PREVALENCE OF RABIES VIRUS IN DOGS SLAUGHTERED FOR FOOD IN KAURA AND JAMA'A L.G.As OF KADUNA STATE BETWEEN OCTOBER 2012 TO JANUARY 2013.

BY

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AHMADU BELLO UNIVERSITY

ZARIA-NIGERIA

APRIL, 2013

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ATTESTATION

I declare that the work in this thesis entitled "PREVALENCE OF RABIES IN SLAUGHTERED DOGS USED FOR FOOD IN KAURA AND JAMA'A L.G.As OF KADUNA STATE" has been performed by me in the Department of Public Health and Preventive Medicine, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria under the supervisions of Prof J.U Umoh and Dr A.A Dzikwi. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree, diploma or certificate at any university.

Diem MATHEW	……..	…..…….
Name of student	Signature	Date

CERTIFICATION

This Thesis entitled **"PREVALENCE OF RABIES IN SLAUGHTERED DOGS USED FOR FOOD IN KAURA AND JAMA'A L.G.As OF KADUNA STATE"** by MATHEW Diem meets the regulations governing the award of the degree of Master of Science of Ahmadu Bello University, Zaria and is approved for its contribution to scientific knowledge and literary presentation.

Professor. J. U. Umoh	……..…….	……..…….
Chairman Supervisory Committee	Signature	Date
Dr A. A Dzikwi	……...	……
Member Supervisory Committee	Signature	Date
DR M.N SAMBO		
Head of department	…….	…….
Community Medicine	Signature	Date
Prof. A.A Joshua	……	……
Dean Post Graduate School	Signature	Date

DEDICATION

This Thesis is dedicated to my Wife Mrs. Rebecca Mathew my, Children Florence Mathew and Gideon Mathew, my Late Sister Mrs. Martina Audu and my beloved mother Mrs. Bridget Tani Diem for their support, encouragement and prayers.

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SUMMARY

Rabies is a zoonosis that occurs in more than 150 countries and territories. Worldwide, more than 55 000 people die of rabies every year. Poor people, children and individual that deals with dogs, especially veterinarians and dog meat processors are at a high risk of exposure. The study was carried out to determine the prevalence of rabies antigen in the brain of dogs slaughtered for food in Kaura and Jama'a LGAs of Kaduna State. The study design was cross sectional. Fluorescent antibody test (FAT) was performed on 200 brain Samples. Forty (40) questionnaires were also administered to dog processors to assess their level of knowledge, attitude and practice towards rabies. A review of records on dog bite in veterinary clinic and health centers between (2007-2011) was also carried out. Out of the 200 brain samples from slaughtered dogs examined, 14(7%) were positive. The frequency distribution of the demographic characteristics of dog meat processors showed that males were 97.5%, which gives an indication that males are more likely to be exposed rabies than females. About 80.0% of dog meat processors were knowledgeable on rabies, 50.0% had an acceptable level of attitude towards rabies and 52.5% had acceptable score for practice. All cases in human hospitals within the five years reviewed, 2.9% were cases of dog bite. Dog meat processors should be made to be aware of the risk of being exposed to rabies during dog meat processing and should be advised to report in case of bites and cut during processing to health authorities.

ABBREVIATIONS

ABLV	Australian bat lyses virus
BC	Before Christ
CI	Confidence interval
CNS	Central Nervous System
DFA/FAT	Direct fluorescent antibody test
DUVV	Duvenhage virus
EBLV I	European bat lyssa virus I
EBLV 2	European bat lyssa virus 2
IKOV	Ikoma lyssavirus I
KAP	Knowledge, attitude and practice
Kb	Kilobyte
LBV	Lagos bat virus
MAbs	Monoclonal antibodies
MOKV	Mokola virus
OR	Odds Ratio
PBS	Phosphate buffered saline
PET	Post exposure treatment
RABV	Classical rabies virus
SHIBV	Shimoni bat virus
WCBV	West Caucasian bat virus
WHO	World Health organization

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CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

Rabies is a typical zoonoses that has been well known since ancient ages, more than 4300years[1]. The cause of rabies is the rabies virus, a species of the Lyssavirus genus, a member of Rhabdovirus family[2.]

It is an infectious viral disease of central nervous system (CNS) leaving victims suffering from convulsions, paralysis, excessive salivation and an aversion to water, leading to death of affected patient in most cases [3.] Two types of rabies cycles exist, this include sylvatic and urban. In the sylvatic cycle, this infection is maintained as a enzootic disease in several species, such as foxes, raccoons, and bats while the urban cycle is usually maintain between humans and dogs[4.]

The disease is acute, progressive encephalitis characterized by changes in behavior like agitation, excitation and drooling of saliva. At first there might not be any symptoms. But weeks, or even years after a bite, rabies can cause pain, fatigue, headaches, fever, and irritability. These are followed by seizures, hallucinations, and paralysis. There have been fewer than five known cases where recovery has occurred [3.]

Rabies is mainly a disease of all warm blooded animals. Its occurrence in man and domestic animals is well known but the importance of wild animals in its spread has not been determined[5]. Usually humans contract rabies occured through rabid animal bite. However, human-to-human transmission of rabies virus occurred through organ transplantations. Furthermore, the virus is usually transmitted through the bite of an

infected animal; corneal transplantation from an infected donor and viral inhalation however, may also result in infection [1.]

Majority of human rabies deaths occur in developing countries; it also kills an estimated 55,000 per year, mostly in Africa, Asia and Latin America[6.]

Although it is a vaccine preventable disease, the annual number of human deaths caused by rabies is estimated to be 32,000 in Asia[7.] India report more than 50% of the global rabies deaths [8.] In Africa, rabies is endemic and wide spread cases of animal and human rabies are recorded each year, from all ecological zones and sub regions in the continent. In Nigeria rabies infections both in animals and humans are grossly under reported[9.]

1.2 JUSTIFICATION OF THE STUDY

Rabies occurs in more than 150 countries and territories. Worldwide, more than 55 000 people die of rabies every year, 40% of people who are bitten by suspect rabid animals are children under 15 years of age. Dogs are the source of 99% of human rabies deaths. Every year, more than 15 million people worldwide receive a post-exposure preventive regimen to avert the disease – this is estimated to prevent 327 000 rabies deaths annually.[10] . The true scale of rabies in Nigeria remains clouded by the many thousands of people protected by post-exposure treatment each year after rabies exposure and the undiagnosed human and animal rabies cases not reflected in official statistics[11]

Some biting dogs remained healthy even after children developed clinical rabies in India. Similarly, in Vietnam, clinical rabies occurred in 2 out of 10 people bitten by the same apparently healthy puppy over a period of 26 days. [12.]

Dogs are listed as only moderately susceptible but are without any doubt the animals most likely to spread infections to human beings while squirrel and other rodents are also susceptible [2].

Fluorescence antibody test (FAT) is now the most widely used method for diagnosing rabies infection in animals and humans, it is carried out as microscopic examination, under ultraviolet light of impressions smears or frozen sections of nervous tissues after treatment with antirabies serum or globulin conjugated with fluorescent isothiocynate. The test is accurate and results can often be obtained within 30 minutes of reaction with specimen. Although for routine purpose a period of 2-4 hours is desirable for the fixation in acetone [16]. The development of the first rabies vaccine by Pasteur surely had been hoped to eliminate or at least drastically reduce its incidence [17]. However, this goal has not been completely achieved because rabies is maintained in many animals' reservoirs, including both domestic and wild. There are still many aspects of the pathogenicity of rabies that are unknown. For example, we have no explanation for the long incubation period (up to 6years). Furthermore, new patterns of rabies infections present a problem for epidemiologists and virologists alike. There are several cases of human rabies in which there was no history of a bite[17.] In Nigeria, particularly in Maiduguri, a survey of the apparently healthy dogs revealed that 32 percent were carriers of the rabies Virus [18] and in another studies carried out in the Northwestern states of Nigeria the results revealed that 23.1 percent were positive for rabies [19.]

