



UNIVERSITY OF NAIROBI

**COLLEGE OF AGRICULTURE AND VETERINARY SCIENCES FACULTY OF
VETERINARY MEDICINE**

**ASSESSMENT OF KNOWLEDGE, ATTITUDES AND PRACTICES (KAP) ABOUT
RABIES PREVENTION AND CONTROL: A COMMUNITY SURVEY IN SIAYA
TOWNSHIP, ALEGO USONGA SUB-COUNTY IN SIAYA COUNTY.**

**PROJECT REPORT FOR PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
BACHELOR'S DEGREE IN VETERINARY MEDICINE**

SUBMITTED BY:

STEVEN ODHIAMBO ONDIASA.

J30/3488/2009

steveondiasa@gmail.com

**SUPERVISOR: DR. ANDREW THAIYAH & DR. GILBERT KIRUI
DEPARTMENT OF CLINICAL STUDIES,
UNIVERSITY OF NAIROBI.**

DECLARATION

I, Ondiasa Odhiambo Steven, hereby declare that this project is my original work and has not been submitted by anyone else for a diploma or a degree in any other institution of higher learning.

Signature

Date

Steven Odhiambo Ondiasa

This project has been submitted for examination with my approval as University supervisor.

Signature

Date

Dr. Andrew Thaiyah (Bvm, Msc, PhD),

Department of Clinical Studies,

University of Nairobi.

Signature.....

Date.....

Dr. Gilbert Kirui (Bvm, Msc),

Department of Clinical Studies,

University

of

Nairobi.

DEDICATION

This project is dedicated to my Guardians, grandmother-Elizabeth Omore, brothers, sisters, my fiancé, my Lecturers and to all my class mates for their continuous unconditional support throughout my course of study.

ACKNOWLEDGEMENT

My sincere gratitude goes to God the almighty for the life, mercy and protection he has given me throughout my study.

I acknowledge with gratitude the tremendous assistance, invaluable advice, constructive comments given and the time devoted by my supervisor, Dr. Andrew Thaiyah and Dr. Gilbert Kirui.

Great appreciation goes to my data collection assistants at Dr. Jamleck Muriuki and Dr. Moses Olum (MVETS at the University of Nairobi, Department of Clinical studies) for their assistance, advice and guidance.

I am indebted to the Department of Clinical Studies and the County government of Siaya County for allowing me to carry out my project in Siaya County and to check their records for my data.

LIST OF ABBREVIATIONS

- MVETS- Master Student in Veterinary science
- PEP-Post exposure prophylaxis
- KAP-Knowledge, Attitude and Practices
- WHO-World Health Organization

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
LIST OF ABBREVIATIONS	v
ABSTRACT.....	vii
CHAPTER ONE	1
1.0 INTRODUCTION.....	1
1.2 PROBLEM STATEMENT	4
1.3 Justification	6
1.4 Hypothesis.....	6
1.5 Objectives.....	6
1.6 Main objectives	7
1.6.1 Other objectives	7
1.7 Significance of the study	7
CHAPTER TWO	8
2.0 LITERATURE REVIEW.....	8
2.1 STUDY AREAS	10
2.2 STUDY DESIGN.....	11
CHAPTER THREE	13
3.0 RESULTS.....	13
3.1 KNOWLEDGE, ATTITUDE AND PRACTICES OF PEOPLE OF SIAYA	20
3.3 Health seeking behaviours	21
3.4 Community actions towards suspect rabid animals	21
3.5 Sources of information about rabies.....	22
CHAPTER 4	23
4.0 DISCUSION.....	23
REFERENCE.....	26
APPENDICES	28

ABSTRACT

Rabies remains a major public health problem in Africa and Asia, although means to control and prevent the disease are available through mass dog vaccination and provision of post-exposure prophylaxis to people exposed to bites by suspect rabid animals. A cross-sectional study was carried out to report on knowledge, attitudes and practices related to rabies control and prevention, covering rural and urban settings in Siaya Township (Alego). The study results showed that the majority of people across Siaya county had knowledge about rabies and knew that it is transmitted by dog bites, but most did not have adequate knowledge about key practices, such as the need for wound cleansing, which could prevent unnecessary deaths from the disease instead most respondents preferred taking the victim to hospital as soon as possible after applying a tourniquet on area above the dog bite and some preferred traditional herbs from herbalists or even applying cheese around the bitten area and allow the suspected dog to lick the site after which the victims would believe that he or she had been healed. In other circumstances, knowledge (for example, about the need to vaccinate dogs to control rabies) did not reflect good practice even though a mass vaccination was done last year in within the region, but with a lot of constraints. In order to address the knowledge gaps identified by this study, there is a need for interventions aimed at increasing awareness, focusing on simple messages and targeting the community as a whole. This information could be channeled through media, community meetings and professionals including community leaders, health workers, teachers, livestock officers and clinicians and public health Officers. There is need to develop standard first aid procedures for rabies victims just like the one for polio and to be distributed all over the Health Centers to broaden the knowledge on how to handle such incidences. The study recommends that Veterinarians and Medical officers should work hand in hand to fight this neglected zoonotic disease that is a silent killer.

CHAPTER ONE

1.0 INTRODUCTION

Rabies is one of the oldest recognized infectious diseases, and affects all mammals. The disease is caused by a *Rhabdovirus* and is most usually transmitted to humans by domestic dog bites. Domestic dogs remain the principal vectors for rabies. In Kenya the prevalence of rabies disease outbreak in 1999 was 58% of all laboratory confirmed cases while in 2000 they accounted for 49% of the cases. The increasing numbers and mobility of both human and dog populations, among other factors, have accentuated the increase in rabies cases. Since the disease is widespread, the whole country is regarded as a rabies endemic area for the purposes of control. These reported estimates are from active surveillance studies and not from official records, which typically underestimate the disease burden. The high burden of rabies mortality in most developing countries suggests that, despite the existence of effective human and animal rabies vaccines, rabies prevention and control efforts in these settings are inadequate.

Free-roaming dogs are domestic dogs that are not confined in any way. They may be owned, but allowed to roam freely, or they may be strays (recently owned and abandoned). About 75% of the worldwide dogs, often referred to as stray, are free to roam and reproduce (<http://icamcoalition.org>). Many studies on free-roaming dogs have been undertaken in different countries in order to implement a rabies control program (Brown, 2002; Villa *et al.*, 2010; One Health, 2013; *Morters et al.*, 2014; Jackman and Rowan, 2007; Sarah *et al.*, 2010; Massei and Miller, 2013). Under optimal conditions (breeding season and adequate feed) a given population of dogs will nearly triple every year and this could exacerbate the problem of free-roaming dogs.

Knowledge, attitudes and practices (KAP) studies have been widely used around the world for different applications in public health based on the principle that increasing knowledge will result in changing attitudes and practices to minimize disease burden. However, before the research described herewith, no such studies had been conducted in Siaya County. The motivation behind this study was the need to provide baseline data that would allow the identification of knowledge gaps that may be affecting rabies control and prevention practices in affected communities in this Region.

