Assessment of Knowledge Attitude and Practice (KAP) about Zoonotic Diseases Among Animal Workers in Sawakin Quarantine, Red Sea State, Sudan (2015)

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Date: 06 / November, 2015
DEDICATION

This project is dedicated to the almighty Allah for giving me the grace, courage and strength to complete it.

Also to my beloved parents, teachers, brothers, my wife, daughter and friends without whom it was almost impossible to complete my project.
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Thanks to Allah Almighty who enabled me to research on my project topic for the post graduation. I revere the patronage and moral support extended with love, by my parents, brothers, wife and daughter whose support and encouragement made it possible for me to complete this project.

I submit my heartiest gratitude to my respected teachers for their sincere guidance and invaluable help for completing this project.

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Assessment of Knowledge Attitude and Practice (KAP) about zoonotic Diseases Among Animal Workers in Sawakin Quarantine, Red Sea State, Sudan (2015)

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ABSTRACT

Zoonosis are infections naturally transmitted between vertebrate animals and humans. An exploratory questionnaire-based survey of animal health workers was carried out from August 2014 to October 2014 in Sawakin veterinary quarantine, Eastern Sudan, to assess local knowledge, attitudes and public awareness for animal zoonoses. A combination of closed and open-ended questions, focus group discussions to gather information on perceptions concerning the type of zoonotic diseases prevalent in the study area, level of risk, mode of transmission and methods of preventing disease, transmission from animals to humans. The results demonstrated that 90% of target group they knew information’s about zoonotic diseases, while 80% of them had ideas about the transmission of these diseases, there was no significant difference in the attitude among different age and educational groups, but we observed that the educated workers had good practice to prevent themselves from the diseases in contrasting to other groups, in Sawakin veterinary quarantine, Eastern Sudan. Awareness and knowledge of zoonoses, combined with food consumption habits and poor animal husbandry are likely to expose respondents to an increased risk of contracting zoonoses. The Study recommended that, the public health promotion on education and interdisciplinary one-health collaboration between vets, public health practitioners and policy makers should result in a more efficient and effective joint approach to the diagnosis and control of zoonoses in Sudan.
تقييم معرفة وسلوك وممارسات العاملين في محجر سواكن البيطري تجاه الأمراض المشتركة بين الإنسان والحيوان، سواكن، السودان (2015)

يوسف الصديق يوسف علي

ملخص الأطروحة

الأمراض المشتركة هي الأمراض التي تنتقل بشكل طبيعي بين الحيوانات الفقارية والبشر. أجري استبيان على 120 من العاملين في مجال الصحة الحيوانية في الفترة من أغسطس 2014 إلى أكتوبر 2014 في المحجر البيطري سواكن، شرق السودان، لتقييم المعرفة المحلية والسلوك ووعي الفرد بالآمار المشتركة. تمت صياغة مجموعة من الأسئلة المغلقة والمفتوحة، ومناقشات جماعية لجمع المعلومات عن تصورات تتعلق بنوع الأمراض الحيوانية. انتشرت الأسئلة في منطقة الدراسة، ومستوى المخاطر، وطريقة انتقال العدوى وطرق الوقاية من المرض، وطرق انتقالها من الحيوانات إلى البشر. أظهرت النتائج أن 90% من الفئة المستهدفة يعلمون المعلومات الأساسية حول الأمراض المشتركة، في حين أن 80% منهم كان لديهم دراية حول انتقال هذه الأمراض، لم يكن هناك اختلاف كبير في النتائج بين الفئات العمرية والتعليمية المختلفة فيما يخص السلوك الصحي، ولكن لاحظنا أن العمال المتعلمين لديهم ممارسات تقييم من انتقال الأمراض بالمقارنة مع المجموعات الأخرى، في محجر سواكن البيطري، شرق السودان. الوعي والمعرفة من الأمراض المشتركة، جنبا إلى جنب مع عادات الاستهلاك الغذائي وسوء تربية الحيوانات من المحتمل أن تعرض العينية إلى زيادة مخاطر الأمراض المشتركة. وقد اوصت الدراسة بضرورة تعزيز الصحة العامة في مجالات التعليم والتخصصات الصحية المختلفة والتعاون بين الأطباء البيطريين والعاملين في مجال الصحة العامة وصناع السياسات ينبغي أن يؤدي إلى نهج مشترك أكثر كفاءة وفعالية لتشخيص ومكافحة الأمراض المشتركة في السودان.
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List of Abbreviations

**AIDS:** Acquired Immunodeficiency Syndrome.

**CCHF:** Crimean Congo Hemorrhagic Fever.

**FAO:** Food And Agricultural Organization.

**HIV:** Human Immunodeficiency Virus.

**MRSA:** Methicilline – Resistant Staphylococcus Aures.

**OIE:** Organization of International Epizootic.

**PPE:** Personal Protective Equipments.

**RVF:** Rift Valley Fever

**WHO:** World Health Organization.

**WSPA:** World Society for Protection of Animal.

**BSE:** Bovine Spongiform Encephathy

**SARA:** Sever Acute Respiratory Syndrome
1.1. Introduction

Zoonoses are infections naturally transmitted between vertebrate animals and humans. They be caused by Bacteria, Virus or parasite,  and protozoa , the means of transmission may be through direct contact or indirect depending on the nature of the disease and its severity. These zoonotic diseases pose major hazards to the environment and public health and have very important economic impact some individual more at risk than others. These include people with a weakened immune system, children age 5, the elderly, and pregnant women.

Brucellosis, rabies, human African trypanosomiasis, bovine tuberculosos (BTB), cysticercosis, echinococcosis and anthrax, are listed as seven endemic zoonoses of concern (WHO, 2006). The majority of pathogenic species causing disease in humans are zoonotic – being estimated at > 60% of all human diseases (Morse, 1995; Palmer and Soulby, 1998; Murphy, 1998). Zoonoses are also considered to be twice as likely to be associated with emerging diseases as non-zoonoses (Taylor et al., 2001). The emergence and re-emergence of zoonoses and their potentially disastrous impact on human health is a growing concern around the globe (Woolhouse and Gowtage-Sequeria, 2005). In developing countries they constitute an important threat to human health community (Wastling et al., 1999).
1.2. Research problem

Zoonotic diseases have both direct and indirect effects on livestock health and production (Smits & Cutler, 2004). Indirect effects occur as a result of the risk of human disease, the economic impact on livestock producers through barriers to trade, the costs associated with control programmes, the increased cost of marketing produce to ensure it is safe for human consumption and the loss of markets because of decreased consumer confidence (McDermott and Arimi, 2002; Perry et al., 2002).