In a study using two groups of apparently healthy slaughtered dogs, the owners and the stray (ownerless) dogs were examined for the presence of rabies virus antigen in their tissue (brain and salivary glands). It was observed that dogs under the different

management systems were equally vulnerable to sub-clinical or non-fatal rabies virus infections. Repeated isolation of rabies virus from healthy dogs for a period of more than seven years has been reported.[14] In addition reports from rabies endemic areas have consistently, indicated that apparent healthy dogs could secrete rabies virus in their saliva for long period without showing sign and symptoms of the disease [14]. The possibility of carrier state in rabies virus infection indicates that the virus antigen or infectivity may be demonstrated in salivary gland and not in the brain.

1.3. RESEARCH QUESTION

a. What is the prevalence's of rabies virus antigen in the brain of slaughtered dogs used for food in Kaura and Jama'a L.G.As of Kaduna State.
b. What is the level of knowledge, attitude and practices of dog meat processors in Kaura and Jama'a LGAs
c. Is processing dog meat a possible risk factor for rabies in the study area
d. Is the level of knowledge of processors of dog meat in Kaura and Jama'a affected by demography variables?
e. Is the level of attitude of dog meat processors in the study area affected by demography variables
f. Is the level of practice of dog meat processors in the study area affected by demography variables

1.4 MAIN OBJECTIVES

To determine the prevalence of rabies virus in Kaura and Jama;a LGAs in dogs slaughtered for food and associated risk for rabies transmission, so that recommendation can made, for public health action.

1.5 SPECIFIC OBJECTIVES

- Review Hospital and Veterinary clinic record for the last five years from state ministry of health and Agriculture on the number of reported cases of dog bite.
- Determine the prevalence of rabies antigen in brain sample of dogs Slaughter for food.
- To assess knowledge, attitude and practices of dog meat processors on rabies transmission.

1.6 HYPOTHESIS

- There is no rabies antigen in the brain tissues of slaughtered dogs in Kaura and Jama'a Local Government Areas of Kaduna State.
- There is no association between reviewed Hospital and Veterinary clinic record for the last five years (2007 to 2011) and rabies infection
- There is no association between knowledge, attitude and practices of dog meat processors on rabies transmission

CHAPTER TWO

LITERATURE REVIEW

2.1 SCIENTIFIC BACKGROUND.

Rabies is a zoonotic disease (a disease that is transmitted to humans from animals) that is caused by a virus. The disease infects domestic and wild animals, and is spread to people through close contact with infected saliva via bites or scratches. People are infected through the skin following a bite or scratch by an infected animal. Dogs are the main host and transmitter of rabies. (6). They are the source of infection in all of the estimated 55 000 human rabies deaths annually in Asia and Africa. Bats are the source of most human rabies deaths in the United States of America and Canada. Bat rabies has also recently emerged as a public health threat in Australia, Latin America and Western Europe. Human deaths following exposure to foxes, raccoons, skunks, jackals, mongooses and other wild carnivore host species are very rare.[6] One survey of apparently healthy dogs in Thailand revealed that 4 percent were carriers of rabies Virus. [13]

Furthermore, in a study carried out in Ethiopia it was observed that dogs inoculated with rabies virus, later recovered from clinical rabies indicating that the virus carrying and excreting healthy dogs could exist[14]. In general, many reported cases in Africa and elsewhere show that clinical rabid dogs may not die but recover and continue to live as carriers [14]. The pattern of rabies in Nigeria still implicated dogs as the principal vector of the disease [15].

2.2 HISTORY OF RABIES

Virtually every infection with rabies resulted in death until two French scientists, Louis Pasteur and Emile Roux, developed the first rabies vaccination in 1885. This vaccine was first used on a human on July 6, 1885, on nine-year-old Joseph Meister (1876–1940), who had been mauled by a rabid dog [20.]

Their vaccine consisted of a sample of the virus harvested from infected (and necessarily dead) rabbits, which was weakened by allowing it to dry for 5 to 10 days. Similar nerve tissue-derived vaccines are still used now in some countries, and while they are much cheaper than modern cell culture vaccines, they are not as effective. Neural tissue vaccines also carry a certain risk of neurological complications. [20]. Rabies has a long history of occurrence throughout Africa, spanning hundreds of years. At least four distinct Lyssavirus species persist throughout the continent, among carnivores, bats and other mammals. Besides a prominent toll on humans and domestic animals, the disease has an underappreciated role in conservation biology, especially for such highly endangered fauna as African wild dogs.

Both Duvenhage and Lagos bat viruses are adapted to bats, but their epidemiology, together with Mokola virus, is poorly understood [8.] The fluorescent antibody test used as a diagnostic test for rabies can only indicate the presence of lyssavirus antigens, which cannot distinguish between lyssavirus genotypes. To identify a lyssavirus precisely, antigenic typing or genetic characterization is necessary, but these techniques are beyond the capability of most laboratories responsible for rabies diagnostics in Africa [21.]

1950s era: History of rabies in Nigeria dated back to the 1950s. Lagos Bat Virus (LBV) was also isolated from frugivorous bats (*Eidolon helvum*) in Nigeria in 1956 [22].

1960s era: Mokola virus (MOKV) was first isolated from shrews (*Crodidua* spp.) in Nigeria in 1968 [22] reported on the isolation of Kotonkan, a new rhabdovirus, which related to Mokola virus of the rabies serogroup. Four rabies-related viruses have been isolated, of which three may be new serotypes, and further investigation of these were recommended. These include: Kotonkan virus (IbAr 23380) represented by a single isolate from *Culicoides* spp. collected at the University of Ibadan Agricultural Farm, Nigeria, in December 1967. Kotonkan virus (IbAr 23380) is a chloroform-sensitive agent related to Mokola virus of the rabies serogroup by complement fixation and fluorescent antibody tests but not by neutralization test[23.]

1970s era: Subsequent cases of MOKV were reported in humans in Nigeria in 1969 and 1971[24.]

1990s era: In 1990, serological evidence of infection of dogs and man in Nigeria by Lyssavirus (family Rhabdoviridae) was reported by[25] . In 1997, the last previous death from rabies in Britain was also traced and linked to an infection in Nigeria, where an 18-year-old London man contracted the disease during a visit to Nigeria [3.]

2000s era: In 2000, the retrospective dog rabies vaccination at Ibadan was evaluated. It showed that there is still low response of dog owners to routine control of dog rabies by immunization[26].

2.3 ETIOLOGY

Eleven distinct species can be distinguished within the genus, namely classical rabies virus (RABV), Lagos bat virus (LBV), Mokola virus (MOKV), Duvenhage virus (DUVV), European bat lyssaviruses type-1 (EBLV1) and type-2 (EBLV2), Australian bat lyssavirus (ABLV) and four lyssaviruses (Aravan virus [ARAV], Khujand virus [KHUV], Irkut virus [IRKV], and West Caucasian bat virus [WCBV]), which have been isolated from Eurasian bats, and have recently been ratified as new lyssavirus species (ICTV). In addition, a newly identified lyssavirus[30]. Shimoni bat virus has been isolated from a bat in Kenya [27] and is awaiting official classification. RABV is found worldwide, and is responsible for the overwhelming majority of reported animal and human rabies cases. Other lyssaviruses appear to have more restricted geographical and host range, with the Majority having been isolated from bats. However, all lyssaviruses tested to date cause clinical disease indistinguishable from classical rabies. Conserved antigenic sites on the nucleocapsid proteins permit recognition of all lyssaviruses with modern commercial preparations of anti-rabies antibody conjugates used for diagnostic tests on brain tissue.The Lyssaviruses have been divided into two phylogroups with distinct pathogenicity and immunogenicity[28]. For RABV, DUVV, EBLV and ABLV, conserved antigenic sites on the surface glycoprotein allow cross-neutralization and cross-protective immunity to be elicited by rabies vaccination. A reduced protection with pre-exposure vaccination and with conventional rabies post-exposure prophylaxis was observed against IRKV, ARAV, and KHUV [29] and all of the above-mentioned lyssavirus species were assigned to phylogroup 1. Little or no cross-protection against infection with the members of phylogroup 2 (MOKV and LBV) is elicited by rabies vaccination and most

anti-rabies virus antiserum do not neutralize these lyssaviruses [28]. WCBV does not cross-react serologically with any of the two phylogroups. Laboratories working with lyssaviruses or suspect material must comply with national biocontainment and biosafety regulations.