Human rabies deaths are almost entirely preventable through prompt delivery of post-exposure prophylaxis (PEP) to victims of bites by rabid animals and according to WHO's recommendation, vaccinating 70% of the dog population helps to control rabies and thus prevent the rabies virus from circulating amongst susceptible animals (WHO, 2005). However, the exponential increase in the population of free roaming dogs is a serious challenge to this strategy in Eastern African countries (Ethiopia, Kenya, Rwanda and Tanzania). Most of the dog owners in these countries are ravaged by poverty to the level that they cannot take care of the dogs, leaving them to roam and increasing the population of free roaming dogs. Eventually, these free roaming dogs come into contact with other rabid domestic animals and other wild animals hence they become the primary source of infection to humans. In addition, community awareness on rabies in the above mentioned countries is now well determined and the knowledge, altitude and practices (KAP) of the community on rabies incidence and human exposures in relation to free roaming dogs is not yet well determined. Furthermore understanding the socio-cultural value of

dog keeping by the community will help in designing appropriate rabies prevention and control strategy in the areas.

Individuals also need to know the risks associated with rabies and the actions required preventing human infection, such as seeking post exposure prophylaxis (PEP) when a bite occurs and bringing their dogs to rabies vaccination campaigns. I hypothesized that knowledge about rabies translates into better practices for control and prevention. Rabies control has not been very successful due to decreasing financial resources at the disposal of government veterinary services and the resulting competition of the scarce resources available by other disease epidemics of greater economic importance and with a potential to spread faster. However, the Government still recognizes the importance of rabies and especially the public health aspect of the disease. There is need to determine the actual incidence of rabies in animals and especially in humans. Availability of such data will influence policy and attract more interest in rabies since the strongest motivation for rabies control will come from the magnitude of the rabies burden not in animals, but in the human population (Kaboyo, 1999). It will also allow development of effective control programmes. The role of wildlife in the epidemiology of rabies is unknown since only a few cases of wild carnivora, bats and other wildlife species are received at Central Veterinary Laboratories, Kabete (*Binepal et al.*, 1992). An efficient and sustainable method to collect wildlife samples for rabies diagnosis needs to be established.

Awareness of the general public of the importance of rabies control is crucial in any rabies control/eradication programme. The Kenya Rabies Group needs to be revived to attract scientists and policy makers, including those from the Department of Veterinary Services and the

Department of Public Health. There is an urgent need to identify a facility to diagnose human rabies, to encourage medical doctors to confirm clinical suspicions of rabies and to make them aware that rabies control is as much a human task as it is a veterinary one, if not more.

1.2 PROBLEM STATEMENT

Rabies claims an estimated 55,000 lives each year, with the majority of fatalities occurring in Asia and Africa (www.rabiesalliance.org). Many of the victims are children, often young boys who are more likely to try playing with or approaching free roaming dogs. The health impact of rabies in East African region is high while it remains neglected by governments. The disease incidence is increasing yearly and this is mainly associated with the increasing number of free roaming dogs in urban centers. Different records in these East African countries indicate higher number of dog bite cases and deaths due to rabies: e.g. estimates of about 4000 dog bite cases were reported from 2009-2012 in Tigray region of Ethiopia resulting to 40 deaths (Tigray Bureau of Health, 2012). Human population of this region is about 6.25 % of the national population. In Tanzania, human rabies mortality was estimated to be 1499 per year in 2002 (WHO, 2002) while in Kenya, in 2012, 146,000 dog bite cases were reported (Kitala and Kiambi, 2013). Reports from Rwanda, Nyagatare District Referral Hospital indicate that at least 2 cases per month of human rabies occur. Fatality rate of rabid dog bites with no post-exposure prophylaxis is up to 100%. About 99% of rabies in humans arises due to bites from free roaming dogs.

Understanding the free roaming dog ecology and epidemic theory is essential for effective control of rabies. Although human and canine rabies are effectively controlled through vaccinating domestic dogs, culling is still frequently carried out in response to rabies outbreaks. Culling is an immediate and visible response to public concerns about rabies, but it may also be

undertaken on the expectation that a reduction in population density by killing dogs will reduce disease transmission and, thus, the incidence of rabies. However, several studies justify that there is, in fact, no clear relationship between host density and disease transmission, and that culling by itself is ineffective in controlling rabies (Morters *et al.*, 2013). In most Eastern African countries (Ethiopia, Kenya, Rwanda and Tanzania), killing is the main means practiced to control human and canine rabies. As evidenced above, this could not be the best solution as a strategy to control rabies in these countries. The other most important factor that contributes to variations in dog population density, transmission of rabies, particularly at the global level, and declines in vaccination coverage is the demographic processes (births, deaths and immigration/emigration). So far, no detailed studies have been conducted to understand the demography of these free-roaming dogs in these countries. Therefore, understanding the demographic process of free-roaming dogs in the Eastern African countries can play a paramount importance in the control of rabies.

According to WHO's recommendation, vaccinating 70% of the dog population helps to control rabies and thus prevent the rabies virus from circulating amongst susceptible animals (WHO, 2005). However, the exponential increase in the population of free roaming dogs is a serious challenge to this strategy in Eastern African countries (Ethiopia, Kenya, Rwanda and Tanzania). Most of the dog owners in these countries are ravaged by poverty to the level that they cannot take care of the dogs, leaving them to roam and increasing the population of free roaming dogs. Eventually, these free roaming dogs come into contact with other rabid animals fox, raccoons and other wild animals and they become the primary source of infection to humans. In addition, community awareness on rabies in the above mentioned countries is now well determined and the knowledge, altitude and practices (KAP) of the community on rabies incidence and human

exposures in relation to free roaming dogs is not yet well determined. Furthermore understanding the socio-cultural value of dog keeping by the community will help in designing appropriate rabies prevention and control strategy in the areas.

1.3 Justification

There was need to assess the knowledge, attitudes and practices related to rabies and its prevention and control amongst a cross-section of households and to determine economic significance of rabies disease in order to check on the economic losses incurred through management of the disease should it occur.

1.4 Hypothesis

Rabies is a viral disease that cause serious infection to domestic animals and human beings (Zoonoses) as well as generally great economic loss to the general public

1.5 Objectives

Rabies disease can be controlled through mass vaccination of both owned and stray dogs. Main target should be to vaccinate at least 70% of total dog population in the area according to World Health Organization (WHO), 2005 and by elimination of stray dogs through baiting. The community should also be well educated and made aware of the dangers of having unvaccinated dogs as well as having knowledge on first aid procedures to follow when handling person who has been bitten by rabid dog

1.6 Main objectives

- Determine dog population dynamics in the Siaya Township, Alego Sub-County and quantify the spatial and temporal dynamics in rabies incidence
- Assess the level of community knowledge, attitude and practices (KAP) on rabies incidence and human exposures, and the socio-cultural value of dog keeping

1.6.1 Other objectives

- To carry out household questionnaire Surveys in Alego sub county
- Control of dogs population through elimination of stray dogs and increasing public awareness through responsible dogs and cats ownership
- To strengthen the rabies Surveillance system by collaborating with sub county health centers in Siaya County

1.7 Significance of the study

According to World Health Organization's recommendations collaborative efforts are necessary to control any zoonotic diseases like rabies. Efforts should be made to fully incorporate rabies control activities in all levels of the health services, aligning them with other public health programmes such as the expanded programme on immunization and those for tuberculosis and vector-borne diseases.

