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Assessment of Knowledge, Attitude and Practices About Rabies Prevention and Associated Factors in Wolaita Sodo City, Southern Ethiopia

Tekalign Woldehana Uro (DVM, MPH)
Livestock and Fisheries Resource Department, Wolaita Sodo, Ethiopia
Tel: +251912059625
Email: Tekalignnahom@gmail.com

Amene Abebe (PhD, Associate Professor)
Wolaita Sodo Univeresity,Wolaita Sodo, Ethiopia
TELL: +251911050812
Email: Ameneabebe@gmail.com

Abstract
Background: Rabies is a fatal viral zoonotic disease which causes encephalitis in many warm-blooded animals and humans. It is an incurable disease once the clinical signs appear. However, it can be prevented via vaccination and community awareness. This study was therefore designed to assess knowledge, attitude and practices about rabies prevention and associated factors in Wolaita Sodo city, Southern Ethiopia.
Methods: A community based cross-sectional study was conducted from May to June 2022. Multi-stage sampling technique was employed for selection of sample unit and data were collected from 423 households by face-to-face interview using structured questionnaire. Data were entered to Microsoft Excel and coded, cleaned and analyzed using SPSS version 20 software. The frequency distribution of both dependent and independent variables were worked out by using descriptive statistics technique (frequency, mean, SD and percentage). Association between independent variables and KAP scores on rabies was calculated using Pearson's Chi square. Variables having $p<0.05$ was considered as statistically significant.
Results: Out of 423 respondents interviewed, 256(60.5%) were males and 167(39.5%) females. The majority of the respondents 145(34.3%) were diploma and above on educational status. Almost all of the respondents indicated that they had previously heard about rabies. Out of 423 interviewed respondants 228(53.9%) had good level of KAP on rabies. There was strong association between KAP scores and sex ($\chi2=40.811$, $p<0.05$); age ($\chi2=82.917$, $p<0.05$); educational level ($\chi2=241.782$, $p<0.05$); occupation ($\chi2=276.558$, $p<0.05$); household size ($\chi2=49.176$, $p<0.05$) and dog ownership ($\chi2=143.619$, $p<0.05$).
Conclusion: Generally, these findings indicate that the Wolaita Sodo city community has good KAP score about rabies. However, raising the community awareness through continuous education, increase knowledge regarding wound washing, seeking post exposure prophylaxis and the need to vaccinate dogs, provision of pre and post exposure vaccines and creating rapid means of communications are suggested. Thus, close collaboration of public health, veterinary sector and local authorities is a key element for preventing this fatal incurable disease.
Keywords: Attitude, Knowledge, Practice, Prevention Rabies and sodo city.
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1. INTRODUCTION

1.1 Background

The World Health Organization (WHO) define Zoonotic diseases are any diseases naturally transmissible from vertebrate animals to humans or from humans to vertebrate animals (1). Zoonotic diseases are widely distributed through the world. More than 75% of emerging infectious diseases and 60% of known human infectious diseases are transmitted from animals (2). Common Zoonotic diseases with major significance of public healthin the world are Rabies, Anthrax, Tuberculosis, Taeniasis, Hydatiosis and Brucellosis. Among these zoonoses, rabies is of utmost public health significance due to its lethality (3).

Rabies is worldwide distributed deadly zoonotic diseases caused by lyssa virus of family Rhabdoviridea. It is disease that affects all warm-blooded animals, is prevalent in many regions of the world. Source of Rabies are dogs, cats, fox, bats and other carnivore in the world in different continents (4-6). Globally, rabies causes more than 61,000 human deaths and around 15 million dog bite victims receive post exposure prophylaxis every year. Asia and Africa are the countries where more than 95% of the rabies mediated human deaths occur and 43% of the death occurred in Africa. Estimates of human mortality due to endemic canine rabies in Asia and Africa annually exceed 31,000 and 24,000 respectively (7). In Ethiopia, rabies is an endemic disease with a high incidence rate that has been diagnosed from various species of domestic and wild animals. However, available

evidences suggest that domestic dogs are the main reservoir and responsible species for human cases in Ethiopia. It is known to cause large number of deaths in humans and animals in Ethiopia (8).

Human Rabies encephalitis is 100% fatal, it is also 100% preventable if post exposure prophylaxis (PEP) is taken timely and effectively by the exposed victims. Exposure to rabid animal can be eliminated at source through sustained mass vaccination of reservoir populations(9). Public awareness and an increase of knowledge about rabies disease, first aid measures after dog bites, increased knowledge about dog behavior and how to avoid getting bitten by dogs are suggested methods to prevent rabies in humans (10). Although rabies is primarily a disease of dogs in Ethiopia, particularly in Wolaita Sodo city, no adequate research has been done to address the knowledge gap on the disease through assessing the knowledge, attitude and practice of the community toward the disease.

The available information on rabies in Ethiopia is largely based on passive reports to Ethiopian Health and Nutrition Research Institute Zoonoses laboratory, the only rabies diagnostic laboratory in the country. There is lack of accurate quantitative information on rabies both in humans and animals to understand the epidemiology of rabies disease (6). The limited diagnostic facility, poor surveillance protocol, unavailability of vaccine and post-exposure treatment, an increasing stray dog population, low level of public awareness, poor attention and resource allocation by the government are major significant factors that hinder the control of rabies in Ethiopia (11).

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. For example, in Thailand a KAP study demonstrated the influence that increasing community knowledge on the control and prevention of dengue had on improving practices for its prevention (12). Other applications of KAP surveys include identifying knowledge gaps, cultural beliefs and behaviour patterns that may pose barriers to controlling infectious diseases, designing relevant public health awareness campaigns, and provision of baseline data for planning, implementation and evaluation of national control programmes. In Swaziland, for instance, KAP surveys were used to investigate local communities' understanding of malaria transmission, recognition of symptoms, perceptions of causes, treatment-seeking patterns, and preventive measures and practices in order to provide baseline data for a national malaria control programme. KAP surveys have applied to study rabies in order to generate baseline data. This baseline data is essential in tracing major loops in knowledge, awareness, and practices related with rabies for its control and prevention (13).