The control and prevention of the zoonotic disease depends mainly by increasing the awareness in the community specially in the groups at risk (veterinarians, animals owners, animal workers and butchers.

This study is designed to Promote positive knowledge and culture about zoonotic diseases among workers involved.

1.3. General Objective

To assess knowledge, attitudes and practices about zoonotic diseases among workers at Sawakin Quarantine.

1.4. The specific objectives

1- To identify barriers to the implementations of safety and hygiene practices in Sawakin Quarantine.

2- To assess the knowledge of workers about hygiene and safety measures to prevent zoonotic disease.

3- To assess attitudes of workers towards hygiene and safety practices in animal quarantine.
CHAPTER TWO

LITERATURE REVIEW

2.1. Definitions

2.1.1. Zoonotic diseases

A zoonosis is any infectious disease that can be transmitted from animals, both wild and domestic, to humans (Coleman, 2002; WHO/FAO/OIE, 2004). Zoonoses that were formerly regarded as rural diseases to urban areas (Mahy and Brown, 2000; Perry et al., 2002). Different management practices and environmental circumstances in traditional and smallholder livestock keeping systems in rural and (peri) urban areas can influence the risk of zoonoses (Wastling et al., 1999; Omudu and Amuta, 2007). These practices, which could reduce or increase the risk of zoonoses, in the various livestock keeping systems and to the public as whole, will depend on awareness, perceptions, knowledge and attitude to zoonoses (Shirima et al., 2003; John et al., 2008). This level of awareness and knowledge might be different in the traditional system where cattle have been kept for generations and the smallholder system, which is relatively new and where only some of the dairy farmers have had a tradition of cattle keeping. Certain occupations have a higher risk of contracting zoonoses (Schelling et al., 2003;). This is clearly the case where the disease is transmitted through direct contact with infected animals or infected animal materials. Livestock workers, veterinarians, abattoir workers, laboratory workers and people handling raw livestock products belong to these at-risk groups (McDermott and Arimi, 2002). The objective of this study was to assess the level of awareness, local knowledge and management practices of the different risk groups in the study areas. The intention is that the baseline information generated will facilitate the development of effective and joint veterinary–medical policies and guidelines for controlling these zoonoses.
2.2. Classification of zoonotics

The zoonotic diseases can be classified into six categories according to their causative agents:

Bacterial, viral, parasitic, mycotic, protozoan and tick borne disease as shown in Fig (1).

![Types of Zoonoses](image)

Figure (2.1): Shows types of zoonoses

2.2.1. Major zoonoses

A number of well-known zoonotic diseases, such as brucellosis, rabies, cystic echinococcosis, leishmaniasis and salmonellosis, continue to affect human and animal populations in many countries of the Eastern Mediterranean Region. A wide variety of
animal species, both domestic and wild, act as reservoirs of these diseases. The wide range of animal species and the unusually complex pathogens involved pose significant challenges for effective surveillance, prevention and control of zoonoses. Brucellosis is an important source of morbidity in almost all Member States, with more than 60,000 reported cases in the Eastern Mediterranean Region (WHO, 2003). The most important practices associated with brucellosis include consumption of raw milk and dairy products, such as white cheese. Geographical distribution depends upon local food habits, milk processing methods, animal husbandry types and standards of personal and environmental hygiene. Although human brucellosis is a notifiable disease in most countries, it is often unrecognized and unreported due to weakness of laboratory diagnostic capacity. Some countries have established reference centres for diagnosis of brucellosis and production of vaccines for immunization of livestock. Rabies remains a public health problem in the Region. It is a disease of poverty affecting very vulnerable, often remote rural populations, mostly in the age group of 5–15 years. In 2002, 5000 deaths were recorded in the Region, mostly from Afghanistan, Islamic Republic of Iran and Pakistan. On average, fewer than 10 cases per country were reported in most other countries of the Region (WHO, 2003).

Cystic echinococcosis (Hydatidosis) is the cause of major public health and economic problems in many rural areas of the Region. Livestock-related economic losses are estimated to reach several million dollars annually and are the result of decreased weight gain, reduced milk and wool production and loss of infected viscera. Among the human population, 4000 to 5000 cases of hydatidosis are reported in the Region every year. The first-line treatment for such cases is surgery, and the success of surgical removal of hydatid cysts is variable; case fatality rates vary from 1% to 4% for first surgical intervention. Recurrences rates vary from 7% to 15% and result in higher mortality. Direct and indirect costs of hospitalization and residual disability or clinical sequelae, although not fully known, are estimated to reach US$ 15 million in Morocco and Tunisia. The main factors contributing to persistence of echinococcosis are large shepherd dog populations; uncontrolled disposal of offal and other slaughter wastes; and importation of live animals with echinococcosis. Prevention of hydatidosis in humans primarily involves regular de-worming of dogs, the definitive hosts.
Keeping dogs away from areas with infected viscera (e.g. abattoirs) is also important (WHO, 2003).

Zoonotic cutaneous leishmaniasis is responsible for important outbreaks in several countries of the Region. Such outbreaks usually follow population explosions in rodent reservoirs. Agricultural water development projects (dams and new irrigation schemes) are important factors in population explosions. Vector control is ineffective against zoonotic cutaneous leishmaniasis. The main control strategy is rodent control and requires effective coordination between health, agriculture and environment sectors (WHO, 2003).