The data obtained through questionnaire will give answers to the above hypothesis and justify the objectives of the study. Most importantly, the data may be used to formulate control measures important in checking on the Zoonotic rabies disease (diseases and the general public on the importance of Zoonotic disease(s))

CHAPTER TWO

2.0 LITERATURE REVIEW

Rabies is one of the deadly zoonotic diseases responsible for more than 55, 000 deaths worldwide and more than 99% of all human deaths from rabies occur in the developing world (WHO, 1996). Although effective and economical control measures are available, rabies remains a neglected disease throughout most of these countries. A major factor in the low level of political commitment to rabies control is a lack of accurate data on the true public health impact of the disease.

Canine rabies can be eliminated, as has been demonstrated in North America, Western Europe, Japan and many areas in South America. During the last two decades, a significant reduction in human rabies associated with dog rabies has been achieved in Mexico, South America and the Caribbean by the programme for the elimination of canine rabies initiated and coordinated by the Pan American Health Organization/WHO Regional Office for the Americas. In contrast, over the past two decades rabies has been increasing in parts of sub- Saharan Africa and Asia, attributed to rapidly growing dog populations and increasing urbanization thereby leading to large proportion of free roaming dogs, density and mobility of human populations. However, canine rabies is still widespread, occurring in over 80 countries and territories, which are predominantly in the developing world. In more than 99% of all human rabies cases, the virus is transmitted from dogs; half of the global human population lives in canine rabies-endemic areas and is considered at risk of contracting rabies (WHO, 2005).

In general free roaming dogs are threats to the community because of their impacts to the society and livestock that include diseases transmitted to livestock and humans, predation on livestock,

bites, road traffic accidents, and nuisance behavior such as barking and soiling (Macpherson *et al.*, 2013; Jackman and Rowan, 2007). In the Eastern African countries looking dogs freely roaming on streets of urban areas and these free roaming dogs are believed to take the greater share of bites in humans and livestock. Several research outputs in different countries for the higher share of bites due to free roaming dogs; for instance in Samoa, 56% of bites occurred in a public place (Farnsworth *et al.*, 2012); in Bangalore (India), 64% of dog bites were associated with stray dogs (Sudarshan *et al.*, 2007). Rabies is one of the deadly zoonotic diseases that is of particular concern for humans and livestock and free roaming dogs are responsible for about 99% of cases or rabies transmission that lead to an estimated 55,000 human deaths every year and for the millions of people that receive post-exposure prophylaxis following a bite each year (Knobel, *et al.*, 2005). About 99% of rabies deaths occur in developing countries (WHO 2004); 56% in Asia and 44% in Africa.

On the other hand, there is an issue of welfare for the free-roaming dogs as they face high mortality, malnutrition, starvation, disease, and abuse (WHO 2004). Free-roaming dog populations suffer from extremely poor welfare. Because of the fear for rabies free-roaming dogs have high rates of mortality due to the inhumane killing process. However, WHO recommendations and other research findings conclude that population management of dogs through killing alone can't be an ultimate solution to control rabies. Moreover, Dogs receive little veterinary care in developing countries, which contributes to the spread of disease and high mortality among dogs.

Several methods to estimate dog population densities based on questionnaire surveys and capture/mark/re-observe studies are available. The combination of these two methods allows collection of accurate information on the whole dog population and subpopulations, defined in

terms of confinement levels or other parameters. Whereas density estimates based on simple capture/mark/re-observe studies using uniform marking (collars and dyes) are usually adequate in rural areas, more complex study designs involving differential or individual marking are recommended in urban and suburban areas in order to compensate for variations in re-observation probability. Questionnaire surveys conducted in the community can be useful where residents recognize the dogs present in their communities.

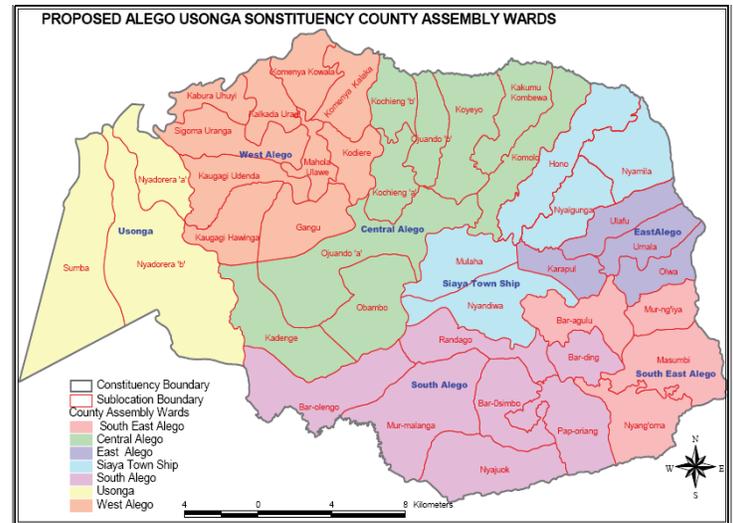
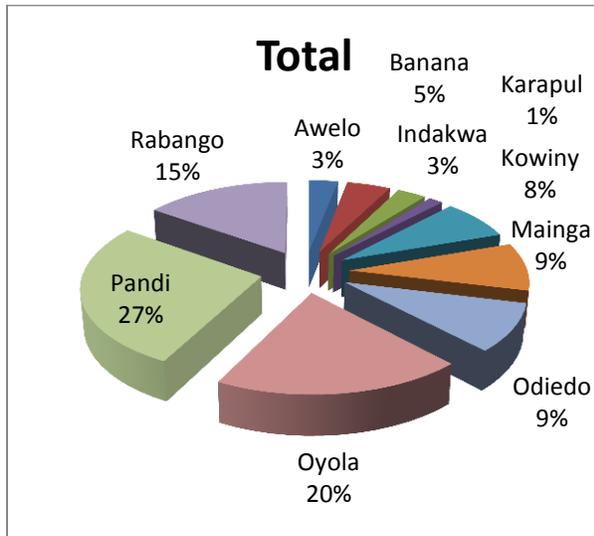
Three practical methods of dog population management are recognized: movement restriction, habitat control and reproduction control. Attempts to control dog populations through culling, without alteration of habitat and resource availability, have generally been unsuccessful. Since the 1960s, animal birth control (ABC) programmes coupled with rabies vaccination have been advocated as a method to control urban street male and female dog populations and ultimately human rabies in Asia. The rationale is to reduce the dog population turnover as well as the number of dogs susceptible to rabies and limit aspects of male dog behavior (such as dispersal and fighting) that facilitate the spread of rabies. Killing of dogs during these programmes may be counterproductive as sterilized, vaccinated dogs may be destroyed.

