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## Public Awareness of zoonotic Diseases and Public Health Implications in Makurdi Metropolis, Benue State, Nigeria.

### Conciencia pública sobre las enfermedades zoonóticas y las implicaciones para la salud pública en la metrópoli de Makurdi, estado de Benue, Nigeria.

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#### ABSTRACT

This study was conducted with the objective of assessing the level of awareness on zoonotic diseases among residents of Makurdi Metropolis. Questionnaire was structured into 3 sections namely, socio- demographic characteristics of residents, awareness on domestic animals, and wild animals transmission of zoonotic diseases. Simple and systematic random sampling was used to select sample locations in which a total of 250 questionnaires were administered; descriptive statistics, Student's t-test and chi-square analysis were used to analyzed data. Field result showed that 144 respondents male were interviewed while 106 respondents were female. Residents of Makurdi Metropolis were quite aware of zoonotic diseases in both domestic and wild animals. The commonest domestic animal zoonotic diseases known to residents were: the mad dog disease, bird flu and swine flu. While the commonest wild animal zoonotic diseases known to residents were: monkey pox disease, Ebola disease, and Lassa fever, the awareness of residents on these zoonotic diseases could be associated with the recent outbreak of these diseases and in the area. It was therefore recommended that more awareness campaigns on other types of zoonotic diseases and their preventive measures should be given to residents of Makurdi metropolis to forestall future public health hazards.

Keywords: Makurdi metropolis, zoonotic diseases transmission, Awareness, domestic and wild animals.

## RESUMEN

Este estudio se realizó con el objetivo de evaluar el nivel de conciencia sobre las enfermedades zoonóticas entre los residentes de la Metrópolis de Makurdi. El cuestionario se estructura en 3 secciones, a saber, las características sociodemográficas de los residentes, la conciencia sobre los animales domésticos y la transmisión de enfermedades zoonóticas a los animales salvajes. Se utilizó un muestreo aleatorio simple y sistemático para seleccionar ubicaciones de muestra en las que se administraron un total de 250 cuestionarios; Se utilizaron estadísticas descriptivas, la prueba t de Student y el análisis de chi-cuadrado para analizar los datos. El resultado de campo mostró que 144 entrevistados hombres fueron entrevistados, mientras que 106 encuestados eran mujeres. Los residentes de la Metrópolis de Makurdi eran muy conscientes de las enfermedades zoonóticas tanto en animales domésticos como salvajes. Las enfermedades zoonóticas de animales domésticos más comunes conocidas por los residentes fueron: la enfermedad del perro loco, la gripe aviar y la gripe porcina. Si bien las enfermedades zoonóticas de animales salvajes más comunes conocidas por los residentes fueron: la enfermedad de la viruela del mono, la enfermedad del ébola y la fiebre de Lassa, la conciencia de los residentes sobre estas enfermedades zoonóticas podría estar asociada con el brote reciente de estas enfermedades y en el área. Por lo tanto, se recomendó que se realicen más campañas de sensibilización sobre otros tipos de enfermedades zoonóticas y sus medidas preventivas a los residentes de la metrópoli de Makurdi para prevenir futuros riesgos para la salud pública.

Palabras clave: Metrópolis Makurdi, transmisión de enfermedades zoonóticas, Conciencia, animales domésticos y salvajes.

## INTRODUCTION

Zoonoses are infectious diseases that are naturally transmissible between vertebrate animals and man, (World Health Organization WHO, 2006). They exert dual impacts on human population that are livestock dependent. This could be either through direct risk of infection by zoonoses or through reduced production by the livestock resulting in food insecurity and poverty, (Molyneux *et al.*, 2011). Their transmission require three elements namely; the source of the organism, a susceptible host, and a means of transmission between the hosts, (Siegel *et al.*, 2007). Today, zoonoses as a domestic and wild animal reservoir constitute a major public health problem. The importance of such zoonoses is increasingly recognized, and the need for more attention in this area is being addressed. The total number of zoonoses is unknown, but Taylor *et al.*, (2001), catalogued 1,415 known human pathogens, 62% were of animal origin. Transmission mechanism of Zoonoses as a domestic and wild animal reservoir represents a