1.2 Statement of the problems

Controlling and preventing rabies in dogs is crucial to preventing the disease in humans. Showcase initiatives have demonstrated that the elimination of canine rabies from Asia and Africa are epidemiologically and practically feasible, through mass vaccination and enforcement of responsible dog ownership. However, even though the tools are available, a number of obstacles prevent a coordinated approach to the global elimination of canine rabies, including: a lack of awareness and education of the public health and veterinary sectors; the absence of diagnostic facilities; inadequate surveillance and reporting systems; limited access to modern vaccines; and failures of responsible dog ownership. The lack of effective control of canine rabies in developing countries is often attributed to low prioritization, epidemiological and operational constraints and insufficient financial resources (12). Because effective rabies control and prevention programs require reliable information on disease occurrence, they should be guided by modern epidemiological insights and driven by laboratory-based surveillance. Improved local diagnostic capacity is essential to achieve adequate canine vaccination coverage and to assess the impact of control and elimination efforts. Since these factors are interlinked, the implementation of one will positively enhance the others (14, 15).

Poor public awareness towards rabies is considered as one of the bottlenecks for the prevention and control of the disease in Ethiopia. Understanding communities' knowledge, attitude, and practice is crucial to plan and implement appropriate control and prevention measures. Hence, Knowledge, Attitude and Practice surveys of community have been undertaken in Ethiopia mainly in and around urban areas (16).

The magnitude of the problem is higher in Wolaita sodo city linked with the presence of a large population of stray dogs and associated factors. However, a community-based KAP study on rabies hasn't been carried out in Wolaita sodo city.Therefore, this study will be designed to assess Knowledge, Attitude and Practices (KAP) about rabies prevention and associated factors in Wolaita Sodo city, Southern Ethiopia.

1.3 Significance of the study

There is increasing research interest on the magnitude of factors associated with knowledge, attitude and practices aboutrabies globally, nationally and in the study area.This study uses as new knowledge generation about rabiesprevention practices. The findings of this study would be used by community of Wolaita Sodo city and also serve as a base line data for future researchers. The study result would be base for the next studies and

its associated factors by serving as source of information.

2. LITERATURE REVIEW

2.1 Etiology

The rabies virus is classified as a Rhabdovirus belonging to the Family Rhabdoviridae, genus Lyssavirus which is rod or bullet-shaped ultra-structurally(Rhabdos=rod in Greek), and composed of a single stranded RNA (ribonucleic acid) genome and 11-15 kb in size. The virus has a diameter of 75nm and length of 100-300nm at the center, extending along the longitudinal axis, is the helical ribonucleocapsid (the RNP core), which consists of the helical RNA and protein. It is surrounded by a lipid-protein membrane. Chemically, the virus is composed of RNA (2-3%), protein (67-74%), lipid (20-26%) and carbohydrate (3%) (17, 18).

2.2 Mode of transmission

The transmission of rabies virus to human or animal occurs through a close contact (bite, scraching, licking) with the saliva of a rabid animal. It is a high socio-economic impact zoonotic disease, mostly in Asia and Africa (19). Most common way of transmission for rabies (90%) is bite of infected animals like dogs, because of their intimate association with human being. Most of the nations in the world, particularly in Asia and Africa, dog bite is responsible for 85%–95% of rabies cases in human, which is generally occurs to the victims in the form of physical and emotional trauma. Usually Rabies virus gains entry into the body via the wounds or cuts, not through the intact skin. So, spread needs deposition of Rabies virus from the saliva or infected neural tissue into the bite wounds, open cuts in the skin and mucous membranes (20-22). The risk of rabies infection by bite is 5%–80%, which is approximately 50 times more than by a licks or scratches, occurrence of which is 0.1%–1%. Mortality in RABV infection depends on the severity of infection, anatomical location of the bite wound, sufficient amount of virus in the saliva and viral load can influence the incubation period of rabies, which may vary for day to several years (4).

2.3 Clinical signs

After a rabies exposure, the rabies virus has to travel to the brain before it can cause symptoms. This time between exposure and appearance of symptoms is the incubation period. It may last for weeks to months. The incubation period may vary based on the location of the exposure site (how far away it is from the brain), the type of rabies virus, and any existing immunity (23, 24).

The first symptoms of rabies may be similar to the flu, including weakness or discomfort, fever, or headache. There also may be discomfort, prickling, or an itching sensation at the site of the bite. These symptoms may last for days.Symptoms then progress to cerebral dysfunction, anxiety, confusion, and agitation (25). As the disease progresses, the person may experience delirium, abnormal behavior, hallucinations, hydrophobia (fear of water), and insomnia. The acute period of disease typically ends after 2 to 10 days. Once clinical signs of rabies appear, the disease is nearly always fatal, and treatment is typically supportive. The signs, symptoms, and outcome of rabies in animals can vary. Symptoms in animals are often similar to those in humans. These include early nonspecific symptoms, acute neurologic symptoms, and ultimately death (26-28).

2.4 Diagnostic tests

Diagnosis of rabies can be carried out by mouse inoculation, cell cultures, serological tests, electron microscopy, histological examinations, molecular methods and immuno-histochemistry. The most commonly used and the gold-standard diagnostic test is the fluorescent antibody test, which detects the virus antigens in brain samples using fluorescent labeled anti- rabies virus antibodies (29, 30).

A diagnosis of rabies in animals can be made after detection of rabies virus from any part of the affected brain, but in order to rule out rabies, the test must include tissue from at least two locations in the brain, preferably the brain stem and cerebellum. The test requires that the animal be euthanized. The test itself takes about 2 hours, but it takes time to remove the brain samples from an animal suspected of having rabies and to ship these samples to a state public health or veterinary diagnostic laboratory for diagnosis (31, 32).

Several tests are necessary to diagnose rabies ante-mortem (before death) in humans; no single test is sufficient. Tests are performed on samples of saliva, serum, spinal fluid, and skin biopsies of hair follicles at the nape of the neck. Saliva can be tested by virus isolation or reverse transcription followed by polymerase chain reaction (RT-PCR). Serum and spinal fluid are tested for antibodies to rabies virus. Skin biopsy specimens are examined for rabies antigen in the cutaneous nerves at the base of hair follicles (33).

2.5 Prevention and control

Prevention and control of rabies virus throughquarantine measures, elimination of stray dogs, registration of dogs, mass dog vaccination to control disease at its source, awareness of rabies and the need to seek treatment if exposed, timely post-exposure prophylaxis (PEP) for people potentially exposed to rabies and pre-exposure

prophylaxis (PrEP) for those at high risk of rabies virus exposure (9, 34, 35).

