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Research Article

Assessment of Knowledge, Attitude and Practice of Human towards Rabies and Retrospective Study in and Around Bedele Town

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Abstract

Rabies is primarily disease of terrestrial and airborne mammals that affect central nervous system and cause public health impact were domestic dog play a principal role as the transmitter of the disease to humans in developing country. A retrospective study and questionnaire based on cross sectional study was conducted from November, 2016 to April, 2017 in bedele hospital with the objectives of reviewing of recorded data on the status of rabies; and assesses community KAP on rabies. The result on retrospective study indicates that a total of 970 peoples were bitten by rabies suspected animals within the period of 2013-2016 in bedele hospital. A structured questionnaires was administered to 104 respondents comprised of 77 urban and 27 from peri-urban areas of bedele to assess the community on knowledge, attitude and practice toward rabies. From the retrospective record review of suspected human rabies, children less than 15years (52.7%) were highly affected. From the questionnaire cross sectional study based survey, all most all non-exposed respondents stated that, they had heard the disease called rabies and they are highly prevalent during the winter season from this finding. More than 73.1% of respondents indicated that they know about the transmission of disease from animal to human by dog. Majority (87.3%) bitten or infected individuals were affected by dogs, while other were infected by cat (8.6%). Majority of the respondent stated that, rabies can be cured by a traditional herbal medicine (37.5%) like consumption of garlic and by use preserved tiger meat with coffee and drinking accordingly and the other community followed by PEP (34.6%). Majority of the respondent never take the dog for vaccination (52.9%). So raising awareness about the disease, dog vaccination and improving access and affordability of the vaccine should be considered in control of the disease in the study area.

Keywords: Attitude; Dog; Knowledge; Practice; Rabies

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Introduction

Infectious diseases, particularly zoonosis, are recognized as the sources of serious problems that affect public and animal health around the world. Emerging infectious diseases have been reported at an unprecedented rate since the 1970s and a large proportion of these diseases are considered to be zoonosis. However, reemerging zoonosis are also affecting public health around the world, in particular rabies, a classic zoonosis that is problematic in Africa and Asia, [1]. Rabies is a fatal viral infection that is most commonly spread to humans through the bite of an infected animal [2].

It is the type of species of the Lyssa virus genus of, which encompasses other similar viruses and can travel to the brain by following the peripheral nerves with incubation period depending on how far the virus must travel to reach the central nervous system, usually taking a few months and remains incurable and survivors are extremely rare [3]. Infection with rabies virus can be difficult to diagnose ante-mortem. The earliest neurological symptom in human beings is usually pain, par aesthesia, or pruritus at the site of infection because of viral replication in local dorsal root ganglia and associated ganglionitis. The most affected regions are tropical countries in Africa, Asia and South America, which have limited resources for diagnosis, treatment, control surveillance, vaccine production and improvement [4]. It is primarily disease of terrestrial and airborne mammals. [5, 6] Dogs are the principal source of infection for humans and livestock's [7].

Globally, human mortality from endemic canine rabies was estimated to be 55,000 deaths per year and 56% of the estimated deaths occur in Asia and 44% in Africa [8]. About 98% of the human rabies cases occur in developing countries that possess large number of dogs, many of which are stray [9]. Ethiopia being one of the developing countries is highly endemic for rabies. Approximately 10, 000 people were estimated to die of rabies annually in Ethiopia which makes it to be one of the worst affected countries in the world [10].

A major factor in the failure of rabies control is the low level of political commitment, partly arising from a lack of quantitative data on the true public health impact of the disease and the cost-effectiveness and cost benefits of controlling it [11].

Poor public awareness towards rabies is considered as one of the bottle necks for the prevention and control of the disease in Ethiopia especially in canine rabies endemic cities like bedele. Understanding communities, perceptions of cause, mode of transmission, symptoms, treatment and possible intervention measures of rabies is an important step towards developing strategies aimed at controlling the disease and determining the level of implementation of planned activities in the future. In general, most developing countries including Ethiopia

do not have the capacity for laboratory confirmation of rabies cases and most suspected rabies victims do not die in hospital both in humans and animals. So rabies is underreported. Hence there is lack of accurate quantitative information on rabies about the awareness of the people about the disease to apply effective control measures in Ethiopia [12].