2.4 MODE OF TRANSMISSION

Transmission can also occur when infectious material – usually saliva – comes into direct contact with human mucosa or fresh skin wounds. Human-to-human transmission by bite is theoretically possible but has never been confirmed. Rarely, rabies may be contracted by inhalation of virus-containing aerosol or via transplantation of an infected organ. Ingestion of raw meat or other tissues from animals infected with rabies is not a source of human infection. Rabies is present on all continents with the exception of Antarctica, but more than 95% of human deaths occur in Asia and Africa. Once symptoms of the disease develop, rabies is nearly always fatal[10].

2.5 FACTORS CONTRIBUTING TO DIFFICULTY IN THE ERADICATION OF RABIES IN NIGERIA:

2.5.1 LOW VACCINATION COVERAGE

Combining the total societal Rabies burden in humans which can be prevented by intervention through vaccination in the animal sector saves post exposure prophylaxis. Theoretically it is necessary to vaccinate a minimum of 60 to 70% of the dogs. Even countries with potentially sufficient resources, however, do not often meet this target due to low index of suspicion and variable to sustain these rates. One reason individual dog owners might feel that it is too expensive to vaccinate their pets[31.]

2.5.2 INCREASED HUMAN ACTIVITIES:

Rabies can emerge either form campaigns that caused dog populations to briefly crash or through introduction into a new population or when the interaction with the vector changes; emergence is also major concern. The geographic nature of rabies foci by microbiological adaptation and change, or groups suggests that dogs are not moving, per se, but global travel[32.]

The patterns in domestic and wild animal contact also suggest that human-related activities may account for these and other variants in human ecology and behavior [31] A phenomena Spread of RABVs from high-incidence although the discovery of such zoonoses is often related regions, particularly by the long-distance migration or to better diagnostic tools, the leading causes of dogs movement is caused by human emergence agricultural practices and globalization of trade. However, result of anthropogenic changes of the biosphere and other factors include wildlife trade and translocation.[33]. Global warming and unrestricted animal and bush meat markets, consumption of exotic meat and exploitation of natural resources such as forests and foods, development of ecotourism, access to petting zoos fisheries, urbanization, human migration and ownership of exotic pets[34] Among these causal, industrialization of animal husbandry cause environmental contamination hence affecting rabies eradication. These changes of the human population, the increased frequency and speed of biosphere favor local emergence of zoonoses, the increase in natural biotopes and their interaction with domestic animal and human-assisted movement of animals and human populations, which favor the dissemination of the disease, changing agricultural practices also favor these zoonotic pathogens worldwide [33.] Transfer of pathogens between wild and

domestic animals and globalization of food (feed) trade, facilitated a range of environmental changes that alter the liberalization of world trade, while offering many distribution of wild hosts and vectors and thus facilitate benefits and opportunities, also represents new risks [35]

In effect, worldwide movement of animals has increased the mechanization of transport and improvements in urban potential for the translocation of zoonotic diseases, in which sanitation reallocated the carrying capacity of the human pose serious risks to human and animal health. [36]

Globalization is also affecting consumption of exotic foods, development of ecotourism, leading to a rise in the emergence of diseases. Ownership of exotic pets. Emergence of these pathogens has its significant on health issues, furthermore, our quest for close contact with exotic pets is associated with a range of causal factors; most of them put us at risk for exposure to zoonoses.

Global migration, social factors and trading activities continue to promote and enhance long-distance movements of rabies-infected animals, increasing the potential risk of reintroducing the disease to regions where the problem has been eliminated. This trend poses new challenges for the regulation of animal movements to attain sustainable elimination [37.]

2.5.3 INCREASING DOG POPULATION:

As in a classic situation, outbreak of rabies in humans followed an outbreak in domestic dogs. Increasing numbers of human rabies cases in Nigeria have been attributed to increasing numbers in animals [38.]

Other human-related activities, such as persons migrating with their dogs may also contribute to long-distance spread of rabies especially the nomad population in Nigeria. While the majority of reported potential rabies exposures are associated with dog and cat incidents in most places especially in urban centers, however most rabies exposures have been derived from rabid wildlife [23.]

Can the high population density of reservoir hosts be reduced? In principal, reducing the density of reservoir hosts could lead to lower transmission rates and prevent disease from persisting in the population. The practical possibilities of doing this depend upon a number of factors. If the reservoir host was a wildlife species, controlling population size would rarely be possible. For domestic dogs, the possibilities would depend upon local peoples' requirement for those dogs[39.] However, the animal population itself does not pose a rabies threat. More research is needed to determine whether domestic dog's movements could be restricted by requiring that owned dogs be collared, that dogs be tied up at night and shooting unaccompanied dogs[40].

2.5.4 POOR SURVEILLANCEAND LACK OF PUBLIC AWARENESS:

Lack of risk communication is one of the factors affecting rabies transmission, making eradication in Nigeria very difficulty. Many countries, especially those with resource constraints and those in sub-Saharan Africa, lack information on the distribution of zoonotic diseases[38]. Lack of public education campaigns in the developing world is another factor affecting rabies eradication. Though, public awareness of the human health risks of zoonotic infections has grown in recent years[30] reliable data on rabies are scarce in many areas of the globe, making it difficult to assess its full impact on human and animal health[26]

Poor surveillance of rabies-related viruses and poor diagnostic capability in most of Africa are large contributors to our lack of information and the obscurity of the African lyssaviruses [21.] The lack of surveillance data on emerging zoonoses from many developing countries means that the burden of human, livestock and wildlife disease is underestimated and opportunities for control interventions thereby limited[9]. However laboratories in the developing nations continue to be sadly behind the times in terms of equipment and skills for diagnosing the emerging pathogens [41]. In resource limited and transitioning countries, many zoonoses are not controlled effectively because adequate policies and funding are lacking [42].

Deficiencies in national veterinary services have contributed to failures in early detection and response; in many regions investigation and diagnosis services have deteriorated [43] Free roaming and unvaccinated dog populations may increase the likelihood spread of RABVs. Quick, decisive action to detect and control novel pathogens and thereby contain outbreaks and prevent further transmission is frequently hampered by incomplete or inadequate data about a new or re-emerging pathogen [31.]

2.6 DOG MEAT COMSUMPTION

This refers to edible parts and the flesh derived from (predominantly domestic dogs). Human consumption of dog meat had been recorded in many part of the world including ancient China, Mexico, and ancient Rome [35.]

In contemporary times some culture view dog meat consumption as their traditional cuisine, while other considered it as inappropriate and offensive on both social and religious ground. Globalization greater international critics (particularly from International animal organization like the world animal organization for the protection of

Animals) which have been increase directives against meat consumption and the torture of dogs caged and farms for their meat (WSPA, 2012).,

2.7 WHO ARE MOST AT RISK?

Dog rabies potentially threatens over 3.3 billion people in Asia and Africa. People most at risk live in rural areas where human vaccines and immunoglobulin are not readily available or accessible. [10].

