UNIVERSITI PUTRA MALAYSIA

PREVALENCE OF DOG BITE AND ITS ASSOCIATED FACTORS AMONG PUBLIC PRIMARY SCHOOLS STUDENTS IN MADAWAKI DISTRICT GUSAU, NIGERIA

HASSAN IBRAHIM

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By

HASSAN IBRAHIM

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Master of Science

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DEDICATION

To my late parents, for their prayers, support and counselling throughout of my life. Particularly my mother, i thank you so much mother may your soul continues to rest in peace, Amin. To my elder brother Musa Hassan whose support for this study have been so outstanding, also to my lovely wife Hibatullahi Umar her support, courage and patience has really make this study worthwhile. To my kids Abba, Abul'azeez, Asiya, Al-ameen and Abdulsamad. I thank you all for your wonderful prayers for the successful completion of this academic journey.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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Chairman : Associate Professor Salmiah binti Md. Said, M.D
Faculty : Medicine and Health Sciences

Dog bite is a global public health problem that is sometimes fatal, due to infection from rabies and this rabies constitute 30% to 50% of this fatality in children, especially 5 to 14 years old. Dog bite is a major source of animal bite injuries in low-income countries such as Nigeria, where 55.7% prevalence of dog bite was reported. Gender and dog ownership are some of the associated factors of dog bite. Despite its prevalence, there is scarcity of research on the prevalence and its associated factors in the northern part of the country.

The objectives of this study were to determine the prevalence of dog bite and its associated factors among public primary schools students in Madawaki district Gusau, Nigeria.

A cross-sectional study was conducted among 1,226 public primary school students aged between 11 to 13 years old, in Madawaki district of Gusau, Zamfara State, Nigeria. In order to select 1,226 eligible participants, out of 4200, stratified sampling technique with unequal proportion was conducted with stratification to urban (4 schools) and semi-urban (3 schools). Self- administered questionnaire was used to report dog bite history, sociodemographic characteristics, knowledge on interaction with dog, knowledge on implication of dog bite to health, dog ownership by the family, dog ownership by neighbour and risk behaviours among public primary schools students in Madawaki district from November 2018 to May 2019. Descriptive analysis, chi-square test, simple and multiple binary logistic regression analysis were conducted, and the level of significance was set at $\alpha = 0.05$.

Majority of the respondents were male (53.2%) and Hausa ethnic group (83.2%). The distribution of respondents by urban, semi urban and rural residential areas was 51.3%, 19.0% and 29.7% respectively. The prevalence of dog bite was 54.5%. Gender, knowledge on interaction with dog, risk behaviours, dog ownership by family and dog ownership by neighbours are significantly associated with dog bite. In the multiple binary logistic regression analysis, the factors of dog bite among respondents were male (AOR = 2.252; Cl = 1.719, 2.949), score for knowledge on interaction with dog (AOR = 0.884; Cl = 0.858, 0.911), score for risk behaviours of children (AOR = 1.020; Cl =1.004, 1.035), dog ownership by the family of the respondents (AOR =1.456; Cl =1.089, 1.946) and dog ownership by the neighbours of the respondents (AOR = 1.752; Cl = 1.334, 2.303).

More than half of the public primary schools students in Madawaki district had history of dog bite, male have experienced dog bite more than the female. Decrease in knowledge score, high score in risk behaviours, gender, owning dog by family or neighbours are responsible for the high burden of this dog bite. Hence, there is a need for awareness and improve knowledge towards prevention programme, towards dog bite in Madawaki district, and to educate the dog owners.

Keywords: Dog bite, prevalence, associated factors, primary school students, Nigeria.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PREVALENS GIGITAN ANJING DAN FAKTOR-FAKTOR BERKAITAN DALAM KALANGAN MURID SEKOLAH RENDAH AWAM DI DAERAH MADAWAKI, GUSAU, NIGERIA

Oleh

HASSAN IBRAHIM

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Pengerusi : Profesor. Madya Salmiah binti Md. Said, M.D
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Gigitan anjing merupakan masalah kesihatan awam global yang kadangkala boleh membawa maut akibat daripada jangkitan rabies yang merangkumi 30%-50% kanak-kanak berumur 5-14 tahun. Gigitan anjing adalah sumber utama kecederaan gigitan haiwan di negara-negara berpendapatan rendah seperti Nigeria, di mana 55.7% prevalen gigitan anjing dilaporkan. Jantina dan pemilikan anjing adalah beberapa faktor yang berkaitan dengan gigitan anjing. Disamping kelazimannya, terdapat kekurangan penyelidikan mengenai kelazimannya dan faktor-faktor berkaitan di bahagian utara Nigeria.