large spectrum of transmission modes. Several zoonotic agents can be directly transmitted from wildlife to humans, coming into contact with the saliva, blood, urine, mucus, feces, or other body fluid of an infected animal example include petting or touching animal and bites or scratch. Zoonotic agents can also be spread from wildlife to humans indirectly by contaminated food and water, coming into contact where animals live and roam, or objects or surface that have been contaminated with germs for example *Salmonella* spp. and *Leptospira* spp. The ecologic changes influencing the epidemiology of zoonoses as a domestic and wild reservoir can be of natural or anthropogenic origin. These include, but not limited to, human population expansion and encroachment, deforestation and other habitat changes, pollution, and climatic changes.

## MATERIALS AND METHODS

This study was conducted in Makurdi Metropolis, Makurdi Local Government Area (LGA) of Benue state, Nigeria. Makurdi LGA is located in the North central Nigeria along the Benue River on Latitude 7.44° N and Longitude 8.32°E. Simple and systematic random sampling techniques were adopted. Five locations were randomly selected based on information recorded from previous survey and known to be residential areas. These locations were Wadata, North Bank II, Wurukum, Kanshio and High Level. In each of the five residential areas, five streets were randomly sampled and 50 houses were selected based on houses with odd numbers on each street, following the method by Omudu *et al.*, (2010), and for each of the selected houses a semi- structured questionnaire was administered and responses were documented. The questionnaire used in this survey was design to extract information on the awareness on zoonotic diseases of the residents .The questionnaire contain 30 questions structured into three sections, these were: Socio-demographic characteristics of residents in the study area, awareness on domestic animals transmission of zoonotic diseases and wild animals transmission of zoonotic diseases. The hypothesis constructed in the null form (H<sub>0</sub>) was: Residents of Makurdi Metropolis are aware that domestic and wild animals can transmit zoonotic diseases. Alternative hypothesis (H<sub>A</sub>) was: Residents of Makurdi Metropolis are not aware that domestic and wild animals can transmit zoonotic diseases. Therefore the test criterion was given as, reject the null hypothesis (H<sub>0</sub>) and accept the alternate hypothesis (H<sub>A</sub>) if  $t_{cal.} > t_{tab}$ . That is if the calculated value is greater than the tabulated value or critical value. The data was analyzed using Student's t-test and chi-square to test the residence level of awareness on zoonotic disease in both domestic and wild animals.

## RESULTS AND DISCUSSION

A total of 250 questionnaires was administered in the five locations, data collected and analyzed indicated that 144 of the respondents were male while the proportion of female was 106, the highest number of residents were in the age group 25-29years, this was similar to the findings of Dawit *et al.*, (2013) in Southwestern Ethiopia who also reported that male accounted for 123 while female were 52 and the highest numbers of residents were in the age group 35-49. Descriptively, there is a greater male than female population, but statistical support is not established whether this assumption has statistical significance. (Table1)

The result of awareness on (Table 2) below showed that residents of Makurdi Metropolis were aware of Zoonotic diseases in domestic animals, this result corroborates the findings by Girma *et al.*, (2012) who also indicated a high level of awareness among residents of Addis Ababa on zoonotic diseases in domestic animal, however this findings do not corroborates the findings by Babu *et al.*, (2015) who reported a relatively low level of awareness and knowledge on domestic animals zoonotic diseases among the public in and around Andhra District in India. This awareness among the residents of Makurdi Metropolis could be attributed to the recent outbreaks of monkey pox diseases in the study area.. Hence we accept the null hypothesis which state that residents of Makurdi Metropolis are aware of zoonotic disease in domestic animals because ( $t\text{-cal.}1.93 \leq t\text{-tab. } 5.32$  at  $p=0.05$ ).