2.1 STUDY AREAS

KAP surveys were conducted across Siaya County in Siaya Township location of Alego Sub-county covering approximately 45.30 km², representing 0.005% of the country's land mass. These areas are inhabited by about 32,252 people (0.08% of the Kenyan population according to the 2010 national census. The 10 Villages were selected to cover Siaya County representative of

areas with different levels of rabies research and control efforts. The areas included the urban and rural areas. These areas were as seen in the table

Locations where Questionnaires were conducted



Map of Alego Constituency

In each study areas, Homesteads were selected randomly, assuming an average household size of 5.78 persons. Questionnaires were then administered to approximately 5% of households in each surveyed village (a total of 66 respondents) after being randomly selected from village households lists. A total of 3,172 dogs were counted and recorded across all study areas.

2.2 STUDY DESIGN

A questionnaire was designed to carry out a cross sectional survey on Knowledge, attitude and practices of people of Siaya County as well as to estimate the total dog. The questionnaire was

semi-structured with both open and closed-ended questions, and captured details of individual and household characteristics that were used to assess socioeconomic status and education levels.

Additional questions covered

- Knowledge of rabies, including a description of the disease, mode of transmission, outcome, range of species affected and means of prevention and control
- Attitudes and practices in relation to rabies prevention strategies and actions towards suspect rabid animals. Further questions were administered to respondents who owned dogs to assess attitudes and practices relevant to rabies control, including willingness to take part in Rabies eradication process in Siaya County.

Research personnel were accompanied by sub-village leaders to identify household heads. Questions were asked to household heads or other household members of at least 18 years of age in the absence of the household head. The questionnaire was conducted both in Local language (Luo), Kiswahili and in English

CHAPTER THREE

3.0 RESULTS

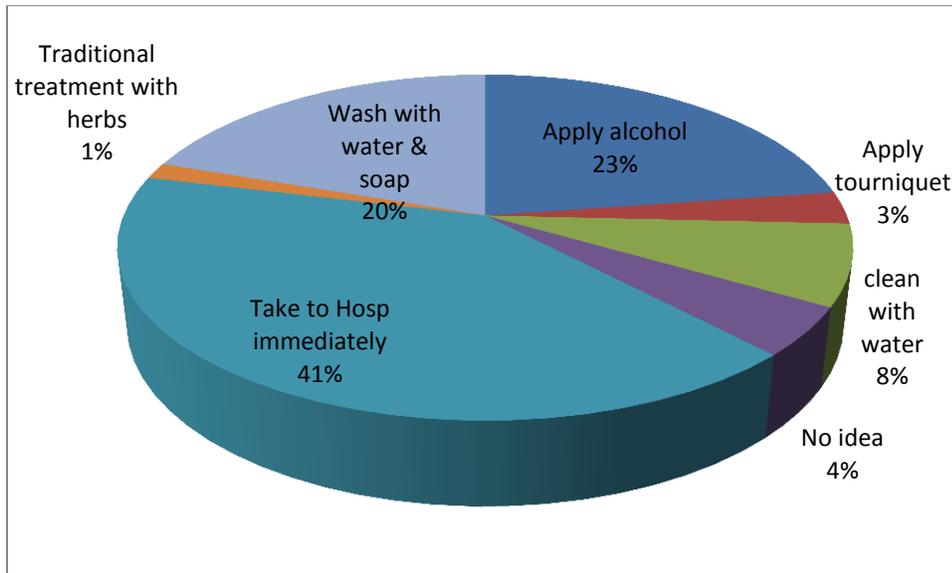
Results investigated knowledge, attitudes and practices related to rabies and its prevention and control amongst a cross-section of households by interviewing 66 respondents in urban and rural areas of Siaya Township in Alego Sub-county in Siaya County. Over 63% (42/66) of respondents owned domestic dogs (average of 2.67 dogs/household), more than 98% (65/66) had heard about rabies. This finding was in agreement with the report (99%) from Bahirdar, Ethiopia by *Tadesse et al* 2014. However, it was higher when compared with reported proportion 68.7% in survey of KAPS about animal bite and rabies in general community in India (*Ichhupujani et al*, 2006). They obtained information through schools, neighbours, and friends that accounted for 63% (42/66), followed by radio or Television 18% (12/66), health centers 12% (8/66) and veterinary services 11% (6/66). More than 63% (43/66) knew that rabies is transmitted through dog bites, about 16% (11/66) knew that it can be transmitted through infections and saliva; the other 18% (12/66) had no idea on what causes the rabies.

Most of the respondents had acquired educations at various levels. From the analysis, 14/66 had attained the primary educations, 33/66 (50%) had secondary educations, 14/66 of the respondents had acquired university education and finally, only 5/66 respondents did not attain any educations (Illiterate)

From the respondents, it was worth noted that the most affected animal by rabies was dogs. This was obtained from more than 60% of the respondents (40/66). Some also knew that cattle, cats, human beings and other wild animals are also affected by the disease. It was also noted that those who owned dogs were more likely to have a greater knowledge about rabies disease.

When asked about the first aid they could provide to the person or animal that had just been bitten by a dog suspected to be rabid, 41% of the respondents would take the victim immediately to hospital, 23% were aware of the prompt wound cleansing by applying alcohol after a bite, 20% would clean the wound area with water and soap. 8% would opt for cleaning the wound with water before taking the person to hospital. The other 7% had mixed reactions whereby 4% had no idea on what to do the victim, 3% would tie the region above the bitten site with a string (Tourniquet) before taking the victim to the hospitals and only one person said that he would use traditional methods to treat the patient. See the chart below