Objektif kajian ini adalah untuk menentukan kelaziman gigitan anjing dan faktor-faktor berkaitan dalam kalangan murid sekolah rendah kerajaan di daerah Madawaki, Gusau, Nigeria.

Kajian keratan rentas telah digunakan dalam kalangan murid sekolah rendah berumur antara 11-13 tahun di 1,226 sekolah rendah awam di daerah Madawaki, Gusau, Negeri Zamfara, Nigeria. Daripada 4200 peserta, sebanyak 1226 peserta yang layak telah dipilih dengan menggunakan teknik persempelan berstrata dengan perkadaran yang tidak sama rata telah dijalankan dengan menggunakan di kawasan bandar (4 buah sekolah) dan luar bandar (3 buah sekolah). Borang soal selidik digunakan untuk melaporkan sejarah gigitan anjing, pemilikan anjing oleh keluarga, pemilikan anjing oleh jiran, pengetahuan tentang interaksi dengan anjing, pengetahuan mengenai implikasi gigitan anjing dan tingkah laku berisiko di kalangan murid sekolah rendah awam di daerah Madawaki bermula dari November 2018 sehingga Mei 2019. Analisis deskriptif, ujian khi kuasa dua, analisa simpel regresi logistik dan berganda dijalankan, dan tahap signifikan ditetapkan ialah $\alpha = 0.05$.

Majoriti responden adalah lelaki (53.2%) dan berbangsa Hausa (83.2%). Taburan responden mengikut tempat tinggal adalah di kawasan bandar sebanyak 51.3%, semi bandar adalah 19.0% dan luar bandar adalah 29.7%. Keseluruhan prevalen gigitan anjing adalah 54.5%. Jantina, pengetahuan mengenai interaksi dengan anjing, tingkah laku berisiko, pemilikan anjing oleh keluarga dan pemilikan anjing oleh jiran mempunyai hubungan statistik yang signifikan terhadap gigitan anjing. Dalam analisis regresi logistik binari berganda, faktor-faktor gigitan anjing di kalangan responden adalah lelaki (AOR=2.252; Cl=1.719, 2.949), skor untuk pengetahuan mengenai interaksi dengan anjing (AOR=0.884; Cl=0.858, 0.911), skor untuk risiko tingkah laku kanak-kanak (AOR=1.020; Cl=1.004, 1.035), pemilikan anjing oleh keluarga responden (AOR=1.456; Cl=1.089, 1.946) dan pemilikan anjing oleh jiran responden (AOR=1.752; Cl=1.334, 2.303).

Lebih daripada separuh pelajar sekolah rendah awam di daerah Madawaki mempunyai sejarah gigitan anjing, lelaki mengalami gigitan anjing lebih banyak daripada wanita. Penurunan skor pengetahuan, skor tinggi dalam tingkah laku berisiko, jantina, pemilikan anjing oleh keluarga atau jiran bertanggungjawab untuk beban gigitan anjing ini yang tinggi. Oleh itu, terdapat keperluan untuk memberi kesedaran dan meningkatkan pengetahuan mengenai program pencegahan, terhadap gigitan anjing di daerah Madawaki, dan untuk mendidik pemilik anjing.

Kata kunci: Gigitan anjing, prevalen, faktor-faktor berkaitan, murid sekolah rendah, Nigeria.

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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I hereby confirm that:

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LIST OF ABBREVIATIONS

$	US dollar
%	Percentage
₦	Nigeria's naira
≤	Less than or equals to
≥	Greater than or equals to
ABLV	Australian bat lyssavirus
ABUTH	Ahmadu Bello University Teaching Hospital
AMAC	Abuja municipal area council
AVMA	American Veterinary Medical Association
CDC	Centre for disease control
CI	Confidence interval
CNS	Central nervous system
df	Degree of freedom
DVM	Doctor of Veterinary Medicine
EBLV	Europian bat lyssavirus
FCET	Federal Collage of Education Technical
HABCAS	Haliru Binji Collage of Art and Science Sokoto
IV	Irkut virus
KV	Khujand virus
LBV	Lagos bat virus
LGA	Local Government Area
LGEA	Local Government Education Authority
MKV	Mokola virus
MNIM	Nigeria's Institute of Management

