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KNOWLEDGE AND ATTITUDE TOWARDS ZOONOSES AMONG WORKERS IN SELECTED ZOOLOGICAL GARDENS IN NIGERIA

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ABSTRACT

An exploratory questionnaire-based survey of zoological workers (n=152) was carried out from April 2016 to March 2017 in Ibadan (Oyo State), Ilorin (Kwara State) and Jos (Plateau State), Nigeria to assess local knowledge and attitude towards zoonoses among zoological workers. A combination of closed and open-ended questions, focused group discussions and ranking techniques were employed 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 revealed that 44.1% of the respondents had good level of awareness about zoonoses. Rabies (99%), tuberculosis (41%), bird flu (47%) and Ebola virus disease (EVD) (44%) were considered the four most common zoonotic diseases in the study area. Among the respondents, 42.1% and 57.2% perceived zoonoses are transmitted by direct contact and attending to sick animals respectively. Constant hand washing was indicated by 45.4% of the respondents as the mode of prevention of zoonoses in the study area. It is necessary that the Government provide the vaccination facility to all the zoological workers against the relevant zoonotic diseases. The level of awareness about the risks associated is needed to improve through proper education, training, and establishment of written infection control policies in the various zoological gardens in the country.

Keywords: Zoonoses, Zoological garden, Workers, Knowledge, Attitude

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INTRODUCTION

Zoonosis is a disease that can be transmitted between non-human vertebrates and human and any detriment to the health and quality of human life from relationships with lower vertebrates or edible or toxic invertebrate animals. WHO estimates more than 150 diseases and Infections communicable to man (Cleaveland, *et al*, 2001; WHO, 2021). Animals are part of man's biological environment, we rear them as pets, man consume the flesh of animals, some sleep on the same bed with them, some even cohabit with animals, all these offer unlimited opportunities for exchange of diseases with animals. Every animal has some diseases to give to man (Ghai *et al*., 2021).

Zoos and biological parks are considered as a hub for public recreation and education. Visitors to the zoos/biological parks are increasing year by year and they generate sizeable amount of revenue. Veterinary professionals play a pivotal role in health management of wild animals in zoos and biological parks (Coleman, 2002). Veterinarians and zoo staff work in close contact with wild animals there is potential risk of transmission of zoonotic diseases from wild animals to humans and vice versa. More than 70% of the emerging zoonotic diseases have wild animals as reservoir hosts (Ghai *et al*., 2021). Major zoonotic diseases that are transmitted from wild animals to humans include rabies, tuberculosis, bird flu, Ebola Viral Disease (EVD), anthrax leptospirosis, Q-fever, psittacosis, nipah virus, toxoplasmosis (Oludairo *et al.,* 2016a). Veterinarians and zoo staff should be conscious of the knowledge pertaining to the source, transmission, pathogenicity, first-aid treatment and control of zoonotic diseases (Coulibaly and Yameogo, 2000).

Zoo workers are exposed to numerous health-related risks in their day to day activities such as animal bites, injuries, infections, adverse gases/odour, needle stick injuries and even death (Cripps, 2000). Wild animals act as reservoirs for several zoonoses, exposures to zoonoses is the most common risk by virtue of their occupation which demand close contact with animals (Oludairo *et al.*, 2016b). It has been documented that more than 70% of human diseases are zoonotic in nature (John *et al*, 2008, Aiyedun, *et al*, 2017). In wild life settings such as zoological gardens and parks both anthropozoonotic and zooanthroponotic transmission can efficiently occur (Coleman, 2002).

The symptoms of zoonotic diseases in humans range from self-limiting to long-term illnesses which may disable the person for several days even after the disease has been cured. Emerging viral diseases like EVD is highly contagious and fatal. Factors such as over-crowding, improper restraint, change in food habits and transport of wild animals to a new environment induces stress in the animals. Negligence of veterinarians and zoo staff toward the use of personal protective equipment during diagnosis, treatment, necropsy and improper hand hygiene enhanced the spread of zoonosis (Murphy, 2008). Unscientific methods of disposal of wild animal carcasses, organs, feces, urine and unused food, serves as sources of pathogens and enhances vector breeding. Lack of good laboratory practices and standard operating procedures (S.O.P) while handling clinical samples also aid the spread of zoonosis (Murphy, 1998).

The objective of the study was to provide information for personnel who work in close association with wild animals. Also, to assess knowledge of zoo workers on the source, transmission, pathogenicity, treatment, reservoirs, vectors and control of zoonosis

MATERIAL AND METHODS

Experimental Design

An exploratory questionnaire-based survey of zoological workers (n=152) was carried out from April 2016 to March 2017 in Ibadan (Oyo State), Ilorin (Kwara State) and Jos (Plateau State) in Nigeria to assess local knowledge and attitudes towards zoonosis among zoological workers. A combination of closed and open-ended questions, focus group discussions and ranking techniques were employed 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 questionnaire was developed to assess perceptions, knowledge and attitudes toward zoonosis. The focus of the questionnaire was on zoo workers knowledge, considered important for identification and perception of zoonosis. The key information asked included; listing and ranking diseases transmitted from animals to humans, how disease is introduced into a zoological garden, the most at-risk animal or product as far as zoonosis is concerned and the associated signs of disease, protective measures taken against diseases, handling practices employed when attending to emergency. Information was also sought on knowledge of the risks posed by zoo animals and the transmission routes.