Poor people are at a higher risk, as the average cost of rabies post-exposure prophylaxis after contact with a suspected rabid animal is US$ 40 in Africa and US$ 49 in Asia, where the average daily income is about US$ 1–2 per person. In India, 20 000 rabies deaths (that is, about 2/100 000 population at risk) are estimated to occur annually; in Africa, the corresponding figure is 24 000 (about 4/100 000 population at risk).
Although all age groups are susceptible, rabies is most common in children aged less than 15; on average 40 % of post-exposure prophylaxis regimens are given to children aged 5–14 years, and the majority are male. [10]

Anyone in continual, frequent or increased danger of exposure to rabies virus – either by nature of their residence or occupation – is also at risk. Travelers with extensive outdoor exposure in rural high-risk areas where immediate access to appropriate medical care may be limited should be considered at risk regardless of duration of their stay. Children living in or visiting rabies-affected areas are at particular risk. [10]

2.8 CLINICAL DIAGNOSIS

No tests are available to diagnose rabies infection in humans before the onset of clinical disease, and unless the rabies-specific signs of hydrophobia or aerophobia are

present, the clinical diagnosis may be difficult. Post mortem, the standard diagnostic technique is to detect rabies virus antigen in brain tissue by fluorescence antibody test. [10.]

Laboratory techniques are preferably undertaken on central nervous system (CNS) tissue removed from the cranium (specifically, brain stem, Ammon's horn, thalamus, cerebral cortex ,Fluorescence antibody test (FAT) is now the most widely used method for diagnosing rabies infection in animals and humans, it is carried out as microscopic examination, under ultraviolet light of impressions smears or frozen sections of nervous tissues after treatment with antirabies serum or globulin conjugated with fluorescent isothiocynate. The test is accurate and results can often be obtained within 30 minutes of reaction with specimen. Although for routine purpose a period of 2-4 hours is desirable for the fixation in acetone [19.]The brain stem is the most important component of the sample.[32]

2.9 IDENTIFICATION OF AGENT:

Agent identification is preferably undertaken using the fluorescent antibody test (FAT). A drop of purified immunoglobulin previously conjugated with fluorescent isothiocyanate (FITC) is added onto an acetone-fixed brain tissue smear, preferably made from several parts of the central nervous system. FAT provides a reliable diagnosis in 98–100% of cases for all rabies virus strains if a potent conjugate is used (oie, 2011). The most widely used test for rabies diagnosis is the FAT, which is recommended by both WHO and OIE. This 'gold-standard' test may be used directly on a smear, and can also be used to confirm the presence of rabies antigen in cell culture or in brain tissue of mice that have been inoculated for diagnosis. The FAT gives reliable results on fresh specimens within a few hours in more than 95–99%

The FAT is sensitive, specific and cheap. The sensitivity of the FAT depends on the specimen (the degree of autolysis and how comprehensively the brain is sampled), on the type of lyssavirus and on the proficiency of the diagnostic staff. For direct rabies diagnosis, smears prepared from a composite sample of brain tissue, that includes the brain stem, are fixed in 100% high-grade cold acetone for at least 20 minutes, air dried and then stained with a drop of specific conjugate for 30 minutes at 37°C. Anti-rabies fluorescent conjugates available commercially are either polyclonal or monoclonal antibodies (MAbs), specific to the entire virus or to the rabies nucleocapsid protein, conjugated to a fluorophore such as fluorescein isothiocyanate (FITC). FAT slides should then be examined for specific fluorescence using a fluorescent microscope and filter appropriate for the wavelength of the fluorescent conjugate used, for instance FITC, the most commonly used, is excited at 490 nm and re-emits at 510 nm. Aggregates of nucleocapsid protein are identified by specific fluorescence of bound conjugate. It is recommended that two independent trained operators read each FAT slide. Fluorescent antibody conjugates may be made locally, but should be fully validated for specificity and sensitivity before use, including its ability to detect lyssaviruses other than rabies. [19]

2.10. COMMON BELIEFS CONCERNING CANINE CUISINE:

i. It offers special protection against witchcraft.

ii. It prevents poison from killing a person.

iii. It can cure malaria.

iv. Eating dog meat can improve your sex life.[21]

2.11 RELATED STUDIES TO THIS WORK CARRIED OUT WITHIN NIGERIAN IN RECENT TIMES.

In 2000, a retrospective dog rabies vaccination at Ibadan was evaluated it showed that there is still low response of dog owners to routine control of dog rabies by immunization[27]. A histological and immunohistochemical studies reported the presence of rabies in apparently healthy dogs[17]. Also a report on the knowledge, attitude and practices among residents of Osun State as the key factors affecting the control of rabies in Nigeria[43]. In another study among 679 individuals, only 33.4% of the respondents knew rabies could be prevented by vaccination, while 38.7% believed that the infection could be treated with traditional medication. Of the 387 victims of dog bite, 240 (62%) never sought prophylactic post exposure treatment. Of the 10 people who received post exposure treatment, only one received the appropriate treatment consisting of washing, disinfection of wounds, tetanus toxoid and complete antirabies immunization[43].

A study, pointed out the socioeconomic factors associated with non vaccination of dogs against rabies in Ibadan, Nigeria[27]. A report on cases of rabies through dog or cat butchering in Nigeria was made[21].

CHAPTER THREE: METHODOLOGY

3.1 STUDY AREA.

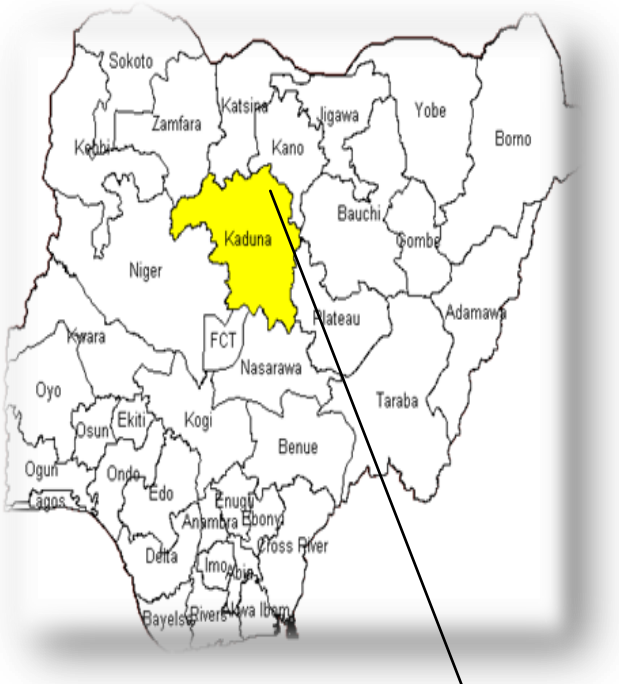

Figure 1 MAP OF NIGERIA SHOWING KADUNA STATE

Figure 2 MAP OF KADUNA SHOWING KAURA AND JAMA'A LGAs

Source; ***WHO HEALTH MAPPER***

Jema'a is a Local Government Area in Kaduna State, Nigeria. Its headquarters are in the town of Kafanchan It has an area of 1,661 km² and a population of 278,735 at the 2006 census,while **Kaura** is a Local Government in Kaduna State, Nigeria. Its headquarters are in the town of Kaura. It has an area of 485 km² and a population of 222,579 at the 2006 census

There are various spot of dog slaughtering point, located throughout the two LGA areas, with a dog population which makes it easier for sample collection and purchase. Christianity is the major religion, farming and animal rearing are also occupational activities.

There are a total of five Veterinary facilities of which (two are public facilities while three are private) all are without diagnostic Laboratory, there are ten medical facilities (six public and the other four are private).

3.2 STUDY DESIGN:

The study design is period prevalence cross sectional to determine the prevalence of rabies virus in apparently healthy slaughtered dog use for food over a period of four months (October 2012 to January 2013).

3.3 STUDY POPULATION

Human subject. Included in the study were dog meat processors who were consented to sell dog head.

Animal subject: Only dog head sold by dog meat processors were included in the study.

Exclusion criteria any head dog below 3 months and adult dogs with suspected rabies symptoms

3.4 SAMPLE SIZE CALCULATION FOR KAP

The sample size was determined by the formula:

$$N = \frac{z^2 pq}{\delta^2}$$ (Lwanga & Lemeshow1991)

Where: N=sample size

p=expected prevalence

q=1 – P

δ=absolute precision z = appropriate value from the desire confidence interval 95% (1.963)

Therefore, using the prevalence of 23% earlier studies in Northwestern Nigeria[19].