Salmonellosis is one of the major causes of severe diarrhoea, especially among children. Different phage types of \textit{Salmonella enteritidis} and multidrug-resistant \textit{S. typhimurium} are responsible for an increasing proportion of human salmonellosis cases. The factors facilitating the spread of salmonellosis are associated with the intensification of animal and poultry production, increased international trade of livestock and lack of compliance with existing regulations concerning processing and handling of food of animal origin. Surveillance for an investigation of outbreaks of salmonellosis in many countries are weak. Control of zoonotic salmonellosis requires a high degree of inter-sectoral and inter-institutional cooperation (WHO, 2003).

\textbf{2.2.2. Emerging zoonoses}

A significant number of outbreaks of new and resurging zoonotic diseases have occurred over the past few years, causing global concern. These zoonoses have emerged as a result of both new pathological entities and already known agents appearing in areas where they had not been previously reported (WHO, 2003). The many factors associated with emergence and resurgence of zoonoses can be categorized broadly into four groups:

- Changing livestock farming practices, international trade patterns of animals and animal products, changing consumer habits, and travel (enteric bacterial pathogens such as \textit{Escherichia coli} O157:H7, \textit{Salmonella enteriditis} and \textit{Listeria monocytogenes}).
- Changing environmental conditions, including climate and disasters which influence reservoirs, vectors, and/or host species and population parameters including increasing
urbanization (Arthropod-borne pathogens such as Rift Valley fever, Crimean–Congo and other haemorrhagic fever viruses, Japanese B. encephalitis and Nipah virus infection).

- Pathogens acquiring new genetic properties through adaptation, mutation, recombination or adapting to a new species (bovine spongiform encephalitis and variant Creutzfeldt–Jakob disease).
- Human population factors (HIV/AIDS elevates the risk of secondary zoonotic disease in affected individuals)

Rift Valley Fever (RVF) is one of the most important emerging diseases in the Eastern Mediterranean Region. Outbreaks of RVF have been reported in several countries, including Egypt (1977–1979 and 1993), Somalia (1997–1998), Saudi Arabia (2000) and Yemen (2000). The first outbreak of RVF outside Africa highlighted several issues, particularly the lack of inter-sectoral collaboration in the prevention and control of disease, the crucial need for integrated control of vector-borne diseases and the need for cross-border collaboration in disease prevention and control. Another emerging disease in the Region is Crimean–Congo haemorrhagic fever (CCHF). Outbreaks have been reported in recent years from Afghanistan, Islamic Republic of Iran, Iraq and Pakistan.

2.2.3. Food borne diseases

Foodborne diseases remain an important challenge. The steadily increasing global population and the increased demand for food of animal origin has brought changes in the technology used in animal husbandry and the food industry. However, the introduction of new technologies carries increased microbiological and toxicological risks. The consolidation of food industries has many implications for the epidemiology of foodborne diseases. Large slaughterhouses and other processing plants for foods of animal origin create hazards for the human food chain, especially where the prevalence of enteric pathogens, such as *Salmonella* spp., *Campylobacter* spp. or *Listeria* spp., become endemic in poultry and livestock. Poorly regulated antimicrobial use during animal production can pose human health hazards. Because of the globalization of the food supply and increasing international travel, multidrug resistant organisms can spread to all parts of the world. Antimicrobial-resistant strains of *Salmonella*, for example, have become increasingly prominent due to consolidation of the egg production industry (WHO, 2003).
2.3. Transmission of zoonotic disease

2.3.1. Direct contact transmission

The following diseases may be spread by bites, scratches, or direct contact with animal tissues or fluids (e.g., urine, feces, saliva). Disease transmission may also occur indirectly through contact with contaminated objects or surfaces (fomites), such as cages, aquaria, bowls, or bedding.

- Acarasis (mange).
- Brucellosis.
- Cat Scratch Disease.
- Dermatophytosis.
- Glanders.
- Influenza.
- Leptospirosis.
- Lymphocytic Choriomeningitis.
- Melioidosis.
- Monkey pox.
- Mycobacteriosis.
- Methicillin-Resistant Staphylococcus aureus (MRSA).

2.3.2. Oral transmission

The following diseases can be transmitted by ingestion of food or water contaminated with a pathogen. This typically occurs from fecal contamination from unwashed hands or soil contact.

- Baylisascariosis
- Campylobacteriosis
- Cryptosporidiosis
- Escherichia coli O157:H7
- Echinococciosis
- Giardiasis
• Hookworm Infection
• Leptospirosis
• Salmonellosis
• Toxocariasis
• Toxoplasmosis
• Trichuriasis
• Tularemia
• Yersiniosis

2.3.3. Aerosol transmission

The following diseases can be transmitted through the air by droplet transfer, fluids aerosolized from an animal to a person (e.g., sneezing or cough) or by aerosolized materials which are inhaled.

• *Bordetella* Infection
• Cryptococcosis
• Hantavirus
• Influenza
• Leptospirosis
• Melioidosis
• Plague
• Psittacosis
• Q Fever

2.3.4. Vector-borne transmission

These diseases listed below are transmitted by arthropod vector:

**FLEAS**
• Plague

**MOSQUITOES**
• West Nile Encephalitis

**SAND FLIES**
• Leishmaniasis
TICKS

- Ehrlichiosis
- Lyme Disease
- Rocky Mountain Spotted Fever
- Tularemia

TRIATOMINE (kissing bugs)

- Trypanosomiasis (Chagas disease)

2.4. Economic importance

In recent years, several major human epidemics have occurred on a world-wide scale. Notable examples include SARS, avian influenza and swine flu, each of which have spread over a number of continents and caused widespread morbidity and mortality. Similar occurrences have been observed in animal populations, for example foot-and-mouth-disease in the United Kingdom, avian influenza in the Netherlands and bluetongue disease in Europe. In each of these examples, the pathogens were considered “exotic” prior to their introduction and spread. (DEFRA2009)

In 2007 there were total 25 outbreaks that were designated as food borne outbreaks. The most common causative organism identified was Salmonella species. Almost 387 people were affected by this food-borne outbreak; there were 30 hospitalizations and 5 deaths in total. (DEFRA2007)

Influenza pandemic across globe, such a complex scenario creates an arena in which the medical and veterinary disciplines bring distinct, but interrelated, professional skills together to help solve any problems associated with the interaction between people and animals. The outbreaks of avian influenza are not the first zoonotic infections to show the importance of having a close working relationship between the veterinary and medical officers. The emergence of variant Creutzfeldt-Jakob disease in humans and the possibility that this might be linked to the epidemic of bovine spongiform encephalopathy (BSE) in cattle highlighted the need to collaborate in assessing the potential threats to human health posed by animal diseases. The chief veterinary and medical officers say, “there is need to collaborate with our chief medical and chief veterinary counterparts in European Union.
member states and worldwide via the World Organization for Animal Health (OIE), the World Health Organization, and the various expert advisory groups” (Reynolds and Donaldson, 2005).