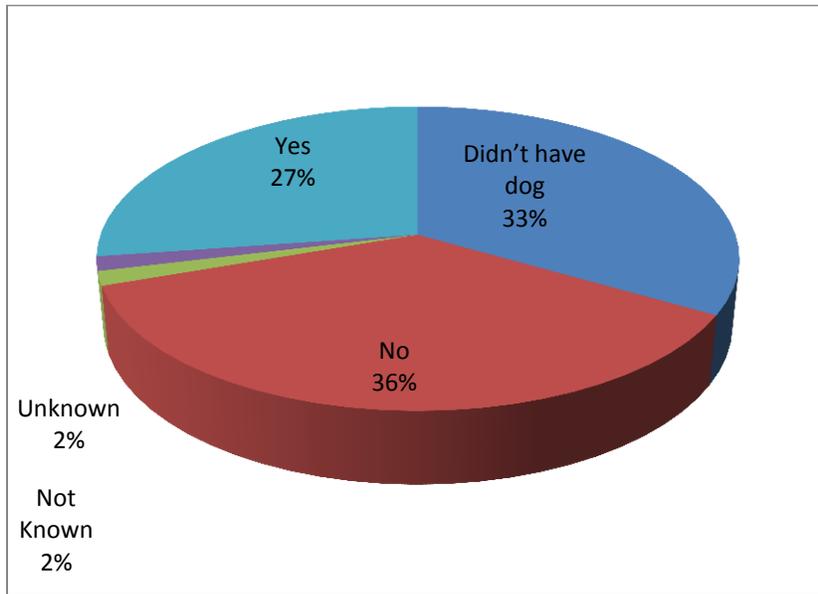
First Aid to the victims



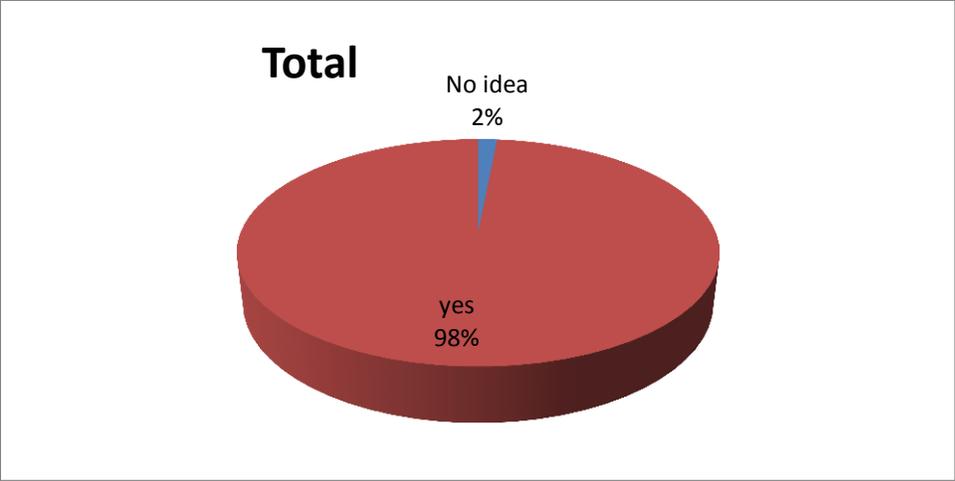
Although more than 52% (34/66) of the respondents knew that dog vaccination as a means to control rabies, only 27% had been vaccinating their dogs. This was as a result of low economic

status, those originating from areas with rabies interventions or those that had just recently purchased new dogs as well as those who were residing in the urban areas. See the tables

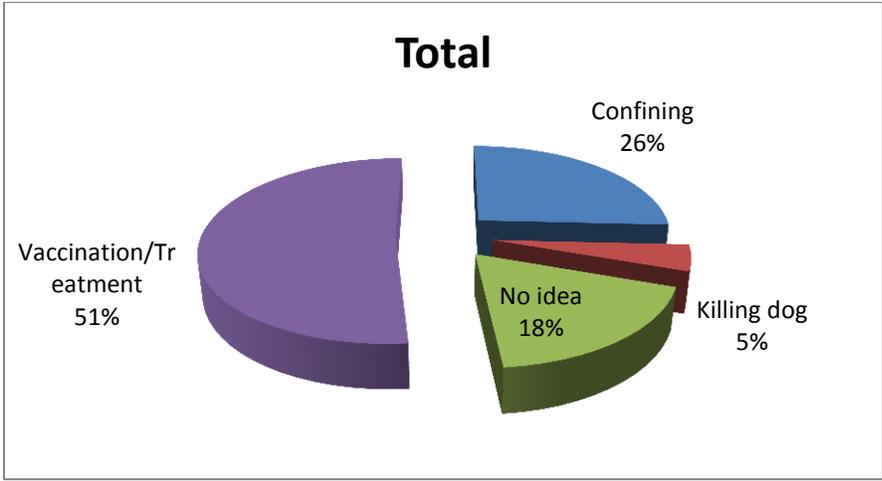
Those providing health care to their dogs



The majority of the dog-owning respondents were willing to take part in the rabies campaign and eradication process and that accounted for 98% (65/66). Only one person did not know what she could do in that case

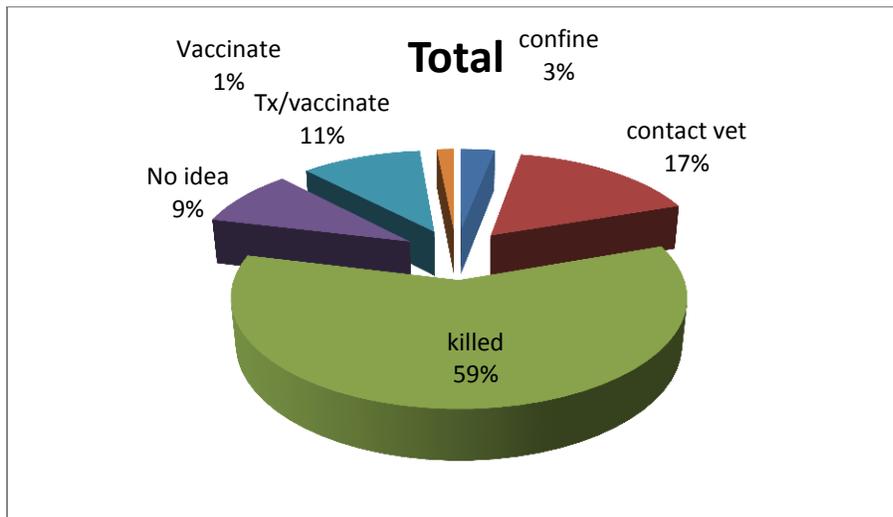


The main mechanism of prevention of the disease outbreak was through vaccination 52%, followed by confining the suspected dogs 26%, killing rabid dogs at 5%, those who did not have any idea was 18%. See the tables below

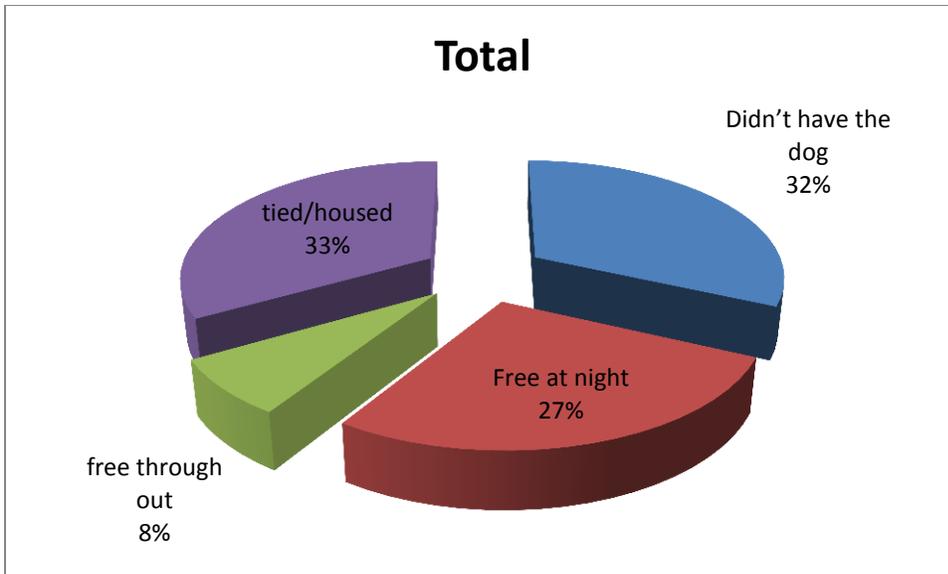


Management of dogs suspected to be rabid was mainly through killing 59% , those who would inform the Veterinary Officers in the area were at 17% , Treating or Vaccinating the animals

11% and finally through confining the dogs for at least 14 days/ those with no idea 9%. The chart is as follows.