Data analysis

The data collected on the questionnaires and from the focus group discussion were stored and analyzed using version 6.04 of the Epi Info software package Epi-info, (1996) by the Centers for Disease Control and Prevention, Atlanta, GA. The relationships between dependent and various independent factors were explored in $\chi 2$ tests. A P-value of 0.05 was considered indicative of a statistically significant difference.

RESULTS

Completed questionnaire from one hundred and fifty-two respondents were analysesd indicating gender distribution of (98) ninety-eight female and (54) fifty-four male respondents. All the respondents knew that there are certain diseases that can be transmitted from animal to man; the level of awareness however ranged between poor (33.2%), good (44.1%) and excellent (23.7%) (Table 1). Rabies (99%), tuberculosis (41%), bird flu (47%) and Ebola virus disease (EVD) (44%) were the top four diseases listed by the respondents that they have knowledge about (Table 2). At confidence level of 0.05, association between groups were statistically significant. Direct contact and multiple modes of transmission were identified by the respondents as the highest and lowest modes of transmission of zoonoses respectively (Table 3). The level of risk of zoonoses from the various activities in the zoo indicated that 57.2% and 15.1% of the respondents identified attending to sick animals and cleaning of animal cages as the highest and lowest risk factors respectively (Table 4). The perceived modes of prevention of zoonoses by respondents in this study were constant hand wash (45.4%), vaccination (23.7%) and the use of personal protective equipment (PPE) (3.9%) (Table 5).

Table 1: Level of awareness of zoonoses among respondents in the study

S/No.	Assessment	Respondents	Percentage (%)
1	Poor	49	32.2
2	Good	67	44.1
3	Excellent	36	23.7
	Total	152	100

Table 2. Zoonoses that respondents in the study areas know about and their relative frequency

S/No.	Zoonosis	Number (%) of Respondents with knowledge of zoonosis	Number (%) of Respondents without knowledge of zoonosis	P value
1.	Rabies	151 (99)	1 (1)	P < 0.05
2.	Tuberculosis	62 (41)	90 (59)	
3.	Bird flu	71 (47)	81 (53)	
4.	Ebola Virus Disease (EVD)	67 (44)	85 (56)	

Table 3: Perception of the frequency of the mode of transmission of zoonoses in this study

S/No.	Route of transmission	Frequency	Percentage (%)
1	Oral	29	19.1
2	Nasal (Respiratory)	36	23.7
3	Direct (Contact)	64	42.1
4	Multiple (More than one routes)	23	15.1
	Total	152	100

Table 4: Level of risk of zoonosis from various activities in the zoo

S/No.	Risk factors	Frequency	Percentage (%)
1	Attending to sick animals	87	57.2
2	Cleaning of animal cages	23	15.1
3	Direct contact with contaminated materials in the zoo	42	27.6
	Total	152	100

Table 5: Perception of the mode of prevention of zoonoses in this study

S/No.	Preventive measures	Frequency	Percentage (%)
1	Personal Protective Equipment (PPE)	47	3.9
2	Constant hand wash	69	45.4
3	Vaccination	36	23.7
	Total	152	100

DISCUSSION

The recorded level of awareness of zoonosis could be as a result of the location of the zoo in an academic environment which could have influenced their level of education and information about zoonosis. The zoonosis stated by respondents in this study are diseases that have being of public health concern in recent years and may be why the respondents in this study were able to exhibit the form of knowledge recorded in this study. Wild animals (including zoo species) act as reservoirs for several zoonotic infections. It has been documented that more than 60% of the emerging human infectious diseases are zoonotic in nature of which more than 70% have wild animals as the reservoir hosts (Cutler et al., 2010). Wildlife zoonosis can also include some neglected bacteria. Jegede *et al*. 2017 established presence of zoonotic *Salmonella spp* on the skin of pythons. This organism can therefore be contacted by direct contact with snakes therefore zoo workers should also be aware of the presence of these organisms in reptiles (Carvalho, 2006).

Direct-contact route of transmission and attending to sick animals may be the most visible factors contributing to the spread of zoonosis and may be the reason respondents in this study recognized these as risk factors. Constant hand washing has been promoted in recent years as a major way of preventing diseases. The information in the public domain could be the reason respondents rated constant hand washing over vaccination and the use of personal protective equipment (PPE). In order to prevent and control zoonotic diseases in humans and animals, there is need for zoological workers to understand the interconnections that exist among human, animal and environmental health. Though specific microorganism species were not identified and possible zoonosis from these species identified which is a limitation to the study, it can still be gathered that zoo workers are quite aware of the presence of zoonotic organisms in zoo settings.

CONCLUSION

The result shows that zoo workers are prone to high risk of contracting zoonoses and the level of risk has been grossly under estimated. Awareness and knowledge of zoonoses is relatively high among zoo staff. Although, local knowledge system is limited to a restricted number of zoonoses such as rabies, tuberculosis, bird flu and Ebola Virus Disease (EVD). The high level of illiteracy among the zoological workers further increases the threat posed by zoonotic infections, most notably by rabies. It also appears from the study that long serving staff are more knowledgeable on zoonoses when compared with newly employed. Personal hygiene can prevent transmission of diseases. Much can be done by education and training to increase the knowledge and skills of different categories of staff, and for raising awareness by facilitating communication and inter-disciplinary collaboration on research and/or sharing of information between zoological workers, veterinarians and policy makers. This can be used to guide the development of a coordinated, efficient and effective approach to the diagnosis, treatment and prevention of

zoonotic diseases in the country. Zoological workers need more knowledge, correct attitude and skill to enable them take precautionary measures against zoonotic diseases.

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