Therefore, the present study was designed to assess the level of:- Knowledge, attitude and practices of selected communities in bedele town on prevention and control of rabies and Reviewing of recorded data to generate information on the status of rabies in bedele health center

Literature Review

Back ground and etiology

Rabies may be the oldest recognized infectious disease, and quite possibly the first recognized zoonotic disease.The first historical description of rabies dates from the 23rd century BC in the le gal Eshuma Code of Babylon, relating to dog bites of humans. The word rabies has its origin in S anskrit, 3000 years BC: "rabhas" means "to do violence". The Greek word for rabies, "lyssa," derives from the root "lud" which means "violent". Thus, the genus of viruses to which rabies be longs is lyssa [13].

Rabies is caused by the RABV, an enveloped, bullet-shaped virus containing a single stranded, negative sense RNA molecule. The rabies virus belongs to the Lyssavirus genus, a group of morphologically similar, antigenically and genetically related viruses in the Rhabdoviridae family [14]. Rabies is an acute fatal viral illness of the central nervous system that affects all warm blooded vertebrates. It is primarily disease of terrestrial and airborne mammals including dogs, wolves, foxes, jackals, cats, lions, mongooses, bats, monkeys and humans [15].

Each year, approximately 55,000 individuals worldwide die from an infection due to the rabies virus. Rabies is a life-threatening disease caused by an RNA virus that is usually transmitted to humans through bites from rabid animals. More recently, reports of transmission by means of organ transplantation have been reported [16]. The incubation period (time from exposure to virus until development of symptoms) can vary but is generally 3-8 weeks. Since the virus grows along peripheral nerves to the central nervous system (CNS), the distance from the bite to CNS and the innervation at the area of the bite are some of the factors that can influence the length of the incubation period [17].

Epidemiology

Host Range and Susceptibility

RABV is distributed globally and found on all continents except Australia and Antarctica. In the United States, multiple RABV variants circulate in wild mammalian reservoir populations including raccoons, skunks, foxes, and bats. There are many variants (or strains) of this virus, each maintained in a particular reservoir host. The reservoir host may be reflected in the case description, For example, if a virus maintained in skunks caused rabies in a dog, it would be described as skunk rabies in a dog, rather than canine rabies (Marston, 2012).
Dogs are the principal vector for human rabies, and are responsible for more than 99% of human cases. Hence controlling rabies in dogs, and especially free-roaming (stray) dogs, is the first priority for prevention of human rabies [18].

Transmission

The rabies virus is secreted in saliva, and is usually transmitted by a bite from an infected animal. It also can be transmitted when the saliva from an infected mammal comes in contact with open wounds or mucous membranes (e.g., eye, nose or mouth). The virus is excreted in the saliva of infected terrestrial animals during clinical illness and for only a few days prior to illness or death. Bats can transmit the virus by bite as early as twelve days before clinical signs appear and 24 days before the bat's death [19]. Transmission of both wild and urban rabies occurs mainly when an animal that is shedding virus in its saliva bites to another susceptible animals or humans [20].

Spread of the disease is often seasonal, with high incidence in late summer and autumn because of large scale movement of wild animals at the mating time and in pursuit of food [21]. Although all mammals are susceptible to and capable of transmitting the rabies virus, those considered reservoirs of the virus include carnivorous mammals and bats [22]. Reservoirs of the rabies virus are responsible for the long-term existence and persistence of the virus, and samples from various reservoirs have revealed genetically distinct variants [23].

Canines are considered the primary vectors of the virus worldwide and are responsible for the majority of human rabies cases in Africa, Asia, Central America, Eastern Europe, Russia, and South America. Human transmission of the rabies virus occurs primarily through rabid animal bites, where infected saliva penetrates the skin. The virus can also be transmitted by exposure of an open wound or mucous membrane to the saliva of a rabid animal, although this occurs less frequently. A remote potential of rabies infection occurs through aerosol inhalation of the virus, although this may only be possible in a few caves located within the United States where bat density is high, and high temperatures, extreme humidity, and little ventilation exist (WHO, 2009). Infrequently, human-to-human transmission has been reported. In 2004, the rabies virus was transmitted to four transplant recipients from an infected organ donor in Texas and three transplant recipients from an infected donor in Germany, all resulting in death for the organ recipients [24].

Incubation Period

The incubation period for rabies is the most variable of all acute CNS infections. The average incubation period is around 1-3 months but may range from less than 7 days to 6 years [25]. It is not still clear why there is such a variable and prolonged incubation period. The incubation period may depend on several factors including; density of rabies virus receptors in the affected tissue, the degree of innervation in tissues, the quantity of virus inoculated and the properties of the rabies virus stain [26].

Clinical Sign

Visible wounds may be the first observed indication of potential exposure to rabies. Rabies is often classified as paralytic (dumb) rabies or encephalitic (furious) rabies based on the clinical signs observed. Generally, three forms are classically described; which include prodromal, excitement (furious) and paralytic (dumb) [27]; (Warrell and Warrell, 2004).