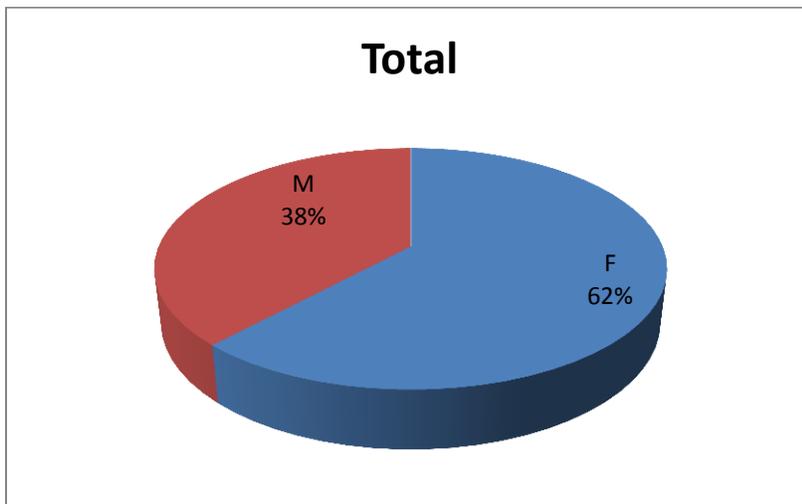


The information obtained from respondents about how they managed their dogs was 32% of the respondents housed their dogs in the kennels during the day but were freed at night up to 6 a.m; about 9% let their dogs loose throughout the days and nights. 33% did not have dogs. The tables are as follows

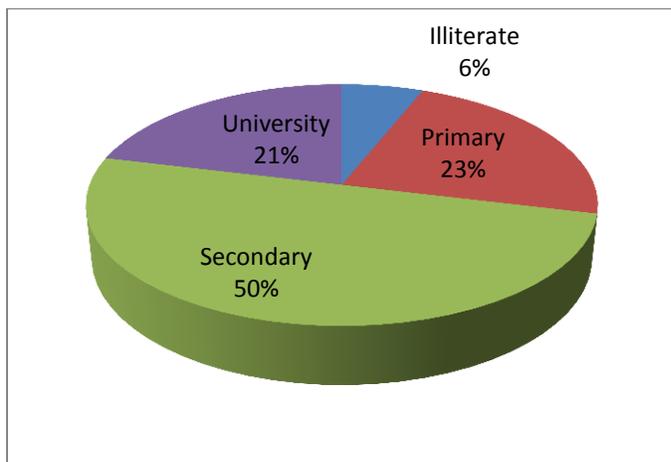


Household and individual characteristics including dog ownership

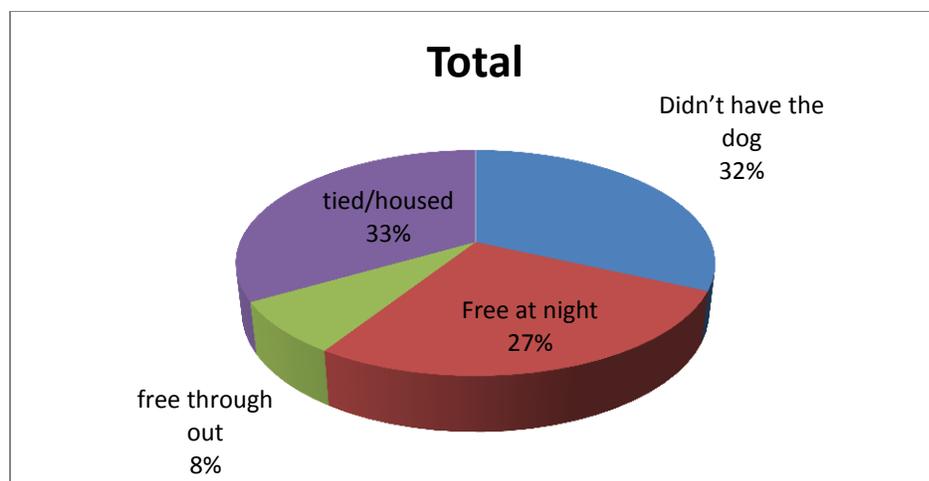
Of the 42 respondents who owned dogs, 62% were females with ages ranging from 18–45 (median 35) and 38% of the dog owners were males.



Most were from rural areas (68%) and the majorities were subsistence farmers or engaged in mixed farming practices systems (agro-pastoralists). Most respondents were household heads and were from areas with no rabies interventions or areas with recent interventions only. The majority (23%) had only attended primary school, with 50% having secondary, the other 21% had university education or higher education, whilst 6% had no formal education (Illiterate). Among the respondents without formal education, the majority were from rural. See the tables



Almost two-thirds of households in the survey (63%) owned domestic dogs, with 1–11 dogs per dog-owning household (average 2.67, standard deviation 2.7). Dogs were kept for security, for multiple purposes and hunting. Large portion of dog owners fed their dog at least one meal per day, while 33% of households housed their dogs in the kennels, 27% housed their dogs throughout the day but allowed their dogs to roam freely at night up to 6 a.m. in the morning, 8% neither tied their dogs nor housed them and 32% did not own dogs. Chart is as follows



3.1 KNOWLEDGE, ATTITUDE AND PRACTICES OF PEOPLE OF SIAYA

Levels of knowledge about rabies transmission, disease outcome, and prevention in humans and control in animal populations are detailed in the supporting information. In brief, the majority (98%=65/66) of respondents had heard about rabies. 65% knew that rabies was transmitted through bites by suspect rabid animals. While 70% knew that domestic dogs and humans can suffer from rabies, only 7% could name three or more types of animals capable of transmitting rabies. Although the majority of respondents (63%) knew that rabies is fatal following the onset of symptoms, a large percentage was unaware of the fatal nature of the disease. When knowledge of rabies prevention was investigated, 35% of respondents reported that they would expect anti-rabies vaccine at a hospital, 14% reported that they would expect other treatments (e.g. antibiotics, tetanus and pain relief), whereas the rest of the respondents (51%) reported that they would depend on physicians' advice. When asked about methods to control rabies in animals, the majority knew of dog vaccination (mentioned by 67% of respondents), but only 4% knew additional methods such as restraining dogs, and killing suspect animals.

