

STUDIES ON DOG POPULATION IN MAKURDI, NIGERIA (I): DEMOGRAPHY AND SURVEY OF PET OWNERS' BELIEFS AND ATTITUDES

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ABSTRACT

A survey of dog population in some residential areas of Makurdi, Nigeria, was investigated using household census and street observation methods, while residents' dog-related attitudes and beliefs were investigated using a structured questionnaire. The average number of dogs per household was 1.43. Dog-human ratio in the study location was 1 dog to every 4 persons, in Wurukum residential area this was however less with the ratio of 1 dog to every 3 persons. There was no significant ($X^2 = 1.42$, $df = 1$, $P > 0.05$) difference in the distribution of sexes of dogs. The difference between free roaming dogs and those restricted within residential compounds was also not statistically significant ($X^2 = 1.08$, $P > 0.05$). A total of 198 (98.0%) respondents who owned dogs kept them as house guards and/or security alert; only 18.8% of dog owners kept them as pets. The variation in reasons for keeping dogs was significant ($X^2 = 12.1$, $P < 0.05$). The majority of respondents who do not own dog (91.7%) said it was to avoid dog bites. A significant proportion of respondents (48.0%) who kept dog could not mention any dog disease or disease transmitted by dogs. The implications of these findings are very critical in the control of rabies and other dog-borne disease and mobilization of residents for more responsible dog ownership in Nigeria.

Key words: Dog population, Residents' Attitudes and Beliefs, Responsible Ownership.

INTRODUCTION

Despite the mutual relationship between man and dogs, the concerns of medical and community health officials about responsible pet ownership have increased. Dog populations depend on the availability of resources humans make available or deliberately withhold. Several health and environmental problems have been associated with the ever-increasing dog population, especially free roaming dogs. These include biting children, killing livestock, barking and fighting, indiscriminate defecation and transmission of diseases like rabies (Beck, 2000, Matter *et al.*, 2000). There has been steady increase in the incidence of dog bites, rabies transmission and unprecedented contamination of public parks with ova of dog ascaris *Toxocara canis*

in Nigeria and elsewhere (Omudu *et al.*, 2003, Okoh 2007, Omudu and Amuta, 2007, Ovegrauuw and Knapen 2000).

The stray dog population absolutely results from irresponsible dog ownership, where dogs belongs to individuals and/or families and are left entirely unsupervised or with partial restriction. Planning control programmes for disease such as rabies, babesiosis and other dog-borne zoonoses requires information on the size and population dynamics of dogs in a particular location. Studies on dog population and ecology have over the years provided veterinary public health officials with estimates used in planning rabies vaccination and control of dog internal and external parasites (Prosperi *et al.*, 1992, Nunes *et al.*,

1997, Matters *et. al.*, 2000, Okoh 2007, Omudu and Amuta 2007, Butter and Brigham. 2002, Child *et. al.*, 1998). Before a practical solution can be found for irresponsible dog ownership and community health problems associated with pet populations, the public's attitudes on issues related to responsible pet ownership must be determined.

This study was conducted to provide baseline data on the demography and dog-human relationships of dogs in Makurdi, Nigeria. The survey included analysis of human and dog population in residential houses and administration of questionnaires to investigate attitudes related to dog ownership and potential public health problems associated with dog populations.

MATERIALS AND METHODS

Description of Study Area

Makurdi, the capital of Benue State, Nigeria, is fast becoming a metropolitan centre with attendant health, social, housing and environmental problems. The town lies between latitude $7^{\circ} 15' - 7^{\circ} 45' N$ and longitude $8^{\circ} 15' - 8^{\circ} 40' E$. The town lies in the guinea savanna vegetative belt and on the bank of the second largest river in Nigeria, River Benue. The river divides the town into North and South banks and the town covers an area of $16 km^2$. The river constitutes the main source of water supply for the inhabitants of the town. The sudden influx of commercial and developmental activities that resulted from rapid urbanization has side-lined many indigenous people and urban migrants, consequently, the populations of poorer residential areas such as Wadata, Wurukum and North bank are beginning to swell. These areas were selected for this study because of high human population density and number of

dogs sighted on the streets during our advocacy visits. In addition to these areas, High Level and Low Levels areas of the town were included as more affluent residential areas. The housing and sanitary conditions of these settlements have previously been described by Omudu and Amuta (2007).

Advocacy visits and recruitment of participants

Pre-survey visits were made to identify premises with dog(s), to interact with residents and obtain their consent to participate in the study. Consent was obtained through verbal acceptance to participate in the study by responding to questions and making their dogs available for examination. Appointment was booked with consenting dog owners to make themselves and their dogs available for questioning and examination respectively. Premises of consenting dog owners were marked to ease identification during the actual study.

Sampling Procedure and Data Collection.