The significance of zoonotic diseases and related foodborne diseases is growing in the Eastern Mediterranean Region. In addition to causing human morbidity and mortality, such diseases hamper agricultural production, decrease availability of food and create barriers to international trade.

2.5. Human health and zoonoses

A total of 61% (n = 868) of all human diseases and 75% of emerging human pathogens are zoonotic (Taylor L. et al. 2001). Besides the fact that many emerging human diseases are zoonotic (Palmer S. R. et al. 1998), it's only now that they have been demonstrated by quantitative analysis as risk factors for disease emergence (Taylor L. Et al., 2001). Both domestic and wild animals have been shown to be important reservoirs of zoonoses (Kilonzo B. Et al., 1993). In Africa, bovine tuberculosis, brucellosis, anthrax, sleeping sickness, and rabies are still widespread (Barrett M. P. 2006) and in Tanzania, African trypanosomiasis, plague, rabies, brucellosis, anthrax and echinococcosis have been documented as being among the most common zoonoses (Kilonzo B. 1993). In a study conducted in northern Tanzania in 2002, nineteen diseases were recorded as zoonoses by household members with rabies, tuberculosis, anthrax and brucellosis the top four zoonoses in pastoral, agro-pastoral and smallholder dairy farming systems (Shirima G. M. Et al., 2003). Although the majority of households practiced at least one risk activity for transmission of zoonoses there was general lack of knowledge about the diseases (Shirima G. ,. 2003).

2.6. Knowledge and attitude practice associated with zoonotic

The increase in urban and peri-urban livestock production furthermore poses a risk of introducing zoonoses that were formerly regarded as rural diseases to urban areas (Mahy and Brown, 2000; Perry et. al., 2002). Different management practices and environmental circumstances in traditional and small holder livestock keeping systems in rural and (peri) urban areas can influence the risk of zoonoses (Wastling et al., 1999; Omudu and Amuta,
2007). These practices, which could reduce or increase the risk of zoonoses, in the various livestock keeping systems and to the public as whole, will depend on awareness, perceptions, knowledge and attitude to zoonoses (Shirima et al., 2003; John et al., 2008). This level of awareness and knowledge might be different in the traditional system where cattle have been kept for generations and the smallholder system, which is relatively new and where only some of the dairy farmers have had a tradition of cattle keeping. Certain occupations have a higher risk of contracting zoonoses (Schelling et al., 2003; Swai and Schoonman, 2009; Kramer, 2009). This is clearly the case where the disease is transmitted through direct contact with infected animals or infected animal materials. Livestock workers, veterinarians, abattoir workers, laboratory workers and people handling raw livestock products belong to these at-risk groups (McDermott and Arimi, 2002).

The objective of this study was to assess the level of awareness, local knowledge and management practices of the different risk groups in the study areas. The intention is that the baseline information generated will facilitate the development of effective and joint veterinary–medical policies and guidelines for controlling these zoonoses.

Individuals as well as societies have been slow to act on zoonoses (Hardy A. 2003). This could be due to insufficient systematic continuing education and opportunities to acquire new knowledge on zoonoses for those working in health institutions (Asano K, 2003).

A physician attending to an ill veterinarian or a zookeeper will immediately suspect a wide array of diseases other than zoonoses; likewise a pediatrician attending to a sick child who recently received a puppy will not suspect an animal transmitted disease. All these underscores the fact that medical professionals have not been giving due consideration of animals as carriers of diseases that can be transmitted to humans (Goscienski P. J. 1983). This has resulted in poor quality of epidemiological data on zoonoses and their control measures on animal and human populations in particularly sub-Saharan Africa (Holden S. 1999).

Translation of knowledge into proper care of patients is among the critical areas in health care delivery (Sinuff T. , et al. 2008). This is only possible if health service providers
have the right knowledge of health problems they are dealing with. In some countries active continuing education programmes have been intensified to consolidate the knowledge of health workers (Wu H. B. 2006). Innovative educational approaches have also been addressed in target specific groups of health workers to facilitate the implementation of guideline-based recommendations in the management of patients (Doroodchi H. et al. 2008). Because targeted education is an integral part in improving the diagnosis of diseases (Jorge P. P. et al. 2005), assessing the knowledge of practitioners could be an important step in identifying target receptors for public health education in Tanzania.

Success in reducing the public health significance of zoonotic diseases greatly depends on the level of cooperation between medical and veterinary sectors in diagnosis of zoonoses, exchange of information, organization of shared surveillance systems, common training of staff and creation of community awareness. High-level commitment and the ability of national programmes to mobilize the necessary resources and to collaborate closely with other relevant sectors are needed in order to cope with the common challenges in Management and communication skills of zoonoses control.

staff need to be strengthened through educational training, and control staff must be better represented in key policy-making positions. The managerial staff need to have:

- Ability to mobilize resources, disseminate information and promote intersectoral cooperation.
- Skills to administer available technology and to integrate it within national programmes.
- Ability to articulate zoonoses issues effectively to politicians and policy-makers, to the scientific and technical community, and to the population in general.
- Knowledge and understanding of sociocultural issues, particularly those related to prevention of zoonotic diseases, including food hygiene practices control of zoonoses.