MScPH	Master of science in Public Health
NAPRI	National Animal Production Research Institute
NBC	National Bureau of Statistics
NPC	National Population Commission
NVIR	National Veterinary Research Institute
NVMA	Nigerian Veterinary Medical Association
NYSC	National Youth Service Corps
OR	Odds ratio
PEP	Post Exposure Prophylaxis
PTS	Post-traumatic stress disorders
RNA	Ribonucleic acids
RV	Rabies virus
SD	Standard deviation
SIWES	Student's Industrial Work Experience Scheme
UBE	Universal Basic Education
UDUS	Usmanu Danfodiyo University Sokoto
UK	United Kingdom
UNESCO	United Nation Educational Scientific and Cultural Organisation
UPM	Universiti Putra Malaysia
USA	United States of America
WAEC	West African Examination Council
WCBV	West Caucasian bat virus
WHO	World Health Organisation
ZVO	Zonal Veterinary Officer
χ^2	Chi- square

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Dog bite is a global problem that is sometimes fatal and it particularly affects children (Morgan & Palmer, 2007). It causes disability as well as post-traumatic stress syndrome (De Keuster, Lamoureux, & Kahn, 2006; Peters, Sottiaux, Appelboom, & Kahn, 2004). It is also a primary cause of traumatic injuries particularly among the paediatric population (Dwyer, Douglas, & van As, 2007). Injuries due to such bite have approximately constitute 60% to 90% of all other animal-related injuries (Ostanello et al., 2005; Paschos, Makris, Gantsos, & Georgoulis, 2014).

It was estimated that risk of getting bite from domestic animal during life time of an individual was 50%, out of which dog bite was responsible for 80% to 90% of total risk (Nygaard & Dahlin, 2011). Apart from being the major public health and clinical issues that cause anxiety to the victims (Abubakar & Bakari, 2012; Adeleke, 2010; Bata, Dzikwi, & Ayika, 2011). More than 99% cases of dog bite especially from rabid dog leads to infection (Hemachudha et al., 2013). Also more than half of such cases affect less than 15 year old children (Cleaveland, Fèvre, Kaare, & Coleman, 2002; Hemachudha et al., 2013).

Worldwide, millions of people experienced dog bite, in 1994 United State of America (USA) was estimated to have 4.7 million dog bite annually, out of this figure 800,000 victims needs medical attention, while children of less than 14 years old formed the 44% of the affected individual (Gilchrist, Sacks, White, & Kresnow, 2008). In 2001, 4.5 million dog bite were recorded in the USA, this resulted to 368,265 emergency cases of dog bite, in which a reasonable per cent (42%) of these victims, were children of 14 years old (Ogundare et al., 2017). Bites from dogs especially domestic dogs (*Canis familiaris*), is the most important source of rabies infection to human, with more than 95% cases (De Keuster & Butcher, 2008). Rabies has the highest case fatality rate that is almost 100%, when compared to other usual infectious diseases (Yibrah & Damtie, 2015). Mortality due to rabies infection among human population is still at 50,000 to 60,000 per annum (Haupt, 1999). Rabies is ranked as the tenth infectious disease that causes death, and is distributed in about 100 countries of the world, where more than 2.5 billion people are at risk (Haupt, 1999).

Most injuries due to dog bites are multiple with various severity, which include minor scarring to injuries that are fatal (Kesting, Hölzle, Pox, Thurmüller, & Wolff, 2006). Study have significantly shows that, the proportion of patients with dog bite injuries was accounted by 6 to 12 year old children, because this range of age were for the first time exposed to outside world, without strict parental supervision (Mitchell, Nanez, Wagner, & James, 2003). Another study have indicated that less than 16 year old children appears to be on the highest risk of bite, most time unprovoked bite from either the stray dogs, or owned by a member of the community (Alabi et al., 2014).

Usually, these bite were on high innervated parts of the body, which enhance rapid transmission of rabies virus to the central nervous system (CNS), like hand or neck region of the bitten individual (Alabi et al., 2014). This signifies the urgent needs in recognizing dog bite as public health problem, immediate care for dog bite victims and putting in place the necessary steps in addressing issues of awareness, and understanding dog bite and rabies as potential public health problem, which involve vast majority of children (Ogundare et al., 2017).

Children make up the largest percentage of population affected by dog bite with high prevalence in the late childhood (World Health Organization , 2013). There were also report on dog bite fatalities of children in Belgium, Spain, Australia, United Kingdom and the Republic of Tanzania (Tenzin et al., 2011). Lack of understanding on how dogs can be provoked, children became vulnerable to dog bite (Cornelissen & Hopster, 2010). Their habitual nature of running and screaming, coupled with inability to recognize the changing behaaviour of dogs can all elicit dog's anger (Racca et al., 2010).