Post-exposure prophylaxis (PEP) is administered after a potential exposure to rabies virus, and consists of rigorous wound washing, a series of rabies vaccination, and sometimes administration of rabies immunoglobulin (RIG). RIG can be derived from equine (eRIG), human (hRIG), or monoclonal antibody (mAb) sources(36, 37). Pre-exposure prophylaxis (PrEP) consists of a series of rabies vaccination administered prior to a potential exposure. pre-exposure prophylaxis (PrEP) is recommended for individuals at high risk of rabies exposure, such as those at occupational risk, sub-populations in highly endemic settings who lack access to timely and adequate PEP, and travellers who may be at high risk of exposure. Although PEP and PrEP can be administered intramuscularly (IM) or intradermally (ID), ID vaccination is both dose and cost sparing. Modern purified cell-culture and embryonated egg-based rabies vaccines are highly immunogenic, effective, and safe to use in people of all ages (38, 39).

2.6 Treatment

There is no effective treatment once the symptoms develop. Vaccines, antiviral drugs such as ribavirin, interferon-alpha, passively administered anti-rabies virus antibodies (human immunoglobulin or monoclonal antibodies), ketamine and/or the induction of a coma have been tried in the past, but were usually ineffective. Treatment is often palliative, and there is a very high probability of an unsuccessful outcome. One patient who recovered well was treated with ribavirin and supportive care including the induction of a therapeutic coma; however, the same treatment protocol has been unsuccessful in other patients. If treatment is successful in sustaining life, there may be permanent and possibly severe neurologic defects (40-42).

2.7 Conceptual framework

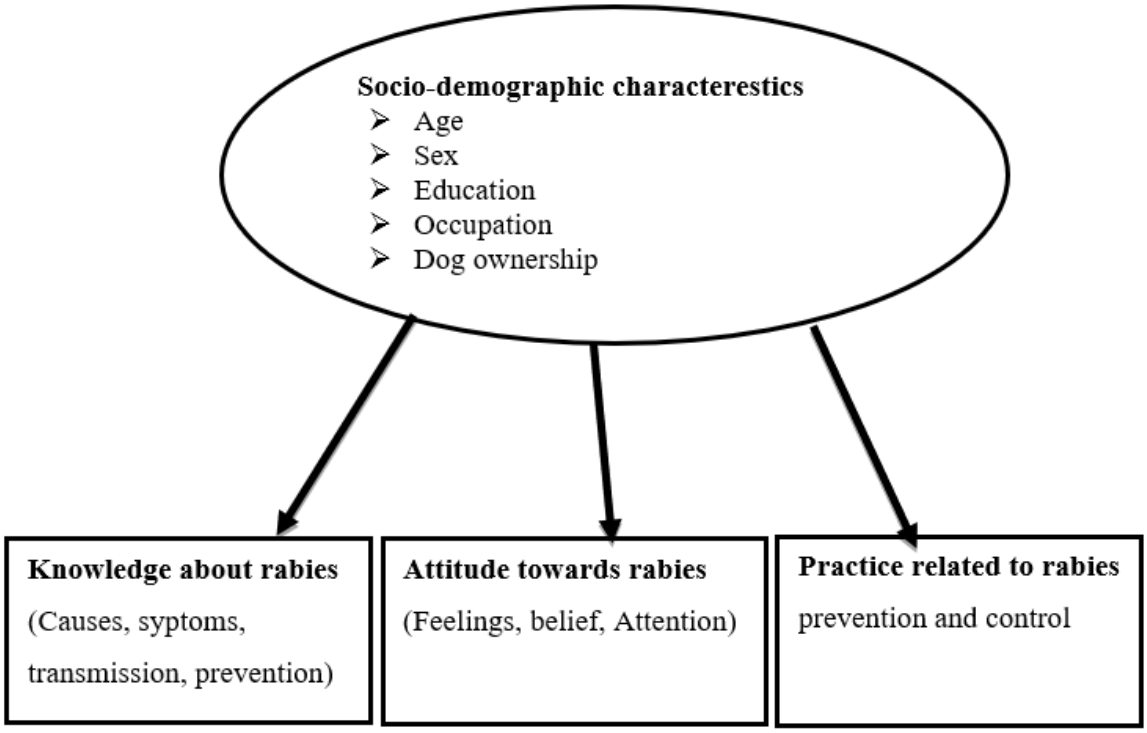

Figure 1: Conceptual framework relationship between socio-demographic and KAP of rabies

3. OBJECTIVES OF THE STUDY

General objective

- To assess knowledge, attitude and practices about rabies preventionand associated factors in Wolaita Sodo city, Southern Ethiopia.

Specific objectives

- To determine the prevalenceof KAP on rabies prevention in Wolaita Sodo city, Southern Ethiopia.
- To identify factors associated with KAP of rabies in Wolaita Sodo city, Southern Ethiopia.

4. METHODS AND MATERIALS

4.1 Description of the study area and the study period

The study was conducted from May to June, 2022 to assess knowledge, attitude and practices about rabies and associated factors in Wolaita sodo city, Southern Ethiopia. Wolaita Sodo city is administrative central of the Wolaita Zone, Southern Ethiopia. The town surrounded by the East and North-East by damot woyede and Damot Galle Districts, in the South by Humbo and Offa Districts, in the West, Northwest, and South west by KindoKoyisha, Boloso Sore, and Offa Districts, respectively. It has latitude and longitudes $6^0$54'N $37^0$45'E with elevation between 1,600 and 2,100 meters (5,200 and 6,900 feet) above sea level. Agro-ecologically characterized as woyna dega (Midland-87%) and Dega (Highland-13%). It is located at 327kms (Kilometers), far from Addis Ababa, the capital city of Ethiopia, and 160kms from Hawassa, the regional capital city (43, 44). Based on the last 2018 population projection by CSA, this town has total population of 254,294 of whom 125,855 were men and 128,439 are women (45).