Outbreaks of zoonotic diseases often occur in areas far from sophisticated health care services, and reliable data on their distribution, incidence, morbidity and mortality are lacking. This is partly due to the lack of appropriate diagnostic tools for diagnosis and
detection of pathogenic agents, which are basic requirements for prevention and control. National programmes need to strengthen their laboratory components to serve for the routine confirmation of clinical syndromes and for rapid confirmation of the causative agent in outbreaks. Laboratory services (availability, functionality and level of sophistication) should be assessed in order to determine the role of the laboratory in surveillance. Networks of national and regional reference centres could be established to meet local needs in diagnosis of zoonotic diseases.

Communities need to be actively involved in the decision-making process and in implementing strategies to control or eliminate diseases of animal origin. Health education programmes should be developed for individual target groups (children, women, consumers, opinion leaders, schoolteachers). Appropriately prepared materials such as pamphlets and posters can be used to communicate information on diseases to local communities, and to encourage them to adopt healthy lifestyles. Dissemination of public information through the mass media is also essential in preventing and controlling zoonotic diseases and promoting zoonotic control interventions. It is particularly important to reach livestock producers, as they are key players in efforts to control zoonoses

2.7. Prevention and control

Coordinated activities among international organizations in the Region occur mainly on an ad hoc basis, usually in response to an emergency. Ongoing activities involving both WHO and the Food and Agriculture Organization of the United Nations (FAO) in zoonosis control are few and concern only brucellosis, a zoonosis where the animal reservoir has high economic importance. When the animal reservoir is of low economic importance for agriculture, as with some rodent reservoirs of Leishmania major, cooperation from the agriculture sector is less common. It is crucial that the agriculture and health sectors at both international and national levels develop a common agenda for zoonoses control with a clear distribution of roles and tasks for each sector. Zoonoses control programmes should be developed with long-term objectives and should include active collaboration with international organizations concerned with animal and human health, such as FAO, International Office for Epizootics (OIE) and WHO, which are charged with providing technical advice and assistance to countries. Within countries, close collaboration is needed
between veterinarians and other health professionals, including epidemiologists, occupational health workers, food technologists, specialists in environmental control and laboratory personnel.

Implementation of such strategies requires that certain preliminary steps are taken:

- Establishing a coordination structure at national level to spearhead control activities. Necessary actions would include the establishment of a strong multisectoral committee or similar structure for zoonosis control and the development of intersectoral surveillance system and control and prevention programme involving both the health and veterinary sectors.

- Building an evidence base to enhance political support. Emphasis must be placed on the economic burden of zoonoses, with results of economic analyses, including cost–benefit and cost–effectiveness analysis of control strategies. This should be carried out at regional level.

- Establishing and strengthening partnerships. Partnerships need to be forged with animal and human health organizations such as OIE, FAO, relevant pharmaceutical companies and interested nongovernmental organizations such as the World Society for the Protection of Animals (WSPA). Such partnerships would be aimed at coordinating zoonosis control activities at regional level, mobilizing resources and supporting operational research in control and prevention.

The primary challenge for effective implementation of zoonoses control is to establish an effective veterinary public health system with well trained staff in the broad areas of public health and preventive medicine. Sectors such as health, consumer protection, agriculture and the environment must be aware of and involved in cooperative efforts in zoonoses control and food hygiene.

Intersectoral cooperation is fundamental for controlling zoonoses. However, processes involved in planning and implementation of intersectoral actions are complex.
Each country must develop its own strategy and approaches for intersectoral action. The process of developing intersectoral cooperation should include the following:

- Elaboration and implementation of policies, rules and requirements aiming at effective collaboration in specific projects.
- Improvement of communication through the bureaucratic structure.
- Identification of health and related problems requiring intersectoral action.
- Identification of technical and financial resources; • Identification and allocation of specific responsibilities and activities for each of the cooperating sectors.
- Planning and implementation of joint in-service training programmes for workers from various sectors.
- Identification of contradictory or conflicting policies between different sectors and constraints resulting in hampering effective collaboration

For sustainable implementation of zoonoses control programmes, both medical and veterinary students must be educated on zoonoses, intersectoral cooperation, exchange of information, epidemiology and control of foodborne diseases, emerging diseases, food quality, animal welfare, human health and the environment. It is important that the educational curricula for veterinary and health professions be reviewed and developed on a regional basis, with emphasis on specific problems of a geographical region. In addition, the national programmes need to encourage interdisciplinary, cost-effective, problem-oriented research relevant to their needs.

The challenge for the national programmes and international organizations such as FAO, OIE and WHO is to promote strong coordination of activities by different stakeholders in the fields of animal management, prevention of animal diseases, zoonoses control, food safety, training and dissemination of information at local, regional and global levels.
CHAPTER THREE

MATERIALS AND METHODS

3.1. Study area (See the map)

This study was carried out from November 2014 to August 2015 in Sawakin veterinary quarantine to assess knowledge, attitude and practices about zoonotic disease among animals workers.

Figure (3.1): Sawakin – Res Sea State – Republic of Sudan

Photo (3.1): Picture shows Sawakin quarantine
3.1.1. Geographic situation of study area

Sawakin city is located in north-eastern Sudan, on the west coast of the Red Sea at 66 meters (216.6 feet) above sea level and 642 kilometers (398.9 miles) from Khartoum, and 54 kilometer from Port Sudan, it include a historic archaeological area which was previously Sudan's main port. The ancient city was built on top of an atoll and turned their homes now to the effects of the ruins.

3.1.2. Climate

During winter season winds blow produce rain and cool breeze in the summer but weather conditions change and be closer to the Indian Ocean warm summer atmosphere saturated with moisture and winds will be accompanied by dust storms blowing from the desert.

3.1.3. Populations

Sawkin population was estimates( in the year 2010 at about 44, 521 people . most of them work as laborers in Osman Digna Port and as animals feeder in the veterinary quarantine.

Photo (3.2): Picture shows worker during work
3.2. Methodology

3.2.1. Study design

The study was designed to be descriptive utilizing different independent variables.

3.2.2. Study population

The study population includes all the workers in Sawakin Veterinary Quarantine during the study period.