Result of residents awareness of zoonotic disease in Wild animal in this study is similar to the findings of Abosede *et al.*, (2017) who reported that residents of some high risk zoonotic disease locations in Nigeria have a relatively high level of awareness on zoonotic disease in wildlife. This high level of awareness was also reported by Bukie *et al.*, (2018), by residents of communities surrounding Afi Mountain Wildlife Sanctuary, in Cross River State. Hence we accept the null hypothesis which state that resident of Makurdi Metropolis are aware of zoonotic disease in wild animals. Because ( $t\text{-cal.}1.93 \leq t\text{-tab. } 5.32$  at  $p=0.05$ ) (Table 3).

Among the several zoonotic diseases transmitted to humans from several species of domestic animals like dog, cattle, pigs, cats, rabbit, residents in the study area were more aware of rabies as a disease transmitted to humans from dog which is followed by bird flu from poultry birds and swine flu from pigs, this is in line with the findings of Babu *et al* (2015) who reported that the frequently known zoonotic disease among the public in and around Andhra District in India was rabies and most of them were unaware of other zoonotic diseases in domestic animals (Figure 3).

Residents were also aware of several diseases that can be transmitted to humans from wild animals but among these diseases monkey pox and Ebola were well known by the residents of Makurdi Metropolis and this could be as a result of the recent 2014 Ebola outbreak and the

2017 monkey pox outbreak in the country which were given much publicity. This high awareness situation was also reported by Bukie *et al.*, (2018) in cross River State, Nigeria. (Figure 4)

Table1. Socio- demographic characteristics of residents in the study area.

Item	Responses	Frequency	Percentage (%)
Gender	Male	144	57.6
	Female	106	42.4
Age	25-29	95	38
	30-34	71	28.4
	35-39	33	13.2
	40 and above	51	20.4
Marital Status	Married	131	52.4
	Single	114	45.6
	Divorced	5	2
Level of Education	Primary	29	11.6
	Secondary	99	39.6
	Tertiary	54	21.6
	Post tertiary	68	27.2
Number of people in household	1-5	69	27.6
	6-10	123	49.2
	11-15	40	16
	16 and above	18	7.2
Major occupation	Traders	89	35.6
	Laborers	48	19.2
	Consultant	9	3.6
	Government Employees	69	27.6
	Private Employees	24	9.6
	Retirees	11	4.4

Table 2. Residents awareness on domestic animal zoonosis.

Item	Response	Frequency	Percentage (%)
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Do you know what domestic animals are	Yes	223	89.2
	No	27	10.8
Do you have domestic animals at home	Yes	103	41.2
	No	147	58.8
Do you cage your domestic animals	Yes	57	55.34
	No	46	44.66
Vaccination	Yes	58	56.31
	No	45	43.69
Are you aware this animal can transmit disease you	Yes	171	76.68
	No	52	23.32
Type of Domestic animal	Dog	83	27.48
	Cat	69	22.85
	Pig	55	18.2
	Bird	71	23.51
	Rabbit	24	7.95
Number of domestic animals	1-5	67	65.05
	6-10	6	5.825
	11-15	0	0
	16 and above	17	16.5
	None	13	12.62

Table 3. Residents awareness on wild animal zoonosis

Item	Responses	Frequency	Percentage (%)
Do you know what wild animals are	Yes	197	78.8
	No	53	21.2
Do you have wild animals at home	Yes	4	1.6
	No	246	98.4
Do you cage your wild animals	Yes	4	1.6
	No	246	98.4
Are you Aware this animal can transmit disease to you	Yes	161	81.73
	No	36	18.27
Type of wild animal	Monkey	4	100
	None	0	0
Number of wild animals		4	100