In Africa, there is high population of unvaccinated dogs, as well as increased number of stray dogs. Bite from any of this group is considered to be serious public health problems (Ogundare et al., 2017). Also bite from the rabid infected dogs continues to remain the principal way of transmitting rabies infection across the African countries (Aworh et al., 2010). The environment, within which the bite occurs, is also other risk factors associated with dog bite. Studies showed that, the vacation period is the time when children spent most of their time outdoors, and this exposes them to the risk of dog bite (Sreenivas, Sakranaik, Sobagiah, & Kumar,2017). Period for reproductive cycles of dogs suggest increase in dog bite (Reece, Chawla, & Hiby, 2013), as well as irresponsible dog ownership increases the risk of dog bite within the community (Atuman, Ogunkoya, Adawa, Nok, & Biallah, 2014). There are many reports on dog bite incidences from countries, but it is still believed to be under reported (Cornelissen & Hopster, 2010).

In Nigeria, study showed children of less than 18 years were the highest victims of dog bite, with 55.7% among the male while 44.3% among the female (Eke, Omotowo, Ukoha, & Ibe, 2015). This could cause various degree of injuries or fatalities among children. Irresponsible dog ownership and high population of stray dogs, most of which are unvaccinated is putting the community in dangers associated with dog bite especially among children (Alabi et al., 2014), and rabies is still endemic in the country (Odeh, Umoh, & Dzikwi, 2013). However it remains a neglected disease that is often misdiagnosed or unreported, this increases the danger to the vulnerable group (Adedeji et al., 2010).

1.2 Problem Statement

The increased prevalence of dog bite in Nigeria is a serious public health concern (Hambolu et al., 2013; Nwoha & Ugwuoke, 2017), particularly on children of primary school age (less than 16 years old). A survey on 195 dog bite victims indicated 73% of these victims were children of less than 16 years old, out of which 66% of them were male, also 182 (93%) of the offending dogs were unvaccinated against rabies infection

(Alabi et al., 2014). Another survey was found to show prevalence of dog bite in children within the age bracket of 6 to 12 years old with male being more predisposed to the bite (71.4%) (Ogundare et al., 2017). Study from the analysis of 9 years available data (2005 – 2014) on dog bite and rabies in Nigeria showed the overall prevalence of dog bite cases was 85.9% (1840/2141). However, the increasing trends on the prevalence of dog bite over the years is 44.0% in 2006, 42.2% in 2007, 73.0% in 2008, 85.2% in 2009 while 74.6% was in 2010 (Sini Ishaya et al., 2016). Furthermore, study on the current primary school curriculum in Nigeria does not focused on addressing dog bite issues among children, rather it dwells on teaching the basic science, English, local languages among others. This is also known as middle basic (primaries 4-6) (O. Igbokwe, 2015). This continues increase of dog bite coupled with poor knowledge and factors involved remains a serious concern that needs to be addressed especially on children (Ameh, Dzikwi, & Umoh, 2014). It is imperatives to conduct a survey on the dog bite in order to estimate its prevalence and use it as a step in reducing the exposure of the population at risk (Ogundare et al., 2017).

Increase in this dog bite within the community, which are mostly unvaccinated dogs and having children more vulnerable to such bite is an issue that, community needs to be assisted through conducting a study which, will enhance their capacity with regards to human-dogs interactions. Despite the fact that problems involved on such interactions cannot be reduced to zero. However, the issues addressed by this study would immensely benefit the community, more especially this community (Madawaki district) that have no specific source of information on dog bite issues.

Dog bite can bring about many repercussions such as disfigurement, post-traumatic stress disorders, wound infections and death (Rothe, Tsokos, & Handrick, 2015). Roughly 3 to 30% of dog bite cases leads to severe infections in which over 100 species of bacteria isolated from the bacterial infection due to bite has the possibilities of being pathogenic (Dhillon, Hoopes, & Epp, 2018; Talan, Citron, Abrahamian, Moran, & Goldstein, 1999). While annual rabies death estimate among the people was about 60,000 with 95% coming from Africa and Asia (Hampson et al., 2015). According to the estimated average of cost of treating dog bite (post exposure prophylaxis) is $ 83.65 per person (Borse et al., 2018). This is equivalent to ₦32,539.85 (Nigeria's currency).

Madawaki district have chosen for this study considering it to be among the three largest of the 11 districts in Gusau local government area of Zamfara state, Nigeria. It also contain the segments of the society i.e urban, semi- urban and rural areas. Community members in this district (inhabitants of Madawaki district), also experience frequent dog bite cases like other districts especially among the children. As far as our knowledge is concern no prevalence study was conducted particularly in this community (Madawaki District Gusau local government area of Zamfara State), concerning dog bite among primary school children and factors associated with it. Despite the fact that it was believed, that dogs are the principal vectors of human rabies in Nigeria (Awoyomi, Adeyemi, & Awoyomi, 2008) and children are more prone to dog bite attack than adult (Venkatesan, Dongre, & Ganapathy, 2017). Below is table highlighting on the dog bite in some part of Nigeria (table 2.1).