Prodromal form: - may be seen during the early stage of rabies or last from 1-3days of age. They can include malaise, fever or headache, as well as discomfort, pain, pruritus or other sensory alterations at the site of virus entry [28].

The paralytic ("dumb") form: - paralytic rabies is characterized by depression and worsening paralysis. In this form, the throat and masseter muscles become paralyzed; the animal may be unable to swallow, it can salivate profusely and there aerophobia and hydrophobia [29]. Laryngeal paralysis can cause a change in vocalization, including an abnormal bellow in cattle or a hoarse howling in dogs. Biting is uncommon. Death usually occurs within 1 to 10 days, after the appearance clinical sign [14].

The furious form: - Encephalitic rabies is characterized by aggression and brain disorders, associated with infection of the limbic system, and is the more common form in cats. Rabid cats are more likely to exhibit aggressive behavior (encephalitic rabies), whereas rabid dogs are more likely to exhibit lethargy and paralysis (paralytic rabies) [30]. Death usually occurs within 1-10 days of the appearance of clinical signs. Large animals with this form, such as horses, are extremely dangerous due to their size. Furious rabies is characterized by restlessness, wandering, howling, polypnea, drooling and attacks on other animals, people or inanimate objects. Affected animals often swallow foreign objects such as sticks and stones. But it is extremely rare to observe all signs in a single infected animal. [31].

Public Health Significance

All rabies variants are thought to be zoonotic. Zoonosis is diseases and infections which are transmitted naturally between vertebrate animals and man. Transmission may occur by a number of routes, from indirect contact through food or drink to direct contact through occupational exposure on farms, from pets or through leisure pursuits [32].

Handling and consumption of tissue from exposed animals might carry risk for rabies transmission. risk factor depend on part of the sight exposure, amount virus present, severity of Wound and weather sufficient contaminated tissue has been excised. If an exposed animals is to be consumed or home slaughtered, for consumption it should be done immediately after exposure all tissue should be cooked thoroughly, a person handling exposed animal carcasses and tissue should use barrier precautions [33]. Tissues and products from rabid animal should not be used for human or animal consumption (CDC, 1999), or transplantation).Additionally pasteurization and cooking will inactivate rabies viruses. Therefore, inadvertently drinking pasteurized milk or eating thoroughly cooked animals products does not constitute rabies [34].

Pathogenesis

Rabies virus gains entry into a new host by introduction of virus-containing saliva into a bite wound. Entry may also be gained by saliva contamination of the mucous membranes of the mouth, eyes and nasal passages. The virus does not penetrate intact skin [35]. At the site of entry, there may be local viral proliferation in non-neural tissue followed by viral attachment to nerve cell receptors and entry into peripheral nerve endings [36]. Transport to the CNS occurs by retrograde axoplasmic flow at an estimated rate of 15 to 100 mm per day.

Virus replication probably does not occur during transport, since axons do not contain ribosomes. Both motor and sensory fibers may be involved in viral transport [37]. Spread within the CNS is intra-axonal, and infection can be widely disseminated before the onset of clinical signs. Following centrifugal transport along efferent cranial nerves, the salivary glands become infected and virus particles are shed in the saliva. Infection of the brain commonly leads to behavioral changes that induce the host to bite other animals, thereby transmitting the virus. The clinical picture can be highly variable between different species, individuals of the same species, and even within the course of the disease in a particular individual. The widespread central nervous system infection almost inevitably leads to death [38].

Pathology

There are no characteristic gross pathologic alteration due rabies which can be seen up on post mortem examination. The histopathologic lesions of CNS are inflammatory in nature and are very much like those seen in other CNS infection. As rule there is more damage to the Pons, medulla, brainstem and thalamus than to other parts of the brain [39].

Diagnoses

Infection with rabies virus can be difficult to diagnose ante-mortem. Although hydrophobia is highly suggestive, no clinical signs of disease are pathognomonic for rabies and differential diagnosis can involve many agents and syndromes (e.g., other viral encephalitis, tetanus, listeriosis, and poisoning) and co-infections, such as malaria, can lead to misdiagnosis. [40]. Historical reliance on the detection of accumulations of Negri bodies is no longer regarded as suitable for diagnostic assessment because of low sensitivity, and alternative laboratory-based tests have been developed to conclusively confirm infection [41].