Residents' awareness on Types of Zoonotic disease in Domestic animals

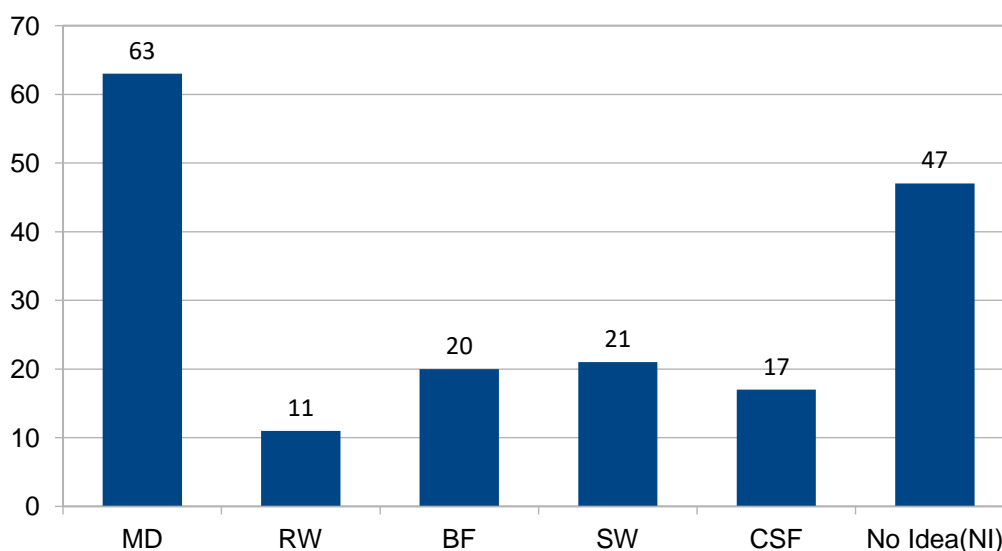


Figure 3. Residents awareness on types of zoonotic diseases in domestic animals

MD=Mad Dog Disease, RW= Ring Worm Disease, BF=Bird Flu Disease, SW=Swine Flu Disease, CSF=Cat Scratch Fever Disease, N.I=No Idea.

Resident awareness on types of zoonotic disease in wild animals.

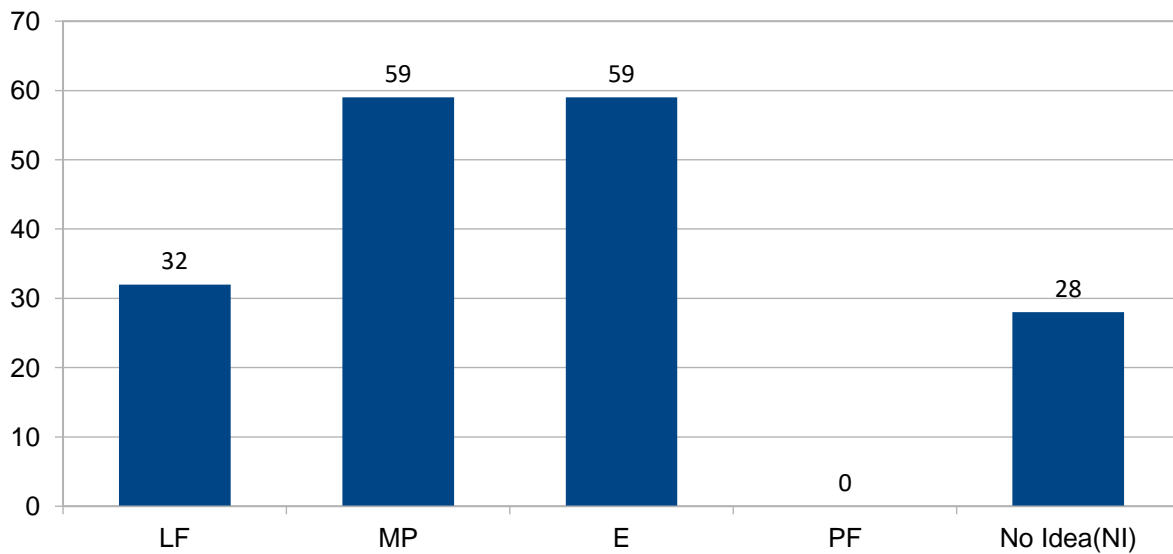


Figure 4: residents awareness on types of zoonotic diseases in wild animals.