In each of the five residential areas selected for the study, fifty (50) houses were chosen based on houses with odd numbers. For each house visited, the human and dog population was taken, the sex and status of the dog(s) was recorded (A dog is considered to be a stray dog if evidence of restriction, shelter and feeding point are not sighted). Street observation was conducted to observed dog behaviour dynamics. Afterwards, a questionnaire was administered to the dog owner or household head to investigate attitudes and practices on issues related to responsible pet ownership. These include attitudes on dog ownership, potential health problems associated with dogs, reasons for owning or not owning dogs and utilization of veterinary health services.

Data Analysis

Data was analysed using simple percentages and these were tested for significance using Chi square. Dog-human ratio was also calculated by dividing the number of people resident in an area by the number of dogs sighted. Questionnaire was analysed using SPSS computer package analysing responses by location.

RESULTS

This survey showed that 80.8% of residential apartments visited had one or more dogs, Wurukum area had the highest percentage of houses with dogs (94.0%). The average number of dogs per household was 1.43. Dog-human ratio in the study location was 1 dog to every 4 persons, in Wurukum however, the ratio was 1 dog to every 3 person (Table 1).

There was no significant ($X^2 = 1.42$, $df = 1$, $P > 0.05$) difference in the distribution of sexes of dogs, 54.2% of dogs seen were however males. 54.5% of dogs were allowed to roam freely, the difference between free roaming dogs and those restricted within residential compound was not statistically significant ($X^2 = 1.08$, $P > 0.05$). The street observations indicated that free roaming dogs present a mild to moderate problem as dogs were simply ignored by human. It was common to see dogs mating on street, scavenging for food on refuse dumps and sleeping under parked cars.

A total of 198 (98.0%) respondents who owned dogs keep them as house guards and/or

security alert, only 18.8% of dog's owners kept them as pets. The variation in reasons for keeping dogs was significant ($X^2 = 12.1$, $P < 0.05$) (Table 2). The majority of respondents who do not own dog (91.7%) said it was to avoid dog bites. Other major reasons for not keeping dogs included dislike for dogs (85.4%), dogs' odour and unhygienic behaviour (83.3%) and religions or superstitious beliefs (85.4%) (Table 3). The reasons for dogs roaming the streets were attributed to inability of owners to feed dogs adequately (72.4%), dogs searching for mating partners (70.8%) and lack of financial resources to cater for dogs (62.8%) (Table 4). Of the dog-borne disease listed by respondents, Rabies was the most frequently mentioned with 56%. Only 5.2% of respondents mentioned tick infestation as potential health risk to dogs and humans (Table 5). A significant proportion of respondents (48.0%) who kept dog could not mention any dog disease or disease transmitted by dogs. Dog owners in Makurdi mentioned several reasons for visiting the veterinary clinics with their dogs, prominent among these reasons were signs of skin infection and lose of hair (51.2%), Vaccination (50.6%) . and for routine check-up (49.6%) (Table 6).

Table I: Demography and do-human relationships in Makurdi.

Locations	Houses examined	Houses with dog (%)	Dogs seen	Persons in houses with dogs	Dog: human ratio	Number of dogs (%)			
						Sex		Status	
						Female	Male	Stray	Restricted
High level	50	32(64.0)	49	201	1:4	20(40.8)	29(59.2)	27(55.1)	22 (44.9)
Low level	50	40(80.0)	52	219	1:4	27(51.9)	25(48.1)	32(61.5)	20(38.5)
North bank	50	41(82.0)	56	229	1:4	30(53.6)	26(46.4)	25(44.6)	31(55.4)
Wadata	50	42(84.0)	63	255	1:4	25(39.7)	38(60.3)	36(57.1)	27(42.9)
Wurukum	50	47(94.0)	70	257	1:3	31(44.3)	39(55.7)	38(54.3)	32(45.7)
Total	250	202 (80.8)	290	1161	1:4	133 (45.8)	157 (54.2)	158 (54.5)	132 (45.5)

($\chi^2 = 1.42$, $df = 1$, $P > 0.05$).

Table 2: Dog owners reasons for keeping dogs in Makurdi.

Reasons	H/level n = 32	L/level n = 40	N/Bank n = 41	Wadata n = 42	Wurukum n = 47	Total n = 202
	Positive response (%)					
Pets for children	10 (31.2)	7 (17.5)	6 (14.6)	8 (19.0)	7 (14.8)	38 (18.8)
Companionship	23 (71.8)	18 (45.0)	23 (56.1)	16 (38.1)	25 (53.2)	105 (51.9)
Hunting	5 (15.6)	8 (20.0)	8 (19.5)	4 (9.5)	9 (19.1)	33 (16.3)
Gift	20 (62.5)	9 (22.5)	12 (29.3)	6 (14.3)	8 (17.0)	55 (27.2)
Breeding for sale	10 (31.2)	14 (35.0)	8 (19.5)	7 (16.6)	13 (27.6)	52 (25.7)
Security	32 (100.0)	39 (97.5)	39 (97.5)	41 (97.6)	47 (100.0)	198 (98.0)
Replacement for previous pet	8 (25.0)	17 (42.5)	16 (39.0)	4 (9.5)	14 (29.8)	59 (26.8)
Physical beauty	15 (46.8)	15 (37.5)	14 (34.1)	21 (50.0)	21 (44.7)	86 (42.5)