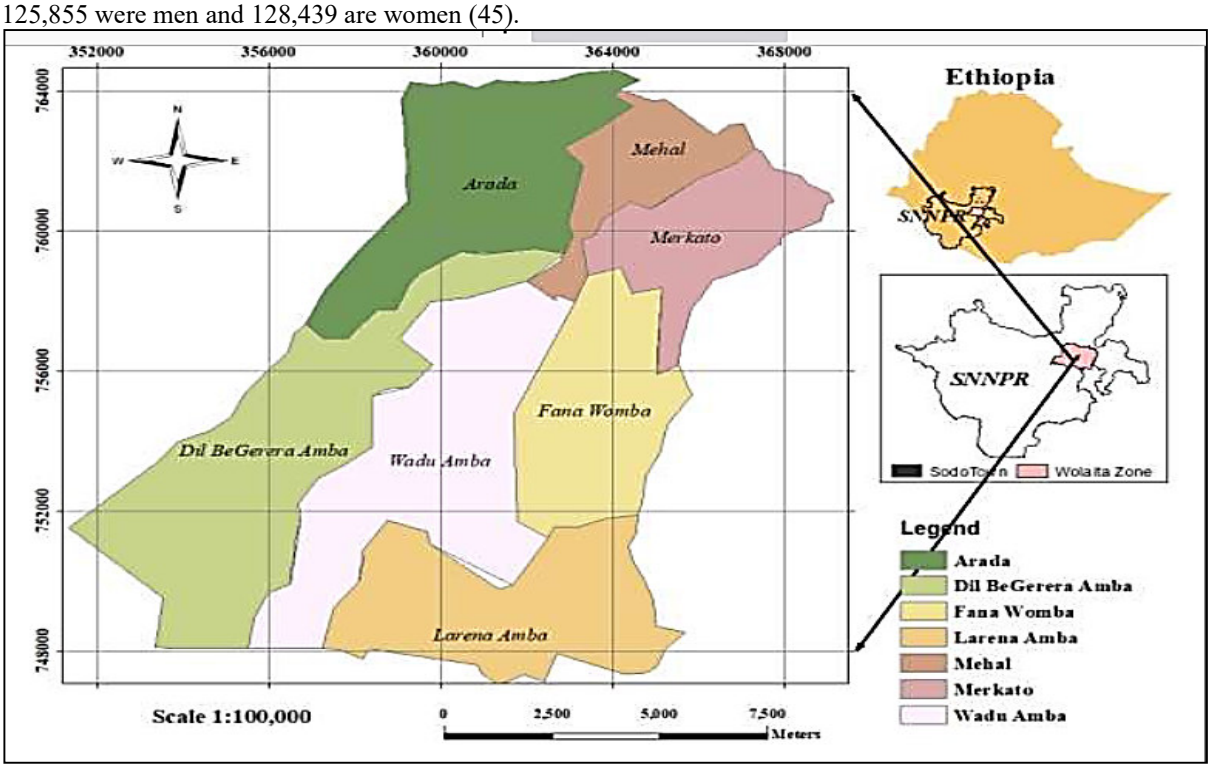

Figure 2: Location map of the study area (Source: Sodo Town Municipality, 2020)

4.2 Study Design

A community based cross-sectional study was conducted from May to June, 2022 in Wolaita Sodo city, Southern Ethiopia.

4.3 Population

4.3.1 Source population

All community who live in Wolaita Sodo city were the source population for this study.

4.3.2 Study population

The study population was community who live in randomly selected subcities of Wolaita Sodocityas permanent residents for more than six months.

4.4 Inclusion and exclusion creteria

4.4.1 Inclusion criteria

All selected households in Wolaita Sodo citywas lived in the study area for more than six months before the commencement of this study, age above 18 years, volunteered to participate in the study and gave consent and assent are included.

4.4.2 Exclusion criteria

Attendants aged below 18 years, lived less than six years, respondents who were unabled or refused to respond to the questionnaire and with any social and physical condition that were limited the ability to participate in the study during data collection was excluded from the study.

4.5 Sample size and sampling technique

4.5.1 Sample size

The sample size was calculated using the single population proportion formula (46) that is:

$$n = \frac{1.96^2 \times P_{exp}(1-P_{exp})}{d^2}$$

$$n = \frac{1.96^2 \times 0.5(1-0.5)}{0.05^2}$$

$$n = 384$$

Where,

n=required sample size

P_{exp}=expected proportion of population knowing about Rabies are 50%

d^2=desired absolute precision (0.05), As a result, 384 study populations will be selected.

This was by considering the following assumptions: there was no previous study on knowledge, attitude and practices towards rabies prevention and associated factors in Wolaita sodo city, Southern Ethiopia. The sample size was calculated by considering the assumptions of 50% prevalence, 95% confidence interval (Z=1.96) and 5% margin of error (d=0.05).As a result, 384 study population were selected, 10% non response rate and total sample size was 423 subjects.

4.5.2.Sampling technique

A multi-stage sampling technique was employed for the selection of the sampling units. Wolaita Sodo city had seven subcities namely Arada, Merkato, Mehel, Wadu, Dile begerera Amba, Larena Amba and Fana Womba. Among the seven sub cities, two were selected using the simple random sampling technique (lottery method), namely Arada (with six kebelles) and Merkato (with five kebelles). Two kebelles for each sub city (total four kebelles) were selected for the study by lottery method. The selected kebelles were Kidane Mihrat and Selam from Arada sub city and Golla and Mehal Gabeya from Merkato sub city. Therefore, the total sample size was proportionally allocated to the four kebelles based on six months living in the kebeles. Therefore, the study participants were households. List of the households or each kebelles were found from the respective subcity administrative. Then, the household in the selected kebeles was further selected using a systematic random sampling technique. Finally, from all the eligible respondents in a household, only one was selected randomly for the interview. To reduce the risk of households locked, we prefer mostly Sunday, which is a religiously respected day and people stay at home. In case, a selected household was not found at home, a second visit was made by appointment.

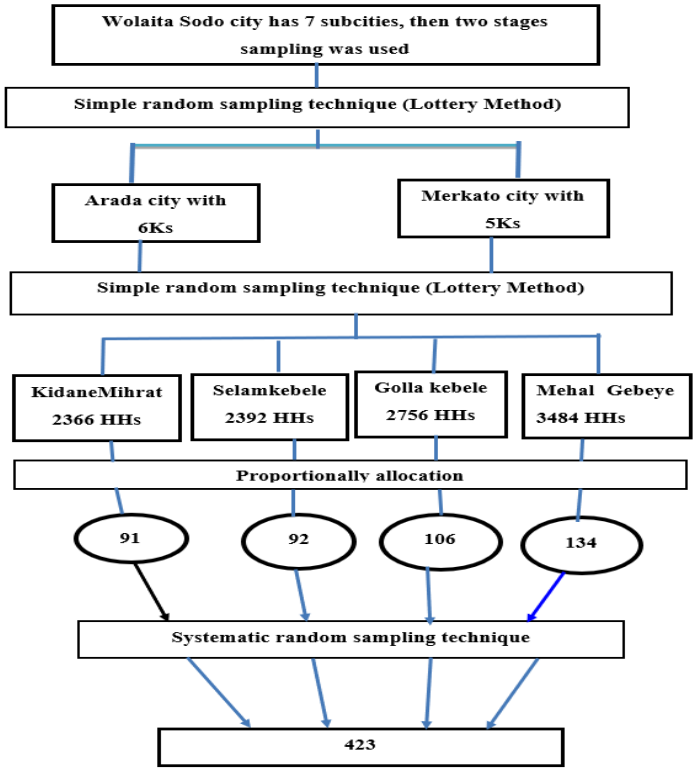

Figure 3: Sampling procedures

4.6 Data collection procedures

Primary data was collected using a pre-tested questionnaire. Furthermore, to keep the consistency, the questionnaire was first translate from English to Amharic (national language), and finally retranslated to English. Data was collected through face to face interview-administered structured questionnaire.

