         |  | Medium   | 10          | 33.33 |
|         |  | High     | 8           | 26.67 |
| 5       | Preventive measures                    | Low      | 8           | 26.67 |
|         |  | Medium   | 17          | 56.66 |
|         |  | High     | 5           | 16.67 |

#### CONCLUSION

The veterinarians working in R & D and diagnostic sector has come across with various occupational hazards. The chemical hazards, biological hazards and physical hazards encountered by them were found to be high, medium and low respectively. In spite of having optimal awareness on various occupational hazards, preventive measures taken by them are improperly practiced. It may be concluded that veterinarians working in R & D and diagnostic sector were exposed to variety of hazardous situations during their practice, hence there is need to educate them during their early years of career.

#### RECOMMENDATIONS

- Awareness on occupational hazards to be incorporated in the under graduate programmes.
- Regular prophylactic vaccinations against the prevalent zoonotic diseases for all veterinarians along with regular medical check-ups must be made mandatory.
- Organizing training and seminars is recommended at the university campus on occupational hazards.
- Medical health insurance and free medical facilities are to be extended to veterinarians.

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