Photo (3.3): Picture explains animals shed in sawakin quarantine
3.2.3. Data collection

Data was collected through a questionnaire. The questionnaire was designed to assess the knowledge, practice, and attitudes among the workers in the quarantine toward the zoonotic diseases, their transmission, their prevention, and the best practices to eliminate their spread.

The target of the questions was to evaluate the knowledge of workers about safety procedures in the Veterinary Quarantine, the use of occupational safety tools during work, and whether the training of workers for the application of safety measures, and if the personal protective equipment are available in the quarry veterinarian, and whether the quarry Veterinary Administration job periodically checks for workers to make sure they are free from diseases.

3.2.4. Ethical considerations

Approval for this study was obtained from the administration of Sawakin Veterinary Quarantine in Red Sea State to conduct the study and collect the data starting from August 2014 to August 2015.
CHAPTER FOUR
RESULTS

4.1. knowledge about Zoonotic

The result of questionnaire showed that 45 (90%) out of 50 of workers had basic knowledge about zoonosis while 5 (10%) of workers out of 50 had basic knowledge of zoonosis as shown in table (1) and figure (2).

Table (4.1): knowledge about zoonotic

<table>
<thead>
<tr>
<th>Gender</th>
<th>Count, Yes</th>
<th>Count, No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>39</td>
<td>4</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>78.0%</td>
<td>8%</td>
<td>86.0%</td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>12.0%</td>
<td>2.0%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>5</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>90.0%</td>
<td>10.0%</td>
<td></td>
</tr>
</tbody>
</table>

Figure (4.1): knowledge about zoonotic
4.2. The knowledge about transmission of zoonotic diseases

Fourty (80) % of workers out of 50 they knew about the transmission of zoonotic diseases, while 10 (20) % of worker out of 50 they dont knew about zoonotic transmission.

**Table (4.2): The knowledge about transmission of zoonotic diseases**

<table>
<thead>
<tr>
<th>Gender</th>
<th>yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Count</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>total%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>34</td>
<td>9</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>68.0%</td>
<td>18.0%</td>
<td>86.0%</td>
</tr>
<tr>
<td>Female</td>
<td>Count</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>12.0%</td>
<td>2.0%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>80.0%</td>
<td>20.0%</td>
<td></td>
</tr>
</tbody>
</table>

**Figure (4.2): The knowledge about transmission of zoonotic diseases**

4.3. The use PPE (Personal Protective Equipment’s) during work

In this table 34 (68.0) % out of 50 of workers they using personal protective clothes during work, while 12(24) % of worker out of 50 don’t using the personal protective equipments, and 4(8.0%)of worker don’t know about PPE.
Table (4.3): The use PPE (Personal Protective Equipment’s) during work

<table>
<thead>
<tr>
<th>Gender</th>
<th>Count, total%</th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td>29</td>
<td>10</td>
<td>4</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>58.0%</td>
<td>0.0%</td>
<td>8.0%</td>
<td>86.0%</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.0%</td>
<td>4.0%</td>
<td>0.0%</td>
<td>14.0%</td>
</tr>
<tr>
<td>total</td>
<td></td>
<td>34</td>
<td>12</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>68.0%</td>
<td>24.0%</td>
<td>8.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Photo (4.1): Picture presents worker handling animal without use Personal protective equipment’s
4.4. Where do you change your dress

In this table 21 (42.0%) out of 50 (100%) of the workers change their dresses in side the veterinary unit while 16 (32.0%) out of 50 (100%) of workers change their dresses outside the veterinary unit.

Table (4.4) where do you change your dress

<table>
<thead>
<tr>
<th>gender</th>
<th>inside veterinary service unit.</th>
<th>outside veterinary service unit.</th>
<th>At home</th>
<th>Don’t change</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>% of Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>12</td>
<td>8</td>
<td>(6.0%)</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>(40.0%)</td>
<td>(24.0%)</td>
<td>(16.0%)</td>
<td>(86.0%)</td>
<td></td>
</tr>
<tr>
<td>female</td>
<td>% of Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>(2.0%)</td>
<td>(8.0%)</td>
<td>(4.0%)</td>
<td>(0.0%)</td>
<td>(14.0%)</td>
</tr>
<tr>
<td>total</td>
<td>21 (42.0%)</td>
<td>16</td>
<td>10</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>(32.0%)</td>
<td>(20.0%)</td>
<td>(6.0%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
</tbody>
</table>

4.5. What do you do when you wash your hands?

In this table 20 (40.0%) out of 50 (100.0%) of the workers wash their hands with water&soap while 26 (52.0%) out of 50 (100.0%) of the workers wash their hands with water only.

Table (4.5) what do you do when wash your hands?

<table>
<thead>
<tr>
<th>Gender</th>
<th>wash my hands with soap and water</th>
<th>wash my hands with water only</th>
<th>Not remember</th>
<th>Don’t know</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>% of Total</td>
<td></td>
<td></td>
<td></td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>23</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4.6: Taking meals and drinks in veterinary quarantine.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Usually</th>
<th>Sometimes</th>
<th>Never</th>
<th>Don’t use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>% of Total</td>
<td>19</td>
<td>19</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(38.0%)</td>
<td>(38.0%)</td>
<td>(8.0%)</td>
<td>(2.0%)</td>
<td>(86.0%)</td>
</tr>
<tr>
<td>Female</td>
<td>% of Total</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(2.0%)</td>
<td>(4.0%)</td>
<td>(8.0%)</td>
<td>(0.0%)</td>
<td>(14.0%)</td>
</tr>
<tr>
<td>total</td>
<td></td>
<td>20</td>
<td>21</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(40.0%)</td>
<td>(42.0%)</td>
<td>(16.0%)</td>
<td>(2.0%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

4.6. take meals and drinks in veterinary quarantine.

In this table 20 (40%) out of 50 (100%) of workers they take meals and drink in veterinary quarantine while 8 (16.0%) out of 50 (100.0%) of workers never do that.
4.7. Educational level know about zoonotic

In this table 45 (90%) out of 50 (100%) of workers they knew about zoonotic while 5 (10.0%) out of 50 (100.0%) of workers do not know about zoonotic.