NOTE: LF=Lassa Fever, MP=Monkey Pox, E= Ebola, PF= Parrot Fever, N.I= No idea.

Measure Taken by Residents to Prevent Being Infected with zoonotic Diseases.

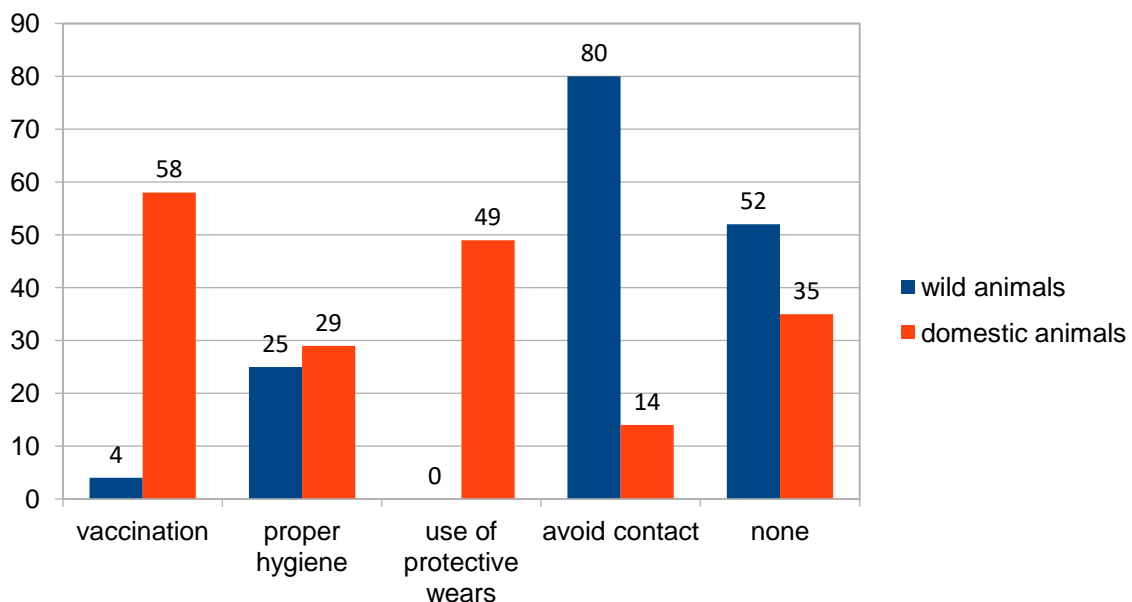


Figure 5: Measures taken to prevent being infected with disease in both domestic and wild animal

Vaccination Interval of Animals in the Study Area.