Antigen detection may be performed using the fluorescent antibody test (FAT), a rapid and sensitive method to diagnose rabies infection in animals and humans. This is the gold standard for rabies diagnosis. However, FAT can lead to a false negative result when bat or horse specimens are involved. Virus isolation may be necessary to confirm the results of antigen detection tests and for further characterization of the isolate using intracranial inoculation into mice or neuroblast cells. Molecular detection using PCR and other amplification techniques are not currently recommended for routine postmortem diagnosis of rabies [42].

Diagnosis of rabies in animals can be made by taking samples from affected brain. There are many diagnosis methods for detection of rabies in animals like mouse inoculation, cell cultures, serological tests, electron microscopy, histological examinations, molecular methods and immune histochemistry, tissue culture infection technique and polymerase chain reaction [41]. 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 (OIE, 2008) [43, 44]. Serology was determined using the rapid fluorescent focus inhibition test (RFFIT) or the indirect fluorescence assay (IFA), (Noah, 1998). The RFFIT measures RABV neutralizing antibodies while the IFA detects serum reactive with RABV antigen in infected cell cultures. Antibodies in serum were considered diagnostic if there was no history of rabies immunization prior to sample collection. Antibodies in cerebrospinal fluid (CSF) were considered diagnostic regardless of rabies immunization history [45]. And also RABV antigens were detected using the direct fluorescent antibody (DFA) test of skin biopsy specimens, or fresh brain tissue [46].

Treatment and Management of Rabies

Treatment

There is no specific treatment for rabies, which is a fatal disease. (Supportive treatment alone has been successful in one recently-reported confirmed case of human rabies in the United States of America [47].

Prevention and Control

The identification of epidemiologic patterns can also be used to focus educational messages for human rabies prevention and thereby increase public awareness of rabies and the importance of seeking medical care after a potential exposure occurs [48].

Pre-exposure vaccination is recommended to people who are at continued risk of exposure to rabies such as veterinarians, laboratory workers handling rabies virus, dog catchers and forest rangers, medical and paramedical people treating rabies patients. Three doses of any modern rabies vaccine can be administered on days 0, 7 and 28. A booster dose is recommended to people at continued risk [49]. A previously immunized person must receive two booster vaccine doses on each of days 1 and 3. If special clinical conditions are present, such as immunosuppression, antimalarial treatment and unsupervised chronic disease, the level of neutralizing antibodies should be assessed 10 days after the last booster vaccine doses [50]. The recommended schedule for a person previously vaccinated against rabies is complex and the following factors should be considered: number of vaccines previously received; lack of Time between the previous treatment and the recent accident; clinical condition of the patient; and kind of vaccine previously used. A normal person under complete treatment should not receive rabies immunoglobulin in re-exposure treatment, because it might interfere with the immune response to the booster vaccine doses [51].

The recommended schedule of post exposure is on days 0, 3, 7, 14 and 28. The dose of the vaccine injected into the patient's on deltoid area and for children aged two years old or younger, the vaccine may be injected into the thigh muscles. The habits of the dog or cat involved in the accident must be evaluated. Treatment of humans may be unnecessary if the animals are considered of low risk for rabies transmission (e.g. animals living inside the houses, without any contact with other animals including bats). In accidents involving bats, it is always necessary to administer anti-rabies serum regardless of the lesion severity. A patient previously treated for rabies should be considered only for booster doses of the vaccine [52].

Post exposure prophylaxis consists of a multimodal approach to decrease an individual's likelihood of developing clinical rabies after a possible exposure to the virus. Wound cleansing and administration of the rabies vaccine are the primary components of rabies post exposure prophylaxis. Since the likelihood of a rabies infection depends on the type and extent of the exposure, thorough assessment of a patient's risk of infection should be undertaken before initiation of post exposure prophylaxis. Generally the prevention and control of Domestic animal vaccination: Multiple vaccines are licensed for use in domestic animal species. Vaccines available include inactivated or modified live-virus vectored products, products for intramuscular and subcutaneous administration, products with durations of immunity from 1 to 4 years and products with varying minimum age of vaccination (Blanton *et al*., 2010).

Animal control: All local jurisdictions should incorporate stray animal control, leash laws, animal-bite prevention and training of personnel in their programs [53].

Public health education: Essential components of rabies prevention and control include ongoing public education, responsible pet ownership, routine veterinary care and vaccination and professional continuing education (Murry *et al*., 2009).