The relevant secondary data related to both animal and human rabies was collect from Wolaita zone Health and Agriculture department with their corresponding offices at the Zone level such as Sodo town health center and Ganame health center. Population data were obtained from the Ethiopian Central Statistics Agency data base. Other important information's relates to the topic was abstracted from several known published articles and unpublished papers.

4.7 Study variables

Dependent variables: Knowledge, Attitude and Practice of rabies prevention (Yes/No).

Independent Variables: Socio-demographic variables(e.g. gender, age, level of education, occupation,marriagestatus, family size, mothlyicome and dog ownership) are independent variables.

4.8 Community KAP about rabies in Wolaita Sodo town

For assessing the community knowledge, attitude and practices (KAP) about rabies each respondent were asked for thirty two (32) questions (seventeen (17) about knowledge, six(06) about attitude and nine (09) about practices) and regarding cause, sources, mode of transmissions, clinical signs and prevention practices. The questionnaires were multiple choices question with close ended. Respondents who answered the questions correctly had got one (1) mark and zero (0) mark for incorrect or do not know responses. Then, the responses for which respondents give correct answer was counted and scored. This score was then pooled together and the mean score was computed to determine the overall KAP of respondents. Respondents who score greater than or equal to the mean value (Mean=17.64, SD=7.749) were grouped to good KAP and whereas, the respondent who scored less than the mean value were grouped to poor KAP level.

4.9 Operational definitions

Attitudes: This is a positive or negative evaluation of something, like people, objects, or ideas. In this study, the concepts used to refer to the feelings of community members towards Rabies and how it is perceived as a public and animal health problem.

Knowledge: In this study, knowledge means awareness of or knowing the Rabies disease, its cause, clinical symptoms, route of transmission, and available prevention mechanisms.

Practices: Actual action and or behaviors of community members undertaking to avoid contracting the human and animal Rabies infection.

Household: Consists of all the people who occupy a housing unit and includes the the related family members and all the unrelated people, if any, such as lodgers, foster children, wards and employees who share the housing unit. A person living alone in a housing unit, or a group of unrelated people sharing a housing unit such as partners or roomers, is also counted as a household.

4.10 Data quality control

To assure the quality of data the questionnaire was pre-tested on 5% (21 HHs) of the sample sizeof a similar population outside of the selected subcities,Mehal subcity (from Damota and Gido kebelles) beforepreceding the actual data collection period. During data collection period four (04) data collectors and two (02) supervisors were selected based on their experience in the field of data collection and supervision. Training was given for field staff before the start of data collection. During training, the objective of the study, procedures of data collection and supervision were discussed in detail. Furthermore, each question included in the questionnaire was discussed deeply and any vagueness made clear. Each day, the collected data was checked for its completeness and consistency by supervisors and principal investigators.

4.11 Data processing and analysis

After collection, the data was cleaned and checked for its completeness. After complete checking-up, the data was coded and entered into Microsoft excel and transport to Statistical Packages for Social Sciences (SPSS) version 20. The frequency distribution of both dependent and independent variables was worked out by using descriptive statics techniques and association between independent variables and KAP scores on rabies was calculated using Pearson's Chi square.

4.12 Ethical considerations

The ethical clearance was obtained from the institutional ethical review committee of Pharma health college, department of public health with a project reference number PC/ERC/007/2014. Permission letter was obtained

from the Wolaita zone health office, and then discussed with Arada and Merkatosubcities about the research, after that the research was carried out. Confidentiality of the information was maintained throughout by excluding names and keeping their privacy during the interview, by interviewing them alone. Participants had the right to withdraw at any time from the interview. The purpose of the study was clearly explained to all community of study participants before obtaining a verbal` informed consent.

5. RESULTS

5.1 Socio demographic character of the participants

A total of 423 community members were interviewed face to face during the study period and all respondents were responded to the questionnaires. The majority of the respondents in this study were males 256(60.5%), while the number of females was 167(39.5%). From all participants of the study, about 381(90.1%) were married and 42(9.9%) were unmarried. The ages of respondents were classified as 18-29, 30-45 and above 46 years old, which comprises about 321(75.9%), 40(9.4%) and 62(14.7%), respectively. Regarding the educational status of respondents, 62(14.7%) were not read and write, 37(8.7%) were read and write, 78(18.4%) had primary education, 101(23.9%) had secondary education, and the rest 145(34.3%) had diploma and above education. With regards to the family size, majority of the respondents about 177(41.8%) were from family size of one to three persons and small portions of the respondents 101(23.9%) were from family size greater than 6 persons. Depending on occupation, most of the respondents, 179(42.3%) were government employee and 151(35.7%) and had regular income. From the whole respondents/ participants (423) in this study, about 149(35.2%) had dogs while 274(64.8%) respondents had no dogs. The socio-dempgraphiccharacterstics of the participants are shown in following (table 1).

Table 1: Socio demographic characters in Wolaita Sodo city (N=423), 2022

Variable	Category	Frequency	Percent(%)
Sex	Male	256	60.5
	Female	167	39.5
Age in years	18-29	321	75.9
	30-45	40	9.4
	>46	62	14.7
Educational status	Not read and write	62	14.7
	Read and write	37	8.7
	Primary (1-8)	78	18.4
	Secondary (9-12)	101	23.9
	Diploma & above	145	34.3
Occupation	Government employee	179	42.3
	Private employee	65	15.4
	Merchant	60	14.2
	Unemployed	114	26.9
	Others	5	1.2
Monthly income per month	No defined	128	30.3
	Irregular	144	34.0
	Regular	151	35.7
Marital status	Married	381	90.1
	Unmarried	42	9.9
Household size	1-3	177	41.8
	4-6	145	34.3
	>6	101	23.9
Dog ownership	Yes	149	35.2
	No	274	64.8

Source: survey, 2022

5.2 Knowledge of respondents related to awareness and transmission of rabies

All 423(100%) respondents were familiar with the rabies disease and gave it slightly different local names (‘Likefit’, ‘Yebedwushabeshita’) which all mean madness and majority of source of information was informal 178(42.1%) and small proportions are mixed source from both formal and informal 102(24.1%). Almost half, 213(50.4%) the participants of this study knew that the cause of rabies is a virus. The majority of study participants 285(67.4%) knew that rabies can affect both human and other domestic animals and mentioned dogs 255(60.3%) as a principal source or reservoir of rabies. Majority of the respondents 225(53.2%) were aware about zoonotic nature of the disease that transmitted from animals to human. Bite and saliva contact with open

wound 215(50.8%) by rabid dog was known as mode of rabies transmission by majority of the respondents.