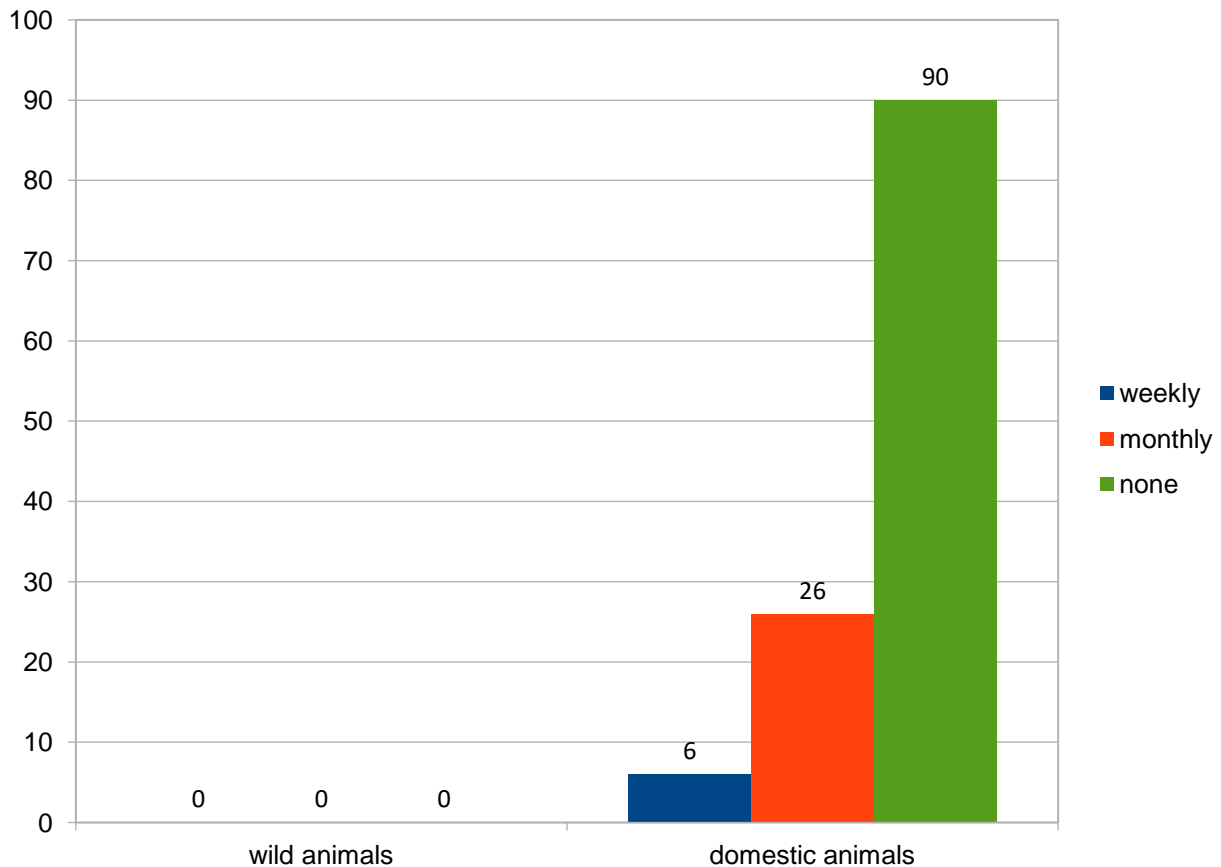


Figure 6. Vaccination interval for domestic animals

The commonly adopted measure by residents in the study area to prevent being infected with zoonotic diseases was by vaccination of the animals and use of protective wears, this however corroborates the report by Omudu *et al.*, (2010) who reported several reasons why dog owners in Makurdi visit veterinary clinic with dogs and one prominent reason was for routine check- up and vaccination against tick infestation (Figure 5).

The residents embark on monthly vaccination of their animals while a higher proportion of the residents do not vaccinate their animals of which can lead to high risk in disease transmission in both domestic and wild animals. This is of public health concern because regular vaccination helps in preventing disease outbreaks and transmission (Figure 6).

As conclusion, among the several zoonotic disease that can be transmitted to humans from animal species, mad dog disease was the well-known zoonotic disease in domestic animal while monkey pox and Ebola were the well-known zoonotic diseases in wild animal by the respondents in the study area, this implies the lack of awareness on other types of zoonotic disease that can be transmitted to humans which can be very dreadful to the human population. This absence of awareness about other zoonotic diseases in the present investigation area

might be due to poor or absent of awareness creation activities that should have been done by medical and veterinary health care professionals of the state.

In conclusion the overall level of awareness on zoonotic disease with respect to the five location is high which could be due to their educational level, experiences and information on zoonotic disease transmission but there is still need for awareness to be carried out about other types of disease can be contacted by humans from animals and a more effective measure to be taken by residents to prevent being infected.

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