3.2 Determinants of knowledge, attitudes and practices

Of 66 respondents, (37%) were classified as knowledgeable about rabies. Results indicated that rabies knowledge was greater among respondents

- 1) With more education,
- 2) In areas with long-term research interventions,
- 3) Originating from households that had experienced suspect rabid bites,
- 4) That were male
- 5) That owned dogs.

There were no significant correlations between any of the variables. Secondary education (and above) was associated with better practices for rabies.

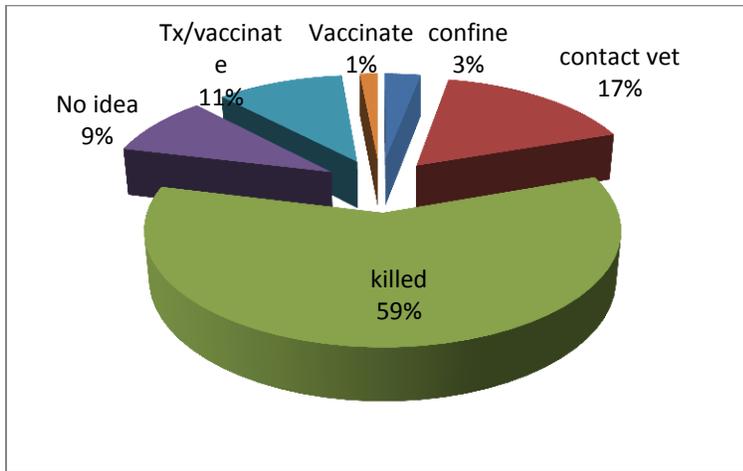
3.3 Health seeking behaviours

Following a suspect bite, about 54% of respondents reported that they would apply first aid measures before going to hospital. About 41% were not aware of wound cleaning: they claimed that they would report to hospital or to the village leader/police without cleaning the wound or would do nothing.

3.4 Community actions towards suspect rabid animals

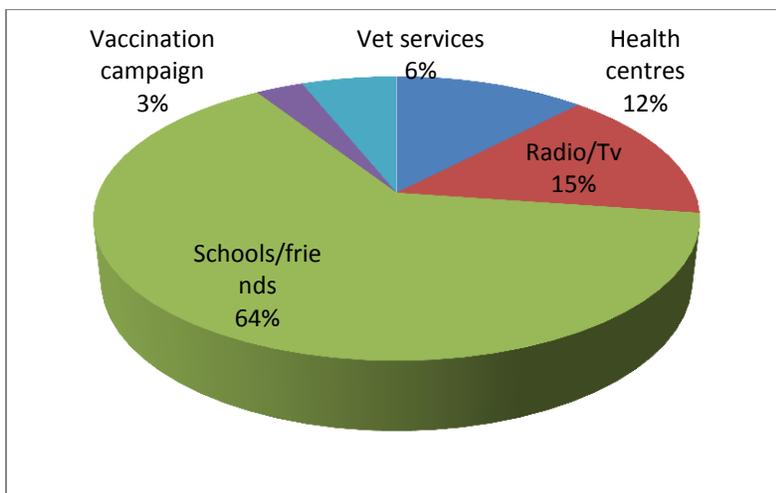
When asked about actions to be taken with regards to a suspect rabid animal, most respondents (59%) reported that they would kill the animal, whereas only 17% would report the incident to Veterinary office for further investigation. Moreover, only 8 respondents (<11%) would vaccinate the suspected dogs or treat of which this should not be the case. Some respondents

(3%) would confine the suspected dog for 14 days and part of that percentage (9%) had no idea on what to do and only 1% would vaccinate the dogs. The pie chart is as follows



3.5 Sources of information about rabies

The most common source of information about rabies was through personal contacts (school, neighbours and friends, 64%), while 15% of respondents received information from the media (television, radio and newspapers) and 3% from vaccination campaigns, 6% from veterinary services and 12% from health centers. See the chart



CHAPTER 4

4.0 DISCUSSION

Rabies remains an important public health problem in Kenya, where canine rabies is not controlled on a large scale, and the bite of an infected dog is the most common means of transmission. To my knowledge this is the first KAP study on rabies conducted in Siaya County, Alego Sub-county. The results revealed that 98% of the respondent knew about the rabies and this finding was in agreement with the report (99%) from Bahirdar, Ethiopia by *Tadesse et al, 2014*. However, it was higher when compared with the reported proportion 68.7% in survey of KAPS about animal bite and rabies in general community in India (*Ichhupujani et al, 2006*).

The majority (79%) of study participants were aware that rabies is transmitted through bites from infected dogs and through contact with the saliva of an infected dog. This was inconsistent with the findings of *Tadesse et al, 2014* who reported that 45% of the respondent knew that bite as main mode of transmission. Many showed an understanding of the need to seek medical attention following a dog bite and to vaccinate dogs against rabies. But overall there was a lack of comprehensive knowledge about rabies and its prevention, such as the importance of wound washing, the risk of rabies transmission from species other than dogs, and, amongst dog-owners, the need to vaccinate their dogs against rabies. Furthermore, poor awareness about the fatal nature of rabies and how it can be prevented in humans (wound cleaning and seeking medical care for PEP) suggests that human deaths are likely occur due to a lack of knowledge.

Dogs were mentioned as the most frequent cause of infection for the most fatal human rabies cases by 84% of the respondent. In addition, rabies in other domestic animals cattle, sheep, goats

and equines were also mentioned as risk for human. These findings were also reported by *Eshetu et al 2002*. Domestic dogs have been reservoir of rabies and a source of rabies infection to humans and other animals, (*John, 2005, Joo et al, 2011*). In many parts of the world especially in Africa and Asia, 85-95% of human rabies cases were being caused by dog bite (*Tang et al, 2005, Fitzpatrick et al, 2012*)

A critical component of PEP is immediate washing of the bite wound with water and soap before hospital presentation. Our results showed that most respondents were unaware of this preventive practice. Lack of wound washing has been shown to be responsible for a five-fold increase in the risk of developing rabies. Improved awareness on wound management (especially prompt flushing with any liquid available) could therefore have considerable impacts on reducing the probability of developing rabies in these communities.

Mass dog vaccination is the most effective measure to control rabies and prevent human deaths. While the majority of respondents knew of the need for dog vaccination, and were willing to vaccinate their dogs, only 46% reported to have previously vaccinated their animals, which reflects a lack of rabies control programmes. Indeed, most respondents reported that dog vaccinations in Siaya are not regularly conducted. However, ‘responsibility’ among dog owners has been clearly demonstrated in this study by the fact that most owners feed their dog, reported a willingness to take part in the rabies eradication activities.