<table>
<thead>
<tr>
<th>Educational level</th>
<th>yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiteracy</td>
<td>% of total count</td>
<td>1(2.0%)</td>
<td>0(0.0%)</td>
</tr>
<tr>
<td>primary</td>
<td>% of total count</td>
<td>2(4.0%)</td>
<td>3(6.0%)</td>
</tr>
<tr>
<td>secondary</td>
<td>% of total count</td>
<td>19(38.0%)</td>
<td>2(4.0%)</td>
</tr>
<tr>
<td>university</td>
<td>% of total count</td>
<td>23(46.0%)</td>
<td>0(0.0%)</td>
</tr>
<tr>
<td>total</td>
<td>% of total count</td>
<td>45(90.0%)</td>
<td>5(10.0%)</td>
</tr>
</tbody>
</table>

Table (4.7): Educational level know about zoonotic

Figure (4.7): Educational level know about zoonotic
4.8. Educational level  PPE (Personal Protective Equipments) are abundant in your quarantine unit and workers don’t use them?

In this study we evaluate the educational level of the workers as factor affect their application of good practice against zoonotic diseases that 18 (36%) of the graduated they used PPE while the percentage decreased to 1 (2%) among illiteracy persons.

Table (4.8): Educational level PPE (Personal Protective Equipments) is abundant in your quarantine unit and workers don’t use them

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>No answer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiteracy</td>
<td>1(2.0%)</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>0(0.0%)</td>
<td>1 (2.0%)</td>
</tr>
<tr>
<td>Primary</td>
<td>1(2.0%)</td>
<td>3(6.0%)</td>
<td>0(0.0%)</td>
<td>1(2.0%)</td>
<td>5 (10.0%)</td>
</tr>
<tr>
<td>secondary</td>
<td>15(30.0%)</td>
<td>3(6.0%)</td>
<td>2(4.0%)</td>
<td>1(2.0%)</td>
<td>21 (42.0%)</td>
</tr>
<tr>
<td>university</td>
<td>18(36.0%)</td>
<td>1(2.0%)</td>
<td>4(8.0%)</td>
<td>0(0.0%)</td>
<td>23 (46.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>5(70.0%)</td>
<td>7(14.0%)</td>
<td>6(12.0%)</td>
<td>2(4.0%)</td>
<td>50 (100.0%)</td>
</tr>
</tbody>
</table>

4.9. Educational level if you get injury in your hand during working

The table show 15(30%) of graduated workers visit a doctors if they get injury, while 0 % of illiteracy persons went to doctors, 17 (34%) dress their wounds when they get injured, 16 (32.0%) ignore and continue their work when they get injured, 2 (4.0%) of workers don’t care when they get injured.
Table (4.9): Educational level if you get injury in your hand during working

<table>
<thead>
<tr>
<th>Educational level</th>
<th>See doctor</th>
<th>Dressing</th>
<th>Ignore and continue my work</th>
<th>Don’t care</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiteracy</td>
<td>% of total</td>
<td>count</td>
<td>% of total</td>
<td>count</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(0.0%)</td>
<td>(2.0%)</td>
<td>(0.0%)</td>
<td>(0.0%)</td>
<td>(2.0%)</td>
</tr>
<tr>
<td>primary</td>
<td>% of total</td>
<td>count</td>
<td>% of total</td>
<td>count</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>(0.0%)</td>
<td>(2.0%)</td>
<td>(8.0%)</td>
<td>(0.0%)</td>
<td>(10.0%)</td>
</tr>
<tr>
<td>secondary</td>
<td>% of total</td>
<td>count</td>
<td>% of total</td>
<td>count</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>8</td>
<td>9</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>(4.0%)</td>
<td>(16.0%)</td>
<td>(18.0%)</td>
<td>(4.0%)</td>
<td>(42.0%)</td>
</tr>
<tr>
<td>University</td>
<td>% of total</td>
<td>count</td>
<td>% of total</td>
<td>count</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>(26.0%)</td>
<td>(14.0%)</td>
<td>(6.0%)</td>
<td>(0.0%)</td>
<td>(46.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>% of total</td>
<td>count</td>
<td>% of total</td>
<td>count</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>17</td>
<td>16</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>(30.0%)</td>
<td>(34.0%)</td>
<td>(32.0%)</td>
<td>(4.0%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Figure (4.9): Educational level If you get injury in your hand during working
CHAPTER FIVE

DISCUSSION

5.1. DISCUSSION

Zoonoses are still a major challenge to human health worldwide. In Africa, it is estimated that infectious diseases account for up to 68% of all deaths especially in vulnerable groups such as children and people infected with HIV/AIDS [black et al. 2010]. Most zoonotic infections go undiagnosed, causing enormous suffering and death of thousands of children and adults daily [Makita et al. 2008]. These findings are similar to those study conducted in different areas in Sudan among zoonosis, in these study we tried to evaluate some habits and attitudes associated with transmission and distribution of these diseases among workers in distinct area (Sawakin quarantine).

With limited knowledge about their responsibilities in the prevention and control of zoonotic disease, animal and human health care workers are not equipped to advise the public on appropriate prevention and control strategies. Some of this lack of knowledge can be explained by structural or institutional weaknesses that may disable health workers from learning about zoonotic diseases. There is a well-established set of best practices for animal and human health workers to follow to reduce risk of zoonoses. Ensuring workers consistently follow these practices can be challenging, regardless of the context (Jeffrey Gilbert et al. 2014). The current research found veterinarians and workers in Sawakin veterinary quarantine had adequate knowledge on zoonosis transmission, prevention and they follow good attitude and practice during the period of the study, this is indicate that the extension unit did their job as well and therefore were able to effectively communicate to their communities.