($\chi^2 = 12.1$, $df = 7$, $P < 0.05$)

Table 3: Reasons for not keeping dogs as given by respondents in houses without dogs

Reasons	H/level	L/level	N/Bank	Wadata	Wurukum	Total
	n = 18	n = 10	n = 9	n = 8	n = 3	n = 48
	Positive response (%)					
To prevent dog bite	17 (94.4)	10 (100.0)	8 (88.9)	78 (85.5)	2 (66.6)	44 (91.7)
To avoid dog ticks/lice	16(88.8)	9 (90.0)	3 (33.3)	7 (87.5)	2 (66.6)	37 (77.1)
Against religious belief	18 (100.0)	7 (70.0)	8 (88.9)	7 (87.5)	1 (33.3)	41 (85.4)
Prevent embarrassing guests	11 (61.1)	8 (80.0)	2 (22.2)	6 (75.0)	2 (66.6)	29 (60.4)
To avoid contamination with dog feaces	10 (55.5)	9 (90.0)	5 (55.5)	8 (100.0)	1 (33.3)	33 (68.7)
Dont like dogs as pets	17 (94.4)	10 (100.0)	4 (44.4)	8 (100.0)	2 (66.6)	41 (85.4)
Superstitious belief	15 (55.5)	9 (90.0)	2 (22.2)	5 (62.5)	0 (0.0)	31 (64.5)
Lack of resources to care for dogs	13 (72.2)	9 (90.0)	5 (55.5)	8 (100.0)	1 (33.3)	36 (75.0)
Dogs unhygienic behaviour and odour	17 (94.4)	8(80.0)	9 (100.0)	5 (62.5)	1 (33.3)	40 (83.3)

($X^2 = 2.11$, $df = 8$, $P < 0.05$).

Table 4: Respondents reasons for the increase in population of stray dogs roaming the streets of Makurdi.

Reasons	H/level	L/level	N/Bank	Wadata	Wurukum	Total
	n = 50	n = 250				
	Positive response (%)					
Uncontrolled breeding	22 (44.0)	27(54.0)	28 (56.0)	26 (52.0)	31 (62.0)	134 (53.6)
Escape from home	27 (54.0)	31 (62.0)	31 (62.0)	31 (62.0)	26 (52.0)	146 (58.5)
Lack of financial resources to cater for dogs	22 (44.0)	35 (70.0)	35 (70.0)	36 (72.0)	29 (58.0)	157(62.8)
Inadequate feeding by owners	25 (50.0)	39 (78.0)	40 (80.0)	35 (70.0)	42 (84.0)	181 (72.4)
Abandonment and neglect by owners	15 (30.0)	27 (54.0)	25 (50.0)	26 (52.0)	22 (44.0)	115 (46.0)
Non enforcement of dog control laws	22 (44.0)	30 (60.0)	30 (60.0)	33 (66.0)	30 (60.0)	145 (58.0)
Dogs searching for mating partners	26 (52.0)	39 (78.0)	41 (82.0)	36 (72.0)	35 (70.0)	177 (70.8)
Dog battering by owners	16 (32.0)	30 (60.0)	31 (62.0)	24 (48.0)	18 (36.0)	119 (47.6)
Dont know	0 (0.0)	2 (4.0)	2 (4.0)	3 (6.0)	1 (2.0)	(.0)

($X^2 = 3.02$, $df = 8$, $P < 0.05$)

Table 5: Dog borne diseases as listed by respondents in Makurdi

Perceived disease	H/level n = 50	L/level n = 50	N/Bank n = 50	Wadata n = 50	Wurukum n = 50	Total n = 250
	Positive response (%)	Positive response (%)	Positive response (%)	Positive response (%)	Positive response (%)	Positive response (%)
Rabies	27 (54.0)	22 (44)	24 (48.0)	23 (46.0)	44 (88.0)	140 (56.0)
Tick infestation	3 (6.0)	3 (6.0)	5 (10.0)	0(0.0)	2 (4.0)	13 (5.2)
Ringworm	0 (0.0)	1 (2.0)	1 (2.0)	0(0.0)	1 (2.0)	3 (1.2)
Worm infection	1 (2.0)	0 (0.0)	4 (8.0)	0(0.0)	0 (0.0)	5 (2.0)
HIV/AIDS	2 (4.0)	0 (0.0)	0 (0.0)	0(0.0)	1 (2.0)	3 (1.2)
Dont know	22 (44.0)	28 (56.0)	26 (52.0)	27 (54.0)	17 (34.0)	120 (48.0)