Adding 10% to cater for non response:

$$N = \frac{3.842 \times 0.23 \times 0.77}{0.0025} = 272 + 27 = 299 \approx 300$$

Approximately = 300 samples

3.5 SURVEY TECHNIGUE

A questionnaire was developed to assess the knowledge, estimate the attitude and practice of dog meat processors toward rabies (Appendix I), the questionnaire was validated before administration to forty dog meat processors (40) who were consented orally. In Kagoro we had 20(50%) of the respondent, while Kafanchan, Manchok and Gidan Waya we had ten (10) respondent each respectively, 15 minutes was used to interview each respondent, with the assistance of trained Kaduna State Agricultural Development Project, livestock extension workers.

The information included in the questionnaire was a "yes", "no" or Don't know answers choice type and were divided in five sections. Section A had tree question on dog meat processor Identification (questionnaire number, location and date), while section B had

seven questions on demographic data, such as sex, name, occupation, level of education, religion and marital status. Section C had eight (8) questions on knowledge about rabies virus, the mode of transmission, reservoir, clinical sign, prevention and control

Section D also had eight questions on attitude of dog processors towards rabies. Section E had (8) question on practice. A making scheme containing expected correct answers was prepared.

The responds were mark and scores allocated, an answer was mark wrong if a respondent tick more than one box or does not tick any box, don't know respond were regarded as "No"

200 dog heads were purchase from dog meat processors who consented for florescence antibody test (FAT).

3.6 STUDY INSTRUMENT

A questionnaire and other data collection tools such as census and hospital review forms were used in each of the local government areas and information were obtained on the following:

1. Zoogeography characteristics of slaughter dogs by (sex, age,).
2. Exposure factors for rabies transmission.
3. Distribution and Location of slaughtered dogs used for food in (Kagoro, Manchok, Kafanchan, Gidan Waya communities).
4. KAP related to rabies exposure
5. Identity of dog processors

- Spread sheet for line listing of dog bite cases and laboratory findings

3.7 SPECIMEN COLLECTION AND PROCESSING.

2.7.1 SAMPLE COLLECTION.

A total of 200 dog brain samples were collected from Kagoro, Manchok, Katsit and Gidan way, over a period of three months (October, November and December 2012) and information on sex , place of origin were obtained were possible

3.7.2 SAMPLE PROCESSING.

The labeled brain samples were placed in sample bottles and transported on an ice pack to Department of Public Health and Preventive Medicine, Faculty of Veterinary medicine, Ahmadu Bello University Zaria.

The brain samples were removed from the head of the dog using the following method. Opening of the head and collection of the brain, the head were allowed to thaw and held firmly on a table with the roastral end of the head facing downward, while the dorsal surface of the head facing the operator, a midline incision was made on the dorsal surface of the head using scalpel and blade.

The skull was then exposed by dissecting away the skin, aponeurosis and temporal muscles and reflecting them laterally. The skull was sawed using hacksaw by making two latero-medial cut through the occipital bone, then the temporal bones and finally joining these two lateral cuts at a midpoint just above the eyes.

The calvarium was lifted off by the aid of a strong thumb forceps, the meninges and the optic nerves were held, with the help of rat tooth forceps and a pointed scissors. The two parts of head was united from the vice and turn upside down and using a scalpel blade, the brain sample was transferred onto a polythene bag and then placed on the table

to remove the hippocampus, cerebrum, and the cerebellum and Gasserian ganglia in the brain.

Each of the hippocampus, cerebellum and Gasserian ganglia was placed in a pre labeled EDTA free bottle and the bottle with the samples placed in deep freezers at 20^0C, till when ready to use. The same procedure was carried out for all other head samples[29].

3.7.3 FLUORESCENT ANTIBODY TEST (F.A.T):

Rabies direct fluorescent antibody assay (DAF) (monoclonal antibody FITC. Conjugate) reagents from Fujireblo Diagnostic Inc. Malvern, P.A. 19355 was used and the working dilution was prepared in accordance with the manufacturers recommendation [19] .

The FA test was carried out in accordance with the procedures described by [19.] A small fraction of the brain sample was smeared using tooth peak on the part of the slide and then air dried and fixed in acetone at freezing temperature. Another smear was prepared on the other part of the slide using the same method.

The smears were then stained, one with conjugate mixed with equal parts of 20% rabies infected mouse brain (RMB) in diluents and the other conjugate mixed with equal part 20% normal mouse brain in diluents (NMB) and incubated at 37^0C.

Excess conjugate was removed from the slides by briefly rinsing with working PBS solution. It was washed for 10 minutes with working PBS solution once during this time. It will be briefly washed once with distilled water to remove salt and allow air dry. The cover slide was mounted with buffered glycerol mounting medium and the slides examined with a fluorescence microscope within 2 hours.

If a brilliant apple-green fluorescent is exhibited in the first impression (absorbed with normal mouse brain suspension) and diminished staining is exhibited in the second

impression (adsorbed with rabies – infected mouse brain suspension); means the test slide is positive. If no specific apple-green fluorescence is exhibited in either impression, the test slide is negative.

3.8 DATA MANAGEMENT (COLLECTION/ ENTRY):

Four Kaduna State Livestock Extension workers were recruited and trained as interviewers, two for each LGA. Questionnaires were pretested, data entry was carried out, consistency check was done and frequencies were run.

Data was analyzed using Excel software: Univariate analysis (frequencies and proportions).Bivariate analysis (Chi-square tests). Multivariate analysis (Regression analysis) were possible.

3.9 ETHICAL CONSIDERATION.

Informed consent was obtained from the respondents before enrollment in the study. The consent was oral. All respondents were assured of anonymity and confidentiality.

3.10 LIMITATION

The major limitation of the study was that of storage of brain Samples from the field to Public Health and Preventive Medicine rabies laboratory in Zaria; however the sample were transported in an ice park to ensure that cool chain was maintain. During sample processing there was incessant electricity failure which was a constraint during viewing of slide under the fluorescent microscope.

CHAPTER FOUR

RESULTS

4.0. The result on review of hospital and veterinary record in the last five years (2007 - 2011), shows that out of 4995 cases, 190 cases (3.8%) were dog bite cases of which 2.9% were for hospital review record, while veterinary clinic record had 1.3% (Table 4.1).

The distribution of human dog bite reported cases reviewed from (2007 - 2011) by year in veterinary clinic and hospitals. In 2010, 13 (23.2%), 23(23.0%) of dog bite cases were the highest reported in veterinary and hospital respectively. (Table 4.2).

The distribution of reported cases of human dog bite (2007 - 2011) by month. The month of June had 11 (19.6%) and 17(12.7%) in veterinary and hospital record reviewed respectively, showing the month with the highest reported cases of dog bite.

The table showing the distribution of reported cases of human dog bite (2007-2011) by locations of patients and sex. Jama'a had high percentage 32 (75%) of dog bite cases from veterinary reviewed cases, while Kaura had 75(56%) in hospital reviewed dog bite cases. Males in both hospital and veterinary reviewed cases were more 45(80.4%) and 104 (75.4%) respectively (table 4.4).

A summary of the distribution of reviewed dog bite cases by age. The age group 5-14 years had 21 (37.5%) cases of dog bite reported in veterinary clinic. Indicating the group with the highest frequency of dog bite cases. (Table 4.5).

The association between rabies antigen detected by FAT and location. Gidan Waya had more positive sample in terms of proportion 3(7.5%) (Table.4.6)

Zoogeographic characteristic of dog sampled for FAT. There were more males dogs sampled 132 (66%) and more positives males 11 (8.33%) with OR = 1.970 (CI = 0.531 – 7.315) (Table 4.7).

The frequency distribution of demographic characteristics of dog meat processors, thirty nine (97.5%) of the respondent were males. Fifteen (37.51%) out of the forty respondent were within the ages of 30 – 39 years, while the ages group between 15 – 29 were 12 (30.0%), marital status twenty eight (70.0%) of the respondent were single.