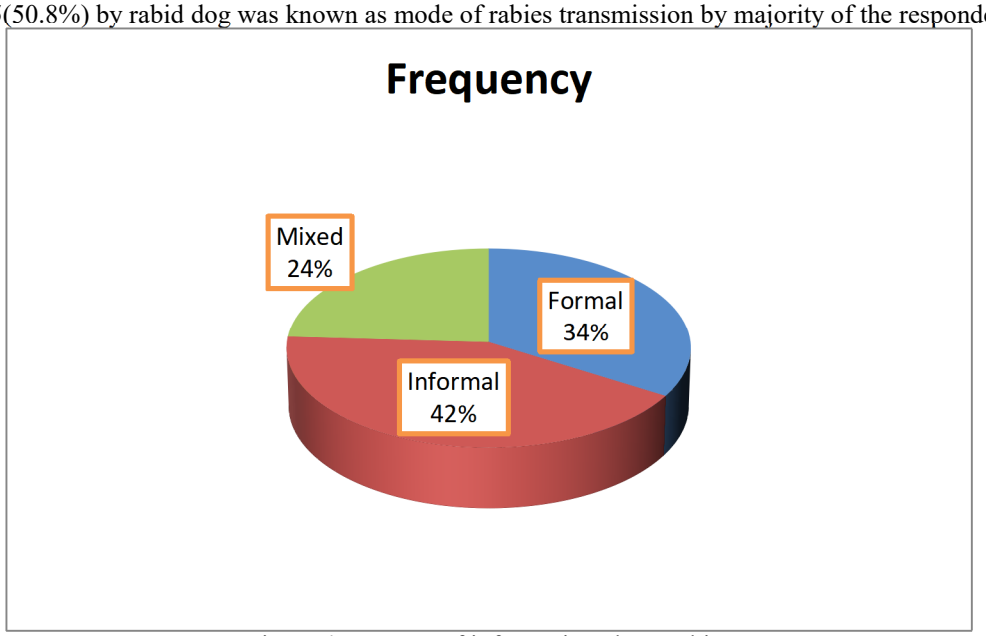

Figure 4: Sources of information about rabies

Table 2: Knowledge of respondents related to awareness and transmission of rabies in Wolaita Sodo city (N=423), 2022

Variable	Category	Frequency	Percent
Heard about rabies	Yes	423	100
	No	0	0
Causes of rabies	Bacteria	120	28.4
	Virus	213	50.4
	Psychological	75	17.7
	I don't know	15	3.5
Affect human and domestic animals	Yes	285	67.4
	No	138	32.6
Rabies common source/reservoir	Dog	255	60.3
	Cat	112	26.5
	Bat	11	2.6
	I don't know	45	10.6
Transmit from animal to human	Yes	225	53.2
	No	198	46.8
Means of transmission	Bite only	56	13.3
	Contact with saliva only	119	28.1
	Bite and saliva contact with wound	215	50.8
	Infected meat and others	33	7.8

Source: survey, 2022

5.3 Knowledge of participants related to clinical signs, prevention and treatment

Regarding the clinical signs of rabies in animals, biting and sudden change in behavior were reported by 161(38.0%) of the participants. 238(56.3%) of the respondents knew fatal nature of the disease once the clinical signs appeared. The majority of the respondents were aware of rabies in discriminately affects 183(43.2%) young age groups. Majority of the respondents 230(54.4%) were not aware about post exposure prophylaxis for rabies while 298(70.4%) of the respondents were aware of dog vaccination as a means of rabies prevention.Only fewer (25.5%)numbers of the participants had practiced washing of the wounds with soap and water as first aid to prevent rabies.

Table 3: Knowledge related to clinical signs in Wolaita Sodo city (N=423), 2022.

Variable	Category	Frequency	Percent
Clinical signs and symptoms in animals	Stop eating and drinking	95	22.5
	Biting and change in behavior	161	38.0
	Paralysis	61	14.4
	Madness	40	9.5
	Hydrophobia	55	13.0
	I don't know	11	2.6
100% fatal after onset of symptoms	Yes	238	56.3
	No	185	43.7
High risky population	Young	183	43.2
	Adult	58	13.7
	Male	71	16.9
	Female	105	24.8
	I don't know	6	1.4
Rabies prevented by vaccination of dogs	Yes	298	70.4
	No	125	29.6
Rabies treated by PEP	Yes	193	45.6
	No	230	54.4
After bite washwound by soap and water	Yes	108	25.5
	No	315	74.5

Source: survey, 2022

5.4 Community attitudes regarding rabies

This study revealed that 302(71.4%) of respondents said that stray dogs are dangerous and majority of them 296(70%) agreed that stray dogs are a problem of their community. Majority of the respondents 315(74.5%) agreed that euthanizing or killing of rabid animals are best measures to control stray dogs and about 275(65%) seeks traditional healers when humans are bitten by rabid animals. The greater numbers 384(90.8%) of the respondents were willing to register their pets. Majority 368(87%) were said that rabies prevented by educating people about the disease.

