



Full Length Article

Dog ecology, dog bites and rabies vaccination rates in Bauchi State, Nigeria



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Abstract A study of dog ecology, dog bites and rabies vaccination rates was carried out in Bauchi the capital city of Bauchi State, Nigeria using direct street counts and questionnaire survey administered on 10% of the city streets selected by stratified random sampling. The questionnaire was designed to obtain data in order to determine the dog to human population ratio, dog management and care, cases of dog bites, consequences of the bites and frequencies of rabies outbreak. The estimated dog population of street counts and compound counts were 5310 and 7670, respectively. The overall human to dog ratio of 4.1:1 was established. The mean number of individuals per dog owning compound was 9.6 ± 0.498 (SEM) and the mean number of dogs owned per dog owning compound was 2.3 ± 0.108 (SEM). Majority of the dogs owned were local breeds (62.8%) aged between 1 and 5 years old and managed under partial or no confinement. The dogs were mostly used for security (69.5%) purposes. Dog owners reported low vaccination coverage (26.4%), level considered not sufficient to prevent rabies transmission. About 12.4% of dog bite victims died and majority of which (71.43%) manifested nervous signs before death. Domestic dogs have been shown to be tolerated and kept in Bauchi but poorly managed in terms of feeding, confinement and vaccination thereby constituting a continuous risk to domestic animals and humans.

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1. Introduction

Rabies, a fatal nervous system disease of warm blooded animals including man is caused by a virus, belonging to the family *Rhabdoviridae*, of the genus, lyssavirus. It has been associated with animal bites for more than 3000 years and it is the oldest infectious disease known to medical science [1]. Human mortality due to rabies is estimated to be 60,000 deaths per year worldwide and millions of persons, primarily in the

developing countries of the tropical and sub-tropical regions undergo costly post exposure treatment [2].

In Nigeria, it is believed that rabies had been recognized quite early in time because of the various dialectic names by which it is called such as digbolugi, (Yoruba), ciwon kare, (Hausa), ginnaji, (Fulani), eboa idat (Efik) and arankita (Igbo) [3]. However, the first scientific report of rabies in man was in 1912, and in the dog, 1925 [4]. Since then rabies has been recognized as a major health problem and is known to be widespread in Nigeria [5].

Traditional rabies control measures in dogs have included mass vaccination, movement restriction and control of stray dogs. The measures have been effectively applied in most of the developed world since the 1940s, resulting in relatively effective control and in some cases elimination of dog and human rabies [6]. However, in Nigeria rabies control measures in dogs have not been effective and canine rabies is increasing and spreading.

Well-designed dog ecology and demographic studies are necessary [7]. Such studies have proved useful in planning rabies control in Asia, Latin America, and in the North, East, and Southern Africa [8,9]. Reports on studies relating to dog ecology in Nigeria are limited and currently information is only available for Kaduna [10], Lagos [11], Maiduguri [12] and Makurdi [13]. This present study is therefore aimed at studying dog population structure and cases of rabies among dog bite victims in Bauchi, the capital city of Bauchi State. The information obtained will be valuable for planning and developing sustainable dog rabies control programs and evaluate other public health risks associated with dogs (Table 1).

2. Materials and methods

2.1. Study area

Bauchi State is located between longitude 9° 15'E to 10° to 43'E and latitude 9° 55'N to 12° 45'N in the Northern Guinea/Sudan savannah zone of Nigeria. It covers a total land area of 66,514 square kilometers and has 20 LGAs. The State has an estimated population of about 5 million people based on 2006 census. Using a detailed map of the Bauchi Township obtained from Bauchi State Urban Development Board, the various socioeconomic and land use districts were plotted

and the Bauchi metropolis was stratified into five areas for the purpose of the study. These areas were (a) the Government Reservation Area (GRA) consisting of old and new GRA. (b) Bauchi township consisting of Wunti, Fadaman Mada, Igbo quarters, and Muda Lawal; (c) Bauchi native town consisting of Fada, Nasarawa, Jahun, and Bakaro; (d) Industrial zone consisting of Railway, Zango, Federal lowcost, and Gudum; (e) Yelwa consisting of Yelwan makaranta, Yelwan tudu, Gwallameji, Unguwan Ngas, and Kagadama areas.

2.2. Direct count estimation method

Ten percent (10%) of the streets in each area were randomly selected as described by [14]. A proforma form was designed for the study which consisted of street name, number of dogs seen, breed, sex and age of the dogs seen. The counting of dogs was carried out early in the morning between 6 a.m and 7.30 a.m. This time was selected because it corresponded with the period of maximum dog activity, less human activity and good visibility. Some youth from the stratified areas were selected and trained to carry out the counting of dogs. They surveyed the areas one at a time, walking up and down each of the selected streets and recorded number of dogs seen in each of the street, taking advantage of local areas that were best for observation such as specific market streets, rubbish dump sites, and known pathways. The number of counted dogs in the selected streets in each of the identified area was used to estimate the population of dogs in that area. An estimate of the entire dog population in the entire Bauchi metropolis was determined based on all the counts from the five areas.

2.3. Questionnaire and household survey estimation method

A structured questionnaire was designed for compound survey of dogs and in addition, information on zoographic and demographic aspects of dog ownership and attitudes of dog ownership was carried out. An adult member of every tenth compound on each side of the selected street was interviewed for about 10–20 min using the structured questionnaire which consisted of three parts: Part one covered information about household and dog population structure, part two dealt with the management of dogs and vaccination program while part three covered cases of dog bites, post exposure management,

Table 1 Street and compound dog counts in Bauchi metropolis.

Area (Stratum)	Street count		Compound count	
	+	++	*	**
Yelwa	160	1600	176	1760
GRA	105	1050	184	1840
Bauchi industrial zone	101	1010	137	1370
Bauchi city	109	1090	213	2130
Bauchi native town	56	560	57	570
Total	531	5310	767	7670

Key

+ Number of dogs in 10% street in the area (randomly sampled).

++ 100% estimate of street count.

* Number of dog in 10% compounds in the area (randomly sampled).

** 100% estimate compound count.

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