The educational level shows that respondent 18 (45.0%) attended primary school education and 17(42.5%) had secondary school education.

For the location Kagoro had 15 (37.5%) of the respondents, with Mancholk the lowest 4 (10.0%) .The occupational situation indicate that unemployed had 20 (50.0%) and self employed 18 (45.0%) and civil servant 1 (2.5%). (Table 4.8)

The assessment of knowledge, altitude, practices of dog meat processors for knowledge the respondent had an acceptable score of 32 (80.0%). Attitude they had 20 (50.0%) acceptability, same follows on practice with 21 (52.5%) acceptable core. Standard error of mean or the mean average for knowledge, attitude and practice at 95% confidence interval. For knowledge 8.22 ± 0.141 (7.933 to 8.504) was acceptable, attitude 6.55 ± 0.135 (CI 6.267 to 6.833) acceptable mean. Practice had a 5.614 ± 0.157 (C1 = 5.388 to 6.041) which is also within an acceptable score for mean average (table 4.10).

The association between some demographic variables of dog meat processors and their categorized knowledge score concerning rabies.

Thirty one (79.5%) were knowledgeable with only one female with a (100%) acceptable score on knowledge. Ages between 15-29 years had 10 (83.3%) acceptable score on

knowledge odds 1.5 (0.205 to 11.00) while ages 30 – 39 had 12 (80.0%) odd ratio 1.20 (10.197 to 7.314). Married individuals were 8 (66.7%) odds 0.3 (0.0673 to 1.552).

For formal education primary school were 17 (94.4%) acceptable score, and odds of 7.083 (CI=0.731 to 68.65) while secondary school 12 (70.6%).

Location – Manchok had 4 (100%) while Kagoro 12 (80.0%) acceptable score and odds 1.5 (0.240 to 9.387).

Occupation – unemployed respondents were 16 (80.0%) and self employed 14 (77.7%) with odd ratio of 0.857 (CI =0.184 to 4.168). (Table 4.11).

Association between demographic variable and attitude score on dog meat processors shows that twenty males (51.28%) had an acceptable score base on categories analysis of attitude. The age group 15-29 score 7 (58.33%) on attitude, within acceptable limit and odd ratio of 1.2 (CI= 0.248 to 5.84) those within the age limit 30 – 39 score 12 (80.8%) and had odd ratio of 1.371 (CL=0.127 to 2.567). For marital status, six (54.55%) respondent were married with an acceptance score on attitude, odd ratio 1.0 (CI= 10.12 to 25.844) for formal education, primary school had 8 (44.4%) acceptable score and 10 (55.56%) unacceptable score on attitude with an odd ratio of 0.560 (CI 1.465 to 2.141). Unemployed respondent had 10 (50.0%) acceptable score for attitude with one civil servant having a (100%) acceptable score for attitude. (Table 4.12).

4.1

Table 4.1 DISTRIBUTION OF REPORTED CASES OF HUMAN DOG BITE BETWEEN (2007-2011) IN KAFANCHAN GENERAL HOSPITAL AND VETERINARY CLINIC N=4995

Variable	Total number of cases review in the last 5years	Total number of dog bite cases reported in the last 5 years	Percent (%)
General Hospital	4560	134	2.9
Veterinary Clinic	435	56	1.3
Total	**4995**	**190**	**3.8**

Table 4.2 SHOWS THE DISTRIBUTION OF HUMAN DOG BITE CASES REVIEW BETWEEN (2007-2011) BY YEAR IN KAFANCHAN VET CLINIC AND GENERAL HOSPITAL, N=56 AND 134 RESPECTIVELY.

Variable YEAR	**Vet Clinic reported cases**	**Hospital reported cases**
2007	12(21.4)	23 (17.2)
2008	9 (1.6)	11(8.2)
2009	10 (1.8)	26(19.4)
2010	13(23.2)	23(17.2)
2011	12(21.4)	11(8.2)
TOTAL	**56**	**134**

Table 4.3 SHOWS THE DISTRIBUTION OF REPORTED CASES OF HUMAN DOG BITE REVIEW (2007-2011) BY MONTHS (VET CLINIC REPORT N=56, HODPITAL REPORTD CASES N=134) IN KAFANCHAN

Variable	Vet clinic report cases %	Hospital reported cases %
January	6(10.7)	15(11.2)
February	1(1.8)	7 (5.2)
March	3(5.4)	6 (4.5)
April	4(7.1)	7 (5.2)
May	6(10.7)	8 (6)
June	11(19.6)	17 (12.7)
July	6(10.7)	5 (3.7)
August	1(1.8)	6 (4.5)
September	4(7.1)	5 (3.7)
October	3(5.3)	2 (1.5)
November	5(8.9)	2 (1.5)
December	6(10.7)	14 (10.4)

Table 4.4 A TABLE SHOWING THE DISTRIBUTION OF REPORTED CASES OF HUMAN DOG BITE (2007-2012) BY LOCATION OF PATIENTS AND SEX . VET CLNIC N=56, HOSPITAL N=134.

Variable	Vet Clinic cases	Hospital cases
Location		
Kaura	14(25)	75 (56)
Jama'a	32(75)	59((44)
Sex		
Female	11(19.6)	33(24.6)
Male	45(80.4)	104(75.4)

Table 4.5 A TABLE SHOWING THE DISTRBUTION OF REVIEWED REPORTED CASES OF HUMAN DOG BITE IN VET CLINICS BY AGE GROUP IN KAURA AND JAMA`A L.G.As OF KADUNA STATE (2007-2011) N=56

AGE INTERVAL (years)	NUMBER OF CASES %
5-14	21 (37.5)
15-24	13(23.2)
25-34	10 (17.9)
35-44	5 (8.9)
45-54	4 (7.1)

TABLE 4.6 ASSOCIATION BETWEEN RABIES ANTIGEN DETECTED BY FAT AND LOCATION SAMPLED.

Variable	Positive %	Number Sampled
Kagoro	6 (6)	100
Kafanchan	3 (15)	20
Mancholk	2 (5)	40
GidanWaya	3(7.5)	40

For both there was no significant association between detection of the rabies antigen and sex and location

Table 4.7 ZOOGEOGRAPHIC CHARACTERISTIC OF DOG SAMPLED FOR FAT.

Variable	**Number positive (%)**	**Total Number Sampled .**
Male	11(8.33)	132(66.0)
Female	3 (4.41)	68 (34)
Total	**14 (7)**	**200**
	OR=1.970	(Cl=0.5304 to 7.315)

For knowledge there were 8questions, and so the scoring was

Knowledge	7 – 8 excellent	ACCEPTABLE
	5-7 good	
	0 – 4 fair	UNACCEPTABLE

The scores were then re-classified base on proportion into acceptable and unacceptable knowledge.