Study showed that there is generally poor communication between communities and the veterinary sector regarding rabies events in a village. In most cases, respondents reported that they would be prepared to kill suspect rabid animals (59%) but would not report to veterinary livestock offices. This makes it difficult for veterinary services to appreciate the scale of the problem and take appropriate steps to prevent further transmission. Awareness messages should focus on informing people that offending animals should be reported to livestock offices. My

study demonstrates that Alego communities have a sufficient understanding of the presentation of rabies such that community participation in reporting rabies cases would be an important entry point for strengthening rabies surveillance in Siaya County and other rabies-endemic areas.

Traditional method of treatment was mentioned as a means of treatment for the victims of dog bites (3%) as well as application of cheese on the bitten site and allows the suspected dog to leak the site. This occurred mostly in rural areas of Siaya and to those with low education level. The practice of traditional treatment was also explained by *Deressa et al 2010*, *Wudu et al 2013*, and *Abraham et al 2013*.

Conclusion and recommendations

Most respondents showed low levels of knowledge about key aspects of rabies and its control and prevention, which should be addressed by key stakeholders. Awareness-raising campaigns focusing on information about the risks associated with rabies and correct behaviour to prevent these risks could prevent unnecessary deaths. Simple messages such as “vaccinate your dogs and cats against rabies”, “immediately wash your wound with water and soap and seek anti-rabies vaccination after a bite from a rabid animal”, “all mammals suffer from rabies”, and “bury or burn carcasses of dead rabid animals”, channeled through government and community networks, could go a long way toward improving community practices.

From my research, I managed to identify important knowledge gaps related to, and factors influencing the prevention and control of rabies in Siaya County. Increasing knowledge regarding wound washing, seeking post-exposure prophylaxis and the need to vaccinate dogs are likely to result in more effective prevention of rabies; however, greater engagement of the veterinary and medical sectors is also needed to ensure the availability of preventative service

REFERENCE

- Campbell, James B.; Charlton, K.M. (1988). *Developments in Veterinary Virology: Rabies*.
- Dunlop, Robert H; Williams, David J (1996). *Veterinary Medicine: An Illustrated History*.
- Ettinger, Stephen J; Feldman, Edward C (1995). *Textbook of Veterinary Internal Medicine* (4th ed.). W.B. Saunders Company.
- Hughes, J. and Macdonald, D.W. (2013): A review of the interactions between free-roaming domestic dogs and wildlife. *BiolConserv*, **157**: 341–51.
- Jackman, J. and Rowan, A. (2007): Free-roaming dogs in developing countries: the public health and animal welfare benefits of capture, neuter, and return programs. In: Salem D, Rowan A, editors. *State of the animals*. Washington DC: Humane Society Press, p. 55–78.
- Kato, M., H. Yamamoto, Y. Inukai, and S. Kira. (2003): Survey of the stray dog population and the health education program on the prevention of dog bites and dog-acquired infections: A comparative study in Nepal and Okayama Prefecture, Japan. *ActaMedica Okayama* **57**(5): 261–266.
- Knobel, D.L., Cleaveland, S., Coleman, P.G., Fevre, E.M., Meltzer, M.I., Miranda, M.E.G., Shaw, A., Zinsstag, J. and Meslin, F.-X. (2005): Re-evaluating the burden of rabies in Africa and Asia. *Bulletin of the World Health Organization*, **83**: 360–368.
- Macpherson, C.N.L., Meslin, F.X. and Wandeler, A.I. (2013): *Dogs, zoonoses and public health*, Second edition. Wallingford, UK: CABI International

- Morters, M.K., McKinley, T.G., Restif, O., Conlan, J.K., Cleaveland, S., Hampson, K., Whay, H.R., Damriyasa, M. and Wood, J.L.N. (2014): The demography of free-roaming dog populations and applications to disease and population control. *Journal of Applied Ecology*, doi: 10.1111/1365-2664.12279
- One Health (2013): Rabies and Other Disease Risks from Free-roaming Dogs, A proceeding of the workshop, Paris, November 5th – 6th, 2013
- Orihuela, T.A., and V.J. Solano. (1995): Demographics of the owned dog population in Miacatlan, Morelos, Mexico. *Anthrozoös*8(3): 171–175.
- *The Merck manual of Medical Information. Second Home Edition*, (2003), p. 484.

APPENDICES

QUESTIONNAIRE SURVEY ON THE ASSESSMENT OF THE COMMUNITY'S KNOWLEDGE, ATTITUDE AND PRACTICE OF SIAYA COUNTY

Code: Date of interview...../...../2015

Please fully fill the following information with a great responsibility for good results

Socio-demographic characteristics of respondents in the sample population

Name: (Optional)

Address: (Optional)

Gender: **A) Male** **B) Female**

Age: **A) 15-19** **B) 20-29** **C) 30-39** **D) 40-49** **E) >60**

Marital status: **A) Single** **B) Married**

Educational Status: **A) Primary** **B) Secondary** **C) University** **D) Illiterate**

Occupation:

Religion: **A) Orthodox** **B) Muslim** **C) Catholic** **D) Protestant**

Specific Questions related to knowledge, attitude and practice of the community on the rabies incidence and human exposure

- 1. Do you care of or have any animals at home? Yes..... No.....
- 2. How many? Cattle..... Sheep..... Goat..... Equine..... Dog..... Cat..... Other.....
- 3. What value do you attach to each group of animals you keep?

-
- 4. If you have a dog at your home, for what purpose do you keep it
- 5. Guard the home..... Hunting..... Home pet..... Other.....
- 6. How does the keeping of dogs improve your life and that of the family?
-
- 7. What are the main diseases of concern in dogs in your home area?

-
- 8. Are any of these diseases transmissible from dogs to people? Yes..... No.....

If yes, give examples.....

- 9. Have you heard about the disease rabies? Yes..... No.....
- 10. If your answer is yes, what is your source of information **A) Media** School, friends, neighbours

B) Vaccination campaigns C) Vet services, D) Health centers

What animals does it commonly affect? (Please list)

.....
.....

11. Where do you think these animals get the disease and how?

.....
.....

12. How do you prevent the disease from infecting your animals?

13. What signs do you use to tell that an animal could be having rabies?

.....
.....

14. What do you do with an animal that you suspect could be having rabies?

15. How do you think the rabies is passed from animals to people?

.....
.....

16. If a person or an animal is bitten by an animal suspected to be rabid, what would be your first line of action at home level?

A) Wound wash with water B) Wound wash with water and soap C) Apply Alcohol

D) Apply irritant like lemon E) Traditional treatment

17. How do you manage your dogs? **A) Tied/Housed B) Not tied but not allowed to leave out of the home compound C) Freely moving to surrounding nearby areas Other**

18. Do you provide your animal with health care? Yes..... No.....

19. Do you think that rabid animals are effectively treated by traditional medications? Yes..... No.....

If yes, how, by whom and with what?

20. Have there been reports of animals or humans being bitten by suspected rabid dogs recently? Yes.... No...

If yes, where is locality? Or how many people/ animals were bitten?

.....
.....

21. Was the dog owned or stray?

.....

22. What is your opinion about the free roaming dogs/stray ones?

.....

23. Would you participate in a rabies controlling program? Yes..... No.....