Table 6: Dog owners reasons for taking dogs to veterinary clinics in Makurdi

Reasons	H/level n = 32	L/level n = 40	N/Bank n = 41	Wadata n = 42	Wurukum n = 47	Total n = 202
	Positive response (%)	Positive response (%)	Positive response (%)	Positive response (%)	Positive response (%)	Positive response (%)
Suspicion of rabies infection	18 (56.2)	18 (45.0)	21 (51.2)	25 (59.5)	29 (61.7)	111 (55.0)
Skin infection and loss of hair	18 (56.2)	18 (45.0)	31 (75.6)	28 (66.6)	33 (70.2)	128 (63.3)
Abnormal aggression and barking	16 (50.0)	16 (40.0)	17 (41.5)	17 (40.5)	25 (53.2)	91 (45.0)
Loss of appetite	14 (43.7)	14 (35.0)	24 (58.5)	24 (57.1)	26 (55.3)	102 (50.5)
Passing out worms in faeces	7 (21.8)	7 (17.5)	8 (19.5)	7 (16.6)	14 (29.8)	42 (21.3)
For vaccination	19 (59.4)	18 (45.0)	30 (73.2)	31 (73.8)	28 (59.6)	126 (62.4)

DISCUSSION

The population of dogs in this study reveals high dog density with human density indicating that residents were not intolerant of dogs at high density. The dog: human ratio is higher than that reported in earlier studies in Nigerian cities of Jos and Kaduna where dogs to human ratio were 1:6 and 1:9 respectively (Okoh, 2007). These Nigerian figures are far higher than that reported in urban areas in Brazil that have 2.8dogs to every 10 persons (Nunes *et al.*, 1997). The average number of dogs per household observed in this study is

also higher than that reported by Nassar and Mosier (1982) in Kansas (USA). These high dog-to-human ratio increases the rate of exposure of humans to dogs and consequently transmission of dog-borne zoonoses. A variety of factors have been suggested to influence the number of dogs in these areas, these include socio economic status of owners, availability of mating partners, food and uncontrolled breeding.

The number of dogs roaming the streets of Makurdi as observed in this study

corroborates earlier studies in some Nigerian cities (Ezeokoli and Umoh, 1986, Obeobulem, 1994). The situation has been worsened as a result of deteriorating housing, sanitary conditions and bulging urban population. Again, the harsh economic environment prevailing in most households makes fending for dogs an additional burden. The dogs are therefore left to scavenge for food. It is these straying dogs that are responsible for the serious public health risks associated with dogs. For example, Prosperi *et al.* (1992) reported correlation between stray dogs and high incidence of dog bites. The increase in the prevalence of rabies in Nigeria has been attributed to the inability of Public Health Officers to enforce legislation on stray dogs (Okoh, 2007). Stray dogs may be also responsible for contaminating public parks, because ova of *Toxocara canis* have been recovered from soil samples collected from primary school playgrounds and parks in Makurdi (Omudu *et al.*, 2003, Omudu and Amuta, 2007).

The lack of responsible dog ownership had been linked to ignorance and socio cultural beliefs, the Nigerian cultural system and communal attitude makes it easy for dogs to move from one household to another. The reasons for increasing stray dog population are inability for owners to adequately provide food and shelter for the dogs and ignorance of basic responsibilities of pet owners. Findings from this study agrees with Okoh (1988) that dog owners keep dogs for a variety of reasons, especially as security guards which seems to be widespread in Nigeria. Erroneous beliefs especially as it relates to dog-borne diseases were observed among respondents in this study. The inability of dog owners to recognize dog diseases that are potential risk

to human health is of serious consequences. The implication of this for veterinary epidemiologists is to address identified areas of misconceptions and erroneous beliefs during health education activities. The success of rabies and other dog-borne disease control has always depended on community participation. This can only be achieved through public education to facilitate responsible pet ownership.

To ensure compliance and sustainability of interventions targeted at the control of stray dogs and vaccination of pets, an investigation of owners' attitude and practices are very critical. Studies in Nigeria and elsewhere have reported variation in reasons why people keep dogs and these seem to be influenced by culture, socioeconomic status and traditional belief systems (Slater 2001, Fielding and Mather 2001, Selby *et al.*, 1979, Selby and Rhoades 1981).

The increasing evidence that frequent dog-human contact can play a serious role in human health, particularly as it relates to prevention and control of rabies and ectoparasite infestation has been long observed (Prosperi *et al.*, 1992). The need for a more comprehensive and largescale research on the sociocultural and economic background of dog owners and dog ecology appears very necessary. Our findings justified the need to educate dog owners on their responsibility to their dogs and protection of public health.

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