The same reclassification was done for attitude and practice

Attitude	=>	7 – 8 excellent	Acceptable
		5 – 6 Good	
		4 – 5 Fair	Unacceptable
		0 – 3 Poor	
Practice	=>	7 – 8 Excellent	
		5 – 6 Good	Acceptable
		4 Fair	Unacceptable
		0 – 3 Poor	

Table 4.8 FREQUENCY DISTRIBUTION OF DEMOGRAPHIC CHARACTERISTIC OF DOG MEAT PROCESSORS IN KAURA AND JAMA, A LGAs OF KADUNA STATE, N=40

a.	**Sex**	**No of respondent (%)**
	Male	39 (97.5)
	Female	1 (2.5)
b.	**Age**	
	15 – 29	12 (30.0)
	30 – 39	15 (37.5)
	40 – 49	13 (32.5)
c.	**Marital**	
	Married	12 (30.0)
	Single	28 (70.0)
d.	**Education**	
	No formal education	5 (12.5)
	Primary school	18 (45.0)
	Secondary/Tertiary	17 (42.5)
e.	**Location**	
	Kafanchan	11 (27.5)
	Kagoro	15 (37.5)
	Gidanwaya	10 (25.0)
	Mancholk	4 (10.0)
f.	**Occupation**	
	Unemployed	20 (50.0)
	Self employed	18 (45.0)
	Civil servant	1 (2.50)
	Private organization	1 (2.50)

TABLE4.9 ASSESSEMENT OF KNOWLEDEGE, ATTITUDE, AND PRACTIES OF DOG MEAT PROCESSORS RESPONDS IN THE STUDY AREA. N=40

	ACCEPTABLE (%)	**UNACCEPTABLE (%)**	**Total**
Knowledge	32(80.0)	8 (20.0)	40
Attitude	20 (50.0)	20 (50.0)	40
Practice	21 (52.5)	19 (47.5)	40

Table 4.10 MEAN ± S.E.M OF KNOWLEDGE, ATTITUDE AND PRACTICE AT 95% CONFIDENCE INTERVAL (N=40)

	Acceptable	**Unacceptable**
	(excellent, Good)	**(Fair, Poor)**
Knowledge	8.22 ± 0.1401	5.00 ± 0.1890
	CI = 7.933 to 8.504	CI = 4.553 to 5.447
Attitude	6.55 ± 0.1352	3.850 ± 0.2741
	CI = 6.267 to 6.833	CI = 3.276 to 4.424
Practice	5.714 ± 0.1565	2.895 ± 0.2008
	CI = 5.388 to 6.041	CI= 2.473 to 3.317

CI = confidence interval

Table 4.11 ASSOCIATIONS BETWEEN SOME DEMOGRAPHIC VARIABLE OF DOG MEAT PROCESSORS AND THEIR CATEGORISED KNOWLEDGE SCORE CONCERNING RABIES N=40

		ACCEPTABLE (%)	UNACCEPTABLE (%)	ODDS RATIO 95% CI
a.	**Sex**			
	Male	31 (79.49)	8 (20.51)	
	Female	1 (100)	0 (0)	
b.	**Age**			
	15 – 29	10 (83.3)	2 (16.7)	1.50 (0.21 to 11.00)
	30 – 39	12 (80.0)	3 (20.0)	1.20 (0.20 to 7.32)
	40 – 49	10 (76.92)	3 (23.08)	
c.	**Status**			
	Married	8 (66.7)	4 (33.3)	0.33 (0.07 to 1.51)
	Single	24 (85.71)	4 (14.29)	
d.	**Education**			
	No formal	3 (60.0)	2 (40.0)	0.63 (0.08 to 4.91)
	Primary	17(94.4)	1 (5.6)	7.08 (0.73 to 68.75)
	Secondary/Tertiary	12 (70.6)	5 (30.4)	
e.	**Location**			
	Kafanchan	8 (72.73)	3 (27.27)	
	Kagoro	12 (80.0)	3 (20.0)	1.50 (0.24 to 9.39)
	Gidan waya	8 (80.0)	2 (20.0)	1.50 (0.19 to 11.54)
	Mancholk	4 (100)	0 (0)	
f.	**Occupation**			
	Unemployed	16 (80.0)	4 (20.0)	
	Self employed	14 (77.78)	4 (22.22)	0.88 (0.18 to 4.17)
	Civil servant	1 (100)	0 (0)	
	Private organization	1 (100)	0 (0)	

Table 4.12 ASSOCIATIONS BETWEEN SOME DEMOGRPHIC VARIABLE AND ATTITUDE SCORE OF DOG MEAT PROCESSORS ON RABIES N=40

	Variables	ACCEPTABLE (%)	UNACCEPTABLE (%)	ODDS RATIO/95%CI
a.	**Sex**			
	Male	20 (51.28)	19 (48.72)	
	Female	0 (0)	1 (100)	
b.	**Age**			
	15 – 29	7 (58.33)	5 (41.67)	1.20 (0.25 to 5.84)
	30 – 39	12 (80.0)	3 (20.0)	1.57(0.13 to 2.57)
	40 – 49	7(53.85)	6 (46.15)	
c.	**Status**			
	Married	6 (54.55)	5 (46.15)	1.00 (0.21 to 3.87)
	Single	14 (50.0)	14 (50.0)	
d.	**Education**			
	No formal	2 (40.0)	2 (60.0)	0.46 (0.06 to 3.57)
	Primary school	8(44.44)	10 (55.56)	0.56 (0.14 to 2.1)
	Secondary/Tertiary	10(58.82)	7 (41.18)	
e.	**Location**			
	Kafanchan	6 (54.56)	5 (45.44)	
	Kagoro	8 (53.33)	7 (46.67)	0.95 (0.20 to 4.54)
	Gidanwaya	6 (60.0)	4 (40.0)	0.80 (0.22 to 7.081)
	Manchok	0 (0)	0 (0)	
f.	**Occupation**			
	Unemployed	10 (50.0)	10 (50.0)	
	Self employed	8 (44.44)	10 (55.56)	0.80 (0.22 to 2.87)
	Civil servant	1 (100)	0 (0)	
	Private organization	1 (100)	0 (0)	

CHAPTER FIVE: DISCUSSION

The finding in this study agrees with other related work which reported the presence of rabies virus in the brains of apparently healthy dogs at postmortem[18]. Some researchers have also indicated a disturbing possibility of rabies by apparently healthy free or strays dogs and this stray dogs are often victims of dog meat processors. The result also suggests with very strong evidence that rabies virus is circulation in slaughter dogs used for food, which could be a potential Source of infection to dog processors and veterinarians. The implication is that control and preventive measured most be targeted at this group. There was problem obtaining documented information on the rabies situation in the study area as only few were available. Some of the figures given in the course of the study were in ranges indicating that records; even when they are kept are not properly done. Scarcity of reliable data on rabies was also reported[20]. It is safe to say at this point that record keeping of rabies occurrence and dog bite cases in the study area (Kaura and Jama,a) L.G.As of Kaduna State is inadequate.

A reviewed of veterinary record, reveal that children within the ages of 5 – 14yrs have the highest frequency of dog bite representing 37.5%, 0ut of 190 cases reported WHO which also correspond with the WHO report that although all ages groups are susceptible, rabies is most common in children aged less than 15 years[32]; on the average 40% of post – exposure prophylaxis regimens are given to children between the ages of 5 – 14yrs and the majority are male. In a related study It was reported that children under 10 years were most susceptible to dog bites and rabies infection[5]. This also corroborates with the report that in Africa* and-Asia, death due to rabies is mostly in children younger

than 15 years of age mostly due to high curiosity shown by them. Children are also more .adventurous and less careful in handling of animals[20].

The distribution of reported cases of human dog bite (2007 - 2011) by month. The months of June had 11 (19.6%) and 17(12.7%) in veterinary and hospital record reviewed cases respectively, which shows the highest reported cases of dog bite, the possible explanation could be that the month of June being the breeding period for dogs, there is constant movement and aggression or it is possible that the dog population may have increased.

Male's respondent represented about (97.5%) of those who were involved in processing of dog meat, which shows that it is entirely a male business in the study area, hence they are the most likely group of individual at risk for rabies infection.

The literacy level seem to be sufficiently high with a 45.0% of the respondent attending primary education and 42.5% secondary level respectively this could also explain why there is sufficient knowledge on rabies, equally the low percentage of rabies antigen prevalence of (7%) in the brain of slaughtered dogs used food in the study area compare to prevalence in some studies of (32%)[18].

Fifteen (37.51%) out of the forty respondent were within the ages of 30 – 39 years, while those between ages of 15 – 29 were 12 (30.0%) , the implication is that the business is mostly done by youth group in the study area, hence control and preventive measured on rabies exposure should also be targeted at this group.