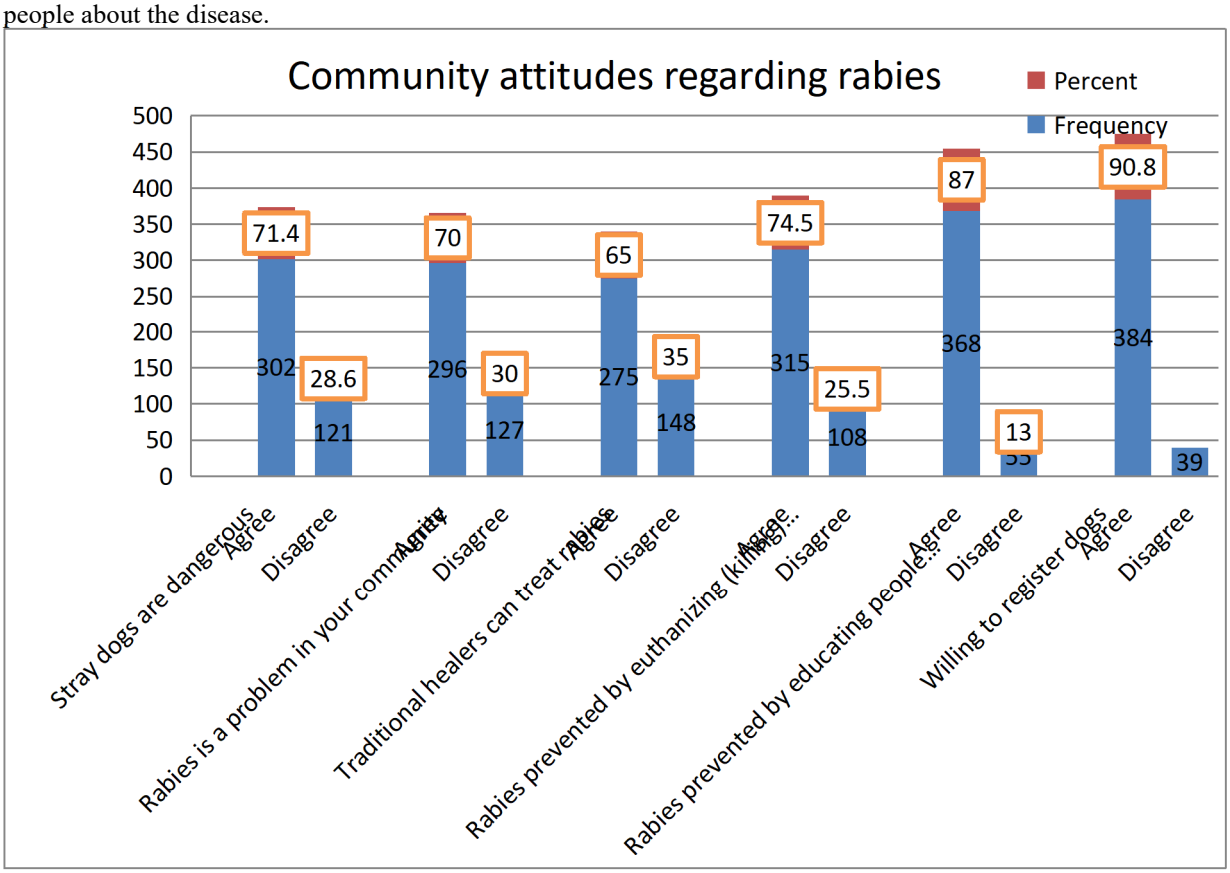

Figure 5: Community attitudes regarding rabies in Wolaita Sodo city (N=423), 2022.

5.5 Community practice regarding rabies

This study showed that, 361(85.3%) of participants have contact with dogs and only 87(24%) participants have hand washing habit after touching dogs. From 106(25%) respondents who had ever been bitten by a dog or who had a family member ever bitten by a dogs, 60(56.6%) went to traditional healers after bite and 46(43.4%) went to health centers.Majority of the respondents 248(58.6%)practiced killing to control stray dog. Among participants, 395(93.4%) had not vaccinated their dogs against rabies. Furthermore, 286(67.6%) participants had kept their pets outside their house or free.

Table 4: Community practice regarding rabies in Wolaita Sodo city (N=423), 2022

Variable	Category	Frequency	Percent
Family members touch dog	Yes	361	85.3
	No	62	14.7
Wash their hands after touching the dog	Yes	87	24.0
	No	274	76.0
Ever bitten by stray dog	Yes	106	25.0
	No	317	75.0
Preferred action taken for bitten human	Health centers	46	43.4
	Traditional healers	60	56.6
Measures to control stray dogs	Aware the owners	118	27.9
	Killing stray dog	248	58.6
	Animal birth control	57	13.5
Anti-rabies vaccine in human after exposure	Immediate	239	56.5
	Later	97	22.9
	Anytime	76	18.0
	I don't know	11	2.6
Vaccinated your dog	Yes	28	6.6
	No	395	93.4
Management of your dog	Indoor	137	32.4
	Free	286	67.6

Source: survey, 2022

5.6 Factors associated with community KAP on rabies in Wolaita sodo town

Association between independent variables and KAP scores on rabies was calculated using Pearson's Chi square (Table 5). There was significantly association between KAP scores and sex ($\chi2$= 40.811, df=1, P<0.05). The good scores were higher in males (66.4%) than females (34.7%). Educational status was significantly associated with KAP scores ($\chi2$=241.782, df=4, P< 0.05). All respondents with diploma and above education levels had good KAP of rabies. Age was significantly associated with KAP scores ($\chi2$=82.917, df=2, P< 0.05). All respondents with age above 46 years had good KAP of rabies. Occupation status was significantly associated with KAP scores ($\chi2$=276.558, df=4, P< 0.05). Government employee had good KAP of rabies.The relationships between KAP scores about rabies and some key independent variables among study respondents are shown in the following (table 5).

Table 5: Relationships between KAP scores and independent variables in Wolaita Sodo city (N=423), 2022.

Variable	Category	Good	Poor	χ2-value	Df	P-value
Sex	Male	170(66.4%)	86(33.6%)	40.811	1	0.000
	Female	58(34.7%)	109(65.3)			
Age in years	18-29	171(53.3%)	150(46.7%)	82.917	2	0.000
	30-45	0(0%)	40(100%)			
	>46	57(91.9%)	5(8.1)			
Educational status	Not read and write	0(0%)	62(100%)	241.782	4	0.000
	Read and write	2(5.4%)	35(94.6%)			
	Primary (1-8)	28(35.9%)	50(64.1%)			
	Secondary (9-12)	53(52.5%)	48(47.5%)			
	Diploma & above	145(100%)	0(0%)			
Occupation	Govt employee	168(93.9%)	11(6.1%)	276.558	4	0.000
	Private employee	46(70.8%)	19(29.2%)			
	Merchant	8(13.3%)	52(86.7%)			
	Unemployed	6(5.3%)	108(94.7%)			

Variable	Category	Good	Poor	χ2-value	Df	P-value
Income per month	No defined	59(46.1%)	69(53.9%)	32.131	2	0.000
	Irregular	60(41.7%)	84(58.3%)			
	Regular	109(72.2%)	42(27.8%)			
Marital status	Married	210(55.1%)	171(44.9%)	2.289	1	0.130
	Unmarried	18(42.9%)	24(57.1%)			
Household size	1-3	81(45.8%)	96(54.2%)	49.176	2	0.000
	4-6	62(42.8%)	83(57.2%)			
	>6	85(84.2%)	16(15.8%)			
Dog ownership	Yes	139(93.3%)	10(6.7%)	143.619	1	0.000
	No	89(32.5%)	185(67.5%)			

Source: survey, 2022

6. DISCUSSION

Rabies remains an important global public health problem particularly in developing countries. Since rabies is regarded as a neglected tropical disease, limited general public knowledge and awareness campaigns are conducted across the globe. Recent work from World Health Organization (WHO) under the umbrella of "Zero Rabies by 2030" have resulted in many countries have started efforts to minimize the risk of rabies due to dog bite (11, 13,47).