Low awareness about how zoonoses are transmitted by eating habits or animal management practices makes communities vulnerable to disease. The team in Cambodia used a household survey and participatory rural appraisal among rural communities in two provinces to investigate the causes of acute diarrhea. More than one-third of households from areas classified as high-incidence for acute diarrhea reported eating sick animals, most
commonly chicken. In China, the team used focus group discussions to explore knowledge, attitudes and practices towards brucellosis. They learned that some people preferred to drink raw milk and some believed that health risks from eating raw meat could be reduced if alcohol was consumed beforehand. None of the participants appeared to be aware that these behaviours increased their risk of obtaining brucellosis or other zoonosis (Jeffrey Gilbert, 2014), in contrast in Sudan we have these bad attitudes in some tribes and religious thinking in different areas in the country that increase the risk of outbreak of diarrheas and even dangerous fetal disease like anthrax.

Zoonoses don’t just have impacts on human health; they also cause economic losses to the livestock sector and can threaten wildlife. Many of the diseases in the projects were not considered diseases of high importance in terms of government priorities. These attitudes were not necessarily based on evidence, as in most cases, recent animal and human health data on these diseases did not exist at the national or district level. As a result, decision-makers at various levels tended to prioritize attention to other health issues that may have appeared to be a larger threat.

The study in Cambodia found that even though many farmers associated eating sick and dead animals with illness, it did not stop them from eating them. Likewise, most health workers had received training on good hygienic practices, but ensuring workers consistently follow these practices can be challenging (Jeffrey Gilbert, et al. 2014). In these study we observed that some workers did not apply consequent biosecurity measures (e.g. use of disinfectant or gloves) when handling sick animals, which can pose a great threat to their own health or transmit brucellosis among other cows in the herd.
6.1. Conclusion

The study provide valuable information about assessment of knowledge attitude and Practice (KAP) about zoonotic diseases among animal workers in Sawakin quarantine (2014).

The most important result of this study showed that, the overall knowledge, attitudes, and practices (KAP) of quarantine workers were significantly higher in our study area.

The study showed that 45 (90\%) out of 50 of workers had basic knowledge about zoonosis while 5 (10\%) of workres out of 50 had basic knowledge of zoonosis.

Regarding the hygiene practices, In this study 34 (68.0\%) out of 50 of workers they using personal protective clothes during work, while 12 (24\%) of worker out of 50 dont using the personal protective equipments.

In this study the educational level of workers affect their application of good practice against zoonotic diseases that 18 (36\%) of the graduated they used PPE while the percentage decreased to 1 (2\%) among illiteracy persons.
6.2. Recommendations

Developing health education materials for farmers and workers in commercial farms as well as in the veterinary quarantine facilities to raise awareness in occupational health among workers.

- Using culturally appropriate materials in extensional communication like brochures, posters, a film and songs, the teachers were able to present the messages in ways that were memorable and easily transferrable to other communities.

- Policymakers, development practitioners and the research community gathered to discuss the research results and their implications for bringing attention to zoonosis as a potentially serious public health issue and livestock industry concern.

- Enhanced laboratory facilities and trained staff were also identified as an immediate need to allow effective differential diagnosis of all diseases affecting animals and humans.
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Defra, 2007
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APPENDIX

Questionnaires about zoonotic disease among animal attendant in Sawakin Quarantine

The purpose of this questionnaire is to estimate knowledge, attitude and practices about zoonotic disease among animal workers in Sawakin Quarantine 2014.

**PART (A)**
**DEMOGRAPHIC CHARACTERISTICS**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>Male ( ) Female ( )</td>
</tr>
<tr>
<td>2</td>
<td>Age (years)</td>
<td>15-25 ( ) 25 – 35 ( ) 35-45 ( )</td>
</tr>
<tr>
<td>3</td>
<td>Nationality</td>
<td>local ( ) other nationality ( )</td>
</tr>
<tr>
<td>4</td>
<td>Educational level</td>
<td>Illiteracy ( ) Primary ( ) Secondary ( ) Universal ( )</td>
</tr>
<tr>
<td>5</td>
<td>Current job</td>
<td>Cleaners ( ) vet. Assistant( ) Others ( )</td>
</tr>
<tr>
<td>6</td>
<td>Duration of works</td>
<td>From 1-5 years ( ) from 5-10years from 10-15 years( ).</td>
</tr>
<tr>
<td>7</td>
<td>Place of living</td>
<td>Inside vet service unit ( ) outside vet. service unit</td>
</tr>
</tbody>
</table>

* Please indicate your opinions for the following statements about zoonotic disease:

**PART (B)**

**KNOWLEDGE :-**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Do you know about zoonotic disease?</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>Do you know how zoonotic disease can be transmit ?</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Are you know about safety measures in vet. Services?</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Are you use PPE (Personal protective equipments) during work?</td>
<td></td>
</tr>
</tbody>
</table>
### PART (C) ATTITUDES

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>No answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>All staff in vet. service unit are well trained about application of safety measures.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>PPE (Personal protective equipments) are abundant in your vet. service unit and workers don’t use them?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Workers Wash and disinfect their hands after each animal handling.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Workers subjected to periodic medical check</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PART (D) PRACTICES

<table>
<thead>
<tr>
<th></th>
<th>Where do you change your dress?</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>(a) in side veterinary service unit.</td>
</tr>
<tr>
<td></td>
<td>(b) outside veterinary service unit.</td>
</tr>
<tr>
<td></td>
<td>(c) At home.</td>
</tr>
<tr>
<td></td>
<td>(d) don't change</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>What do you do when wash your hands?</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>(a) wash my hands with soap and water</td>
</tr>
<tr>
<td></td>
<td>(b) wash my hands with water only</td>
</tr>
<tr>
<td></td>
<td>(c) not remember</td>
</tr>
<tr>
<td></td>
<td>(d) don't know</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>You take your meals and drinks in vet services unit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>(a) Usually</td>
</tr>
<tr>
<td></td>
<td>(b) Sometimes</td>
</tr>
<tr>
<td></td>
<td>(c) Never</td>
</tr>
<tr>
<td></td>
<td>(d) Don’t use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>If you get injury in your hand during working</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>(a) See doctor</td>
</tr>
<tr>
<td></td>
<td>(b) Dressing</td>
</tr>
<tr>
<td></td>
<td>(c) Ignore and continue my work</td>
</tr>
<tr>
<td></td>
<td>(d) Don’t care</td>
</tr>
</tbody>
</table>