Twenty eight (70%) of the respondent believes that rabies does not kill and 38% also believes that rabies can be treated using traditional concussions, which is comparable with a study conducted in Osun, Nigeria.[43]

Generally thirty one (79.5%) were knowledgeable with only one female with a (100%) acceptable score on knowledge.WHO recommendation on local treatment of wounds is that removing the rabies virus at the site of the infection by chemical or physical means is an effective means of protection. Therefore, prompt local treatment of all bite wounds and scratches that may be contaminated with rabies virus is important. Recommended first-aid procedures include immediate and thorough flushing and washing of the wound for a minimum of 15 minutes with soap and water, detergent, povidone iodine or other substances that kill the rabies virus[20].

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CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

The detection of rabies virus antigen in the brain tissues of dogs slaughter for food indicates the importance of this set of dogs to the epidemiology of rabies.

A prevalence of 6%(rabies antigen) detected in the study area, had further confirmed the existence of rabies virus especially in Kaura LGA were work have not being done to detect rabies antigen in brain of slaughter dogs used for food.

A review of veterinary record has shown that children are the most vulnerable group to dog bite; which goes with the WHO report on Victims of dog bite.

Dog meat processors to a large extent are aware of rabies existence, but may not know that apparently healthy dogs the slaughter harbor the rabies virus.

Rabies cases are under-reported; records when available are very scanty, due poor or absence of rabies surveillance network.

6.2 RECOMMENDATION

It have become a clear mandate for children to be formally educated on rabies transmission, the disease and prevention, particularly as educational interventions have proven effective in reducing the number of dog bites in children.

Kaduna State should ensure that a robust surveillance system for rabies is adopted for efficient emergency response and this will help in establishing a baseline data for rabies control in the state.

Dog meat processors should be made to be aware of the risk of being exposed to rabies during dog meat processing and should be advised to report in case of bites and cut during processing to health authorities.

An advocacy for interdisciplinary approach between Veterinarians, Medical personnel in the spirit of (one world one health) on rabies control and prevention should be encouraged.

High risk individual are advice to take an up to date Pre and Post exposure rabies vaccine.

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APPENDIX

1. KNOWLEDGE ATTITUDE AND PRACTICE ON RABIES

Good day sir/ma

My name is..... I am from the Kaduna State Ministry of Agriculture. In view of the frequent reported cases of dog bites in Jama'a and Kaura LGAs. We are conducting a study on the knowledge attitude and practice of rabies cases. The result of this investigation will guide evidence base and targeted public health intervention to prevention and control, I will appreciate if you can spend some time talking with me. All your responses will be treated with outmost confidentiality. Your participation is voluntary and will be highly appreciated.

Do I have your permission to continue?

Yes...

No...

(A) Identification

1. Questionnaire number
2. Date(dd/mm/yyyy)
3. Location

(B) Socio-demographic data

1. Name:

2. **Sex** Male ☐ Female ☐

3. Age

a. 15-29

b. 30-39

c. 40-49

d. 50-59

e. 60 and Above

4. Religion

a. Christianity

b. Islam

c. Traditional worshipper

d. Others (specify)

5. Marital Status

a. Single

b. Married

6. Highest Educational level

a. No Formal education

b. Primary

c. Secondary

d. Post-Secondary

7. Occupation

a. Unemployed

b. Self employed

c. Public servant

d. Work in a Private organization

C. Knowledge

1. Is rabies a disease of?

a. Humans and animals

b. Humans only

c. Animals only

d. Don't know

2. How is rabies transmitted?

a. Bite from a rabid dog

b. Bite from human

c. Witchcraft/supernatural

d. Don't know

3. The main reservoir for rabies in Nigeria is

a. Dog

b. Cat

c. Cattle

d. Bats

e. Don't know

4. What signs do you observe in a rabid dog?

a. Biting of objects and people

b. Sleeping

c. Don't know

5. Can rabies lead to death?

a. Yes

b. No

c. Don't know

6. Can rabies be cured once symptoms begin to manifest?

a. Yes

b. No

7. Can rabies be prevented by vaccination?

a. Yes

b. No

c. Don't know

8. Are you immunized against rabies?

a. Yes

b. No

9. **Where can rabies vaccination be obtained for animals?**

d. Veterinary clinic

e. Hospitals

f. Don't know

8. For a suspected rabid dog do you submitted the dog to the veterinarian?

a. Yes

b. No

c. Don't know

D. Attitude

9. Will you be willing to register your pet if you have one?

a. Yes

b. No

c. Don't know

10. Will you report to the authority (Veterinarian or Police) if bitten by a dog?

a. Yes

b. No

c. Don't know

11. Would you kill and eat a dog if found to be rabid?

a. Yes

b. No

c. Don't know

12. Would you send the head of a suspected rabid animal to the veterinarian?

a. Yes

b. No

13. Do you know the stature of the dogs you eat(stray or own dogs)

a. Yes

b. No

c. Sometimes

14. Do you used any protective clothing during processing dogs

a. Yes

b. No

15. Which of this ethnic group patronize dog meat must?

a. Bajju

b. Oegwurok

c. Ninzon

d. Maro'a

15. Where do you seek medical treatment when bitten by a dog?

a. Hospital

b. Veterinary hospital

c. Traditional healer

d. Spiritual house

e. Pharmacy/chemist

f. Self medication

g. Don’t know

16. What first aid treatment do you give after a bite from a dog?

a. Wash wound with soap and clean running water

b. Clean wound with disinfectant

c. Tie wound surface

d. Rub wound with mud made from saliva and sand

e. Don’t know

E. Practices

17. Do you know the dogs owners

a. Yes

b. No

18. How do they keep their dogs?

a. Housed in kennels

b. Tied outside the house

c. Living inside the house

d. Free to roam around

e. Housed in kennels and free to roam sometimes

19. How are the dogs fed?

a. Finds its own food

b. Fed by neighbors

c. Fed by family members

20. Do they bath their dog?

a. Yes

b. No

21. Do you patronize veterinary services?

a. Yes

b. No

22. Do you Known if the dogs are vaccinated?

a. Yes

b. No

23. Do they have an evidence of vaccination (certificate)

a. Yes

b. No

24. Would they vaccinate there dog, if giving the opportunity to do so?

a. Yes

b. No

Scoring

B. Knowledge

1. A
2. A
3. A
4. A
5. A
6. A
7. B
8. A
9. A
10. D
11. A

10-11 = Excellent

8-9 = Good

6-7 = Fair

0-5 = Poor

C. Attitude

1. A
2. A
3. A
4. A
5. A
6. A

7. A

8. A

7-8 = Excellent

5-6 = Good

4 = Fair

0-3 = Poor

D. Practice

1. No answer

2. E

3. A

4. C

5. A

6. B

7. A

D. Practice

8. No answer

9. E

10. A

11. C

12. A

S/NO	ACTIVITIES	DURATION	TIME OF COMPLETION
1	Purchase of Laboratory Reagent	4 Weeks	September 2012
2	Questionnaire Design and Pre Testing	2 Weeks	September 2012
3	Sample Collection, Storage	4 Weeks	October 2012
4	Sample Processing	2 Weeks	November 2012
5	Data Collection	2 Weeks	November 2012
6	Data Analysis	2 Weeks	December 2012
7	Interpretation Of Result	2 Weeks	December 2012
8	Discussion	2 Weeks	January 2013

APPENDIX II - WORK PLAN

APPENDIX III

ITEMIZED BUDGET PROPOSAL

S/N	ITEM	UNITS	RATES (N)	AMOUNT (N)
1	Dog head	200	800	160,000
2	Rapid test kit	5	20,000	100,000
3	Digital camera	1	25,000	25,000
4	Thick protective and disposable gloves	6 pairs/500 pairs	1000/20	13000
5	Glass slides	400	40	16000
6	Human anti-rabies vaccine	3 doses	3,500/dose	15,500
7	Rabies conjugate			300,000
8	Cooler	4	5,000	20,000
9	Ice pack	8	2,500	20,000
10	Scissors and Thumb forceps	2 pair each	500	2,000
11	Universal sample bottles	300	20	6,000
12	Knife	6	250	1,500
13	Contingency	5%		40,500
Total				**541,500**