Table 1.1 : Information on dog bites in some parts of Nigeria

Author(s)	Study location	Study population	Sample size/number of cases	Location of the bite	Percentage of the bite	Season at which bite occur
Abdulsalam et al (2018)	Sokoto state, (north western Nigeria)	≤ 12 year children	190	-	32.1	-
Omoke & Onyemaechi (2018	Teaching Hospital, Abakaliki, Ebonyi state.	Children (6-12 year)	74	Lower extremities	77.5	-
Ogundare et al (2017)	University teaching Hospital, Ado-Ekiti, Nigeria	Children (6-12 year)	9438	Lower limb	0.89	Jan. 2010 – June, 2014
Eke et al (2015)	Ituka-ozalla, Enugu state.	children	149	-	55.7	-
Alabi et al (2014)	Jos Plateau state, Nigeria.	< 16 year children	383	-	73	April & October
Ehimiyein et al (2014)	Zaria, Nigeria	Children & adult	236	Lower limb	92.4	June & October
Abubakar & Bakari (2012)	ABU teaching hospital, Zaria, Kaduna state, Nigeria	Children & adult	24,683	Lower limb & buttocks	0.3	-
Adeleke (2010)	Kano state, north western Nigeria	Children (4-9year)	44	-	78	April & September (dry season)

1.3 Significance of the Study

The study will be beneficial for the community members (inhabitants of Madawaki district), because it estimated the prevalence and associated factors of dog bite among primary school students. The preliminary data that was generated would help the school management (primary schools) in teaching their students the basic public health issues of concern, that are attached to dog bite on children as well as ways on how they should conduct themselves for safe interactions with dogs. It would also help the members of the community to understand the common scenarios, between dogs and children that could easily leads to dog bite, they will as well realises the negative effect of irresponsible dog ownership behaviours, and free-roaming dogs within their community**.** The study will also help parents to understand the periods when children are not supposed to be alone in their interaction with dogs, without close supervisions.

Lastly, the policy makers (the government at the level of district, local and state) would have a clear understanding on prevalence of dog bite among the community members (inhabitants of Madawaki district). Particularly students of primary school age, in order to institute measure such as public awareness with the regards to the public health effect of dog bite, ensures regular mass dog vaccination and enforcement of laws that control irresponsible dog ownership. It is hoped that the findings in this study will contribute immensely in addressing the menace of dog bite especially, on children through understanding its prevalence within the study area, and serve as a baseline for further study on dog bite in Madawaki district, Gusau local government area.

1.4 Research Questions

The research questions of this study were:

i. What is the prevalence of dog bite among primary school students in Madawaki district of Gusau Nigeria?

ii. What are the predictors of dog bite among primary school students in Madawaki district of Gusau Nigeria?

1.5 Objectives of the Study

1.5.1 General Objectives

The aim of the study is to determine the prevalence of dog bite and its associated factors among public primary schools students in Madawaki district Gusau, Nigeria.

1.5.2 Specific Objective

The specific objectives of this study were:

i. To describe the distribution of respondents by sociodemographic characteristics, knowledge on interaction with dogs, knowledge on the implications of dog bite to health, dog ownership and risk behaviours that leads to bite from dogs.

ii. To determine the prevalence of dog bite among respondents.

iii. To describe the nature of dog bite experience among respondents.

iv. To determine the association of dog bite with sociodemographic characteristics, knowledge on interaction with dogs, knowledge on implications of dog bite to health, dog ownership and risk behaviours that leads to bite from dogs among respondents.

v. To determine the predictors of dog bite among respondents.

1.6 Research Hypothesis

The research hypothesis of this study are as follows:

H_1: There is significant association of dog bite with sociodemographic characteristics among primary school students in Madawaki district of Gusau Nigeria.

H_2: There is significant association of dog bite with knowledge on interaction with dog, among primary school Students in Madawaki district of Gusau Nigeria.

H_3: There is significant association of dog bite with knowledge on implications of dog bite to health, among primary school students in Madawaki district of Gusau Nigeria.

H_4: There is significant association of dog bite with dog ownership, among primary school students in Madawaki district of Gusau Nigeria.

H_5: There is significant association of dog bite with risk behaviours that lead to bite from dog, among primary school students in Madawaki district of Gusau Nigeria.

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