In this study, the overall knowledge, attitude and practice (KAP) score revealed that 53.9% of the respondents had a good KAP score while 46.1% had poor KAP score. This finding is lower when compared with the study by (48)who reported about 75.2% in Addis Ababa, Ethiopia and (49)who reported 60.3% in Debark District, North Gondar. However, the current result is higher when compared with research conducted in Dedo district, Jimma zone which is 51.9% (15).These differences could be associated with training or awareness level of the community, difference in sample size, lack of health education program and information access on rabies in study area.

During analysis of KAP with independent variables, analysis revealed that KAP score was statistical significantly(χ^2=40.811, p<0.05) associated with gender being higher in males (60.5%) than females (39.5%). The same proportion of statistical difference on KAP score of male (57.0%) and female (43.0%) was reported inDedo district of Jimma Zone by (15), in Bahirdar town in males (69.0%) and in females (31.0%) (6). The statistical significant difference in KAP score between males and females might be due to increased activity of males in their daily life away from house as compared with females and could create an opportunity to have a better access for acquiring correct information about rabies disease.

The other factor that identified to be significantly associated was educational status. Statistically significant association (χ^2=241.782, P<0.05) was observed between KAP score and educational levels where by diploma and above were associated with higher knowledge scores. All respondents with diploma and above education levels had good KAP of rabies. This finding was also supported by a study conducted in Flagstaff, Arizona, USA (50). The possible explanation could be educated person would have better information access and can easily understand the disease.

KAP of the community was significantly associated with monthly income of the households (χ^2=32.131, P<0.05). This finding agrees with the reports of (6)from Bahirdar town. This might be partly explained by the strong social interactions of people having good income in their day to day life which may help them to exchange information.

Moreover, significantly (χ^2=143.619, P<0.05) higher good KAP score (93.3%) was also found in dog owners than those who had no dog. This finding is in agreement with (6, 15)who found higher KAP score in dog owner than those who had no dogs. This may be associated with the adoption of dog owners with dog as it might help to know more about dog and dog disease and better chance of acquiring correct information on rabies during time of vaccination and care of dogs.

Occupation also another risk factor that has statistical significant association with KAP score (χ^2=276.558, p<0.05). High KAP score was recorded in government employee (93.9%) and low score in unemployed (9.2%). This finding different from the research conducted in Ambo town (51). The difference might be existing among these groups due to academic knowledge between government employee and unemployed. Most of the time government employees have more chance of getting information from Medias like newspaper,social media, television and radio.

Almost half of (50.4%) the participants of this study knew that the cause of rabies is a virus. This report is

higher when compared with others study in Dedo district, Jima zone, Southwestern Ethiopia was reported (13.3%) (15). This difference may be because of updated information a gained by health workers, veterinarian and media in the study area.

This study reported 67.4% participant reported that rabies is the disease of both human and other domestic animals. This is in line with report of 71.9% in the USA city of New York (45). In contrary, a lower finding from Bahir Dar town (21.4%) (53)and Dedo district Jima zone was reported (57.7%) (15). The reason may be due to finding of different host animals, status and difference in level of awareness and educational in the community.

About 60.3% participant of this study mentioned dog as the main cause of threat for most fatal human rabies. Similar with current study there is also other report that mention domestic dogs as the main reservoir host of rabies and it is the main way of rabies infection to humans and other animals (44, 54-56). The participant of study also revealed the second important animal as source of rabies for human case is cat. In most of the world part, primarily in Africa and Asia, the case for human rabies 85 to 95% is due to dog bite(16, 57).

In the current study, among interviewed participant only a few respondents 25.5% reported a practice of first aid of washing the wound using soap and water for bitten human. This result is very small when compared with others study conducted in Dedo district (49.6%)(15), Debark district (76.4%) (49). The difference can be attributed to the difference related with the awareness status of the community and lack of training on the practice related the early disease treatment at home. Literature report indicated that washing of wounds infected by rabies with water and soap can reduce death by 50% (16).

One Health recognizes that the health of humans, animals and the environment are interconnected. One Health focuses on collaborative efforts that harness and coordinate the power of multidisciplinary and cross-sectoral teams and resources so as to apply them locally, nationally and internationally for optimum health of humans, animals and the environment. The common theme in application of One Health approach in management of rabies is collaboration across disciplines and sectors (52).

Our study showed that there is generally poor communication between communities and the health sector regarding rabies events in a village. In most cases, respondents reported that they would be prepared to kill suspect rabid animals but would not report to health offices. This makes it difficult for health 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 health and Agriculture offices.

In recent decades, no national rabies control programs have been implemented in study area, which could probably explain the more limited knowledge about rabies and its prevention and control. It would also explain why most respondents obtained information about rabies from informal channels. The importance of these informal channels again points to the need to consider the development of community-level interventions as a potentially effective approach to increase community and individual awareness, and improve reporting in addition to formal channels such as media, schools and health centers.

7. CONCLUSION AND RECOMMENDATIONS

In conclusion, this study has shown that the community level KAP about rabies is poor than the study conducted in Addis Abeba. Despite this fact, still there are some gaps in the community regarding the modes of rabies transmission, clinical signs of rabies, prevention methods after suspected animal bite, the first action taken in the home after bitten by a suspected animal (wound washing with soap and water) and attitude to anti-rabies vaccine. There was strong association between KAP scores and Sex, age, educational level, occupational status, household size and dog ownership. There were no statistically significant differences in KAP score and marriage status.

Based on conclusion, the following recommendation should be forwarded:

- Rabies education campaigns and awareness creation programs should be implemented in the study area.
- One Health integrated approaches (Human, Animal and Environment) need to be in place to combat the danger of outbreaks.
- The concerning body, in particular, veterinarians and health professionals, should have to aware of the community the impact of the disease, so that seeking immediate post exposure treatment on time if exposed unknowingly to culminate a necessary death.
- Pet owners should have to get adequate education from both veterinary professional and human health sector on the importance of vaccine against rabies so that interested to vaccinate their dog pets.
- The South Nations Nationalities Regional Health Bureau should give due emphasis and allocate adequate resources for possible stray dog management, dog population management.
- The Agriculture bureau should launch a regular dog vaccination and certification schemes as quickly as possible.

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