Materials and Methods

Study Area

The study was conducted from November, 2016 to May, 2017.in and around Bedele town. Bedele town is found in West wollega Zone of Oromia regional state, Western Ethiopia. Bedele is far from west of Addis Ababa around 480km. The average temperature in the area is 11-25ºc minimum and maximum respectively. Its zone receives the average rain fall of 1800-2050mm. Altitude ranges from 2060 meter above sea level

Study Design

Information about biting of humans by rabid animal in different animal species was determined by reviewing the registers used for recording those humans that were brought in bedele hospital health center. Questionnaire survey was conducted using semi-structured questionnaire by face to face interview to 104 randomly selected communities to assess the public awareness, knowledge and practices about the disease. The questionnaire was designed to collect information about the community knowledge of the disease, treatment and prevention practices. The total of the respondent 104 from bedele town were selected based on willingness and informed consent.

Study Population

A retrospective record review was conducted to assess the incidence of human rabies exposure and associated risk factors from January 1, 2013 to December 30, 2016 and whose data was available at bedele hospital in the form of patients (rabies) registration book. All people who exposed to rabies visited at bedele hospital for PEP between 2013 and 2016 were made up the study population. Ages, sex, source of exposure, residence, are the independent variables of the study, while human rabies exposure treated as an outcome variable.
A survey questioner was conducted to assess the community KAP for non-exposed individuals of bedele community by preparing a structured questionnaire regarding the rabies disease in the study area.

Sample Size

For the retrospective study, the sample size was based on the incidence of animal bite and purposive sampling of retrospective record, the review was made on a total 970 patients recorded or admitted for anti-rabies vaccine during January 1, 2013 to December 30, 2016 that were found to have partially complete record.

For KAP assessment, numbers of respondent were counted and sample size for knowledge, attitudes and practices (KAP) were calculated based on the availability of non-exposed respondents. Accordingly, the overall sample size for KAP assessment were determined to be a total of 104 non-exposed respondents.

Inclusion criteria

Volunteer individuals who their age are greater than 15 were included in the assessment of KAP of the community, while those case admitted in Health Center and complete record were included in the retrospective study.

Data Collection

A four year (2013-2016) registered information data about the occurrence of rabies in humans in the study area was collected. The recorded data were comprised of identification number, sex, and address, source of exposure and date of bite. In addition, standard structured questionnaires were developed to assess the respondents' knowledge, attitude and practice to the various risk factors for the occurrences of the rabies disease in the study area. The questionnaire was comprised of items regarding respondents' profile, levels of knowledge, attitude and practice with respect to rabies and pet care practices and responsible dog ownership. Data was collected face-to-face interview using pre-tested structured questionnaire. The questionnaire was developed based on the information gathered from literature's and on what the community is practicing. The questionnaire was first prepared in English and later it was translated to Afan Oromo.

Data Analysis

The collected data was clarified and the code was given accordingly. The coded data was stored in Microsoft Excel 2010 spread sheet and transfer to SPSS version 20 for statistical analysis. Descriptive statistics were computed as appropriate. Rabies occurrence in human was analyzed by descriptive statistics. Outcome variables (awareness on rabies and associated factors, perceptions towards the public health risk and its prevention strategies and their practices on the major prevention and control activities of the disease) were separated.

The associations of the proportions on knowledge, attitudes and practices of the study participants with age, sex, residence, and educational status was assessed based on logistic binary regression. Logistic binary regression models were fitted containing the appropriate independent variable with 95% confidence interval and less than 0.05 level of precision.

Results

Retrospective Study

During the period of 2013-2016, a total of 970 individual person, were bitten by rabies suspected animals, received anti-rabies post exposure vaccine in bedele hospital. Rabies in dogs is well established in bedele town with no declination in the annual number of rabid registered cases during the last 4 years. As the recorded data indicated an average of 243 people infected annually and of these total reported fatal human rabies the highest cases 52.7% were children (less than 15years age), while the smallest 9.7% case were recorded in adult people greater than 46 years of age. (Table 1) From the total of rabies suspected individuals 847 (87.3%), 83 (8.6%), 34 (3.5% and 6 (0.6%) were bitten by dogs, cat, fox and equine species respectively Figure 1.

Retrospective Association and Independent Variable toward Rabies in Bedele Hospital

Nine hundreds seventy recorded data were collected from recorded case book of bedele hospital regarding age, sex, districts, source of exposure, years of bite and card number.

Variable	Number of suspected case	Percent (%)
Age		
1-15	511	52.7
16-30	262	27.0
31-45	103	10.6
>46	94	9.7
Sex		
Male	547	56.4
Female	423	43.6
Source of exposure		
Dog	847	87.3
Cat	83	8.6
Foxe	34	3.5
Other (horse, donkey)	6	0.6

Table 1: Socio-demographic study on Retrospective record from the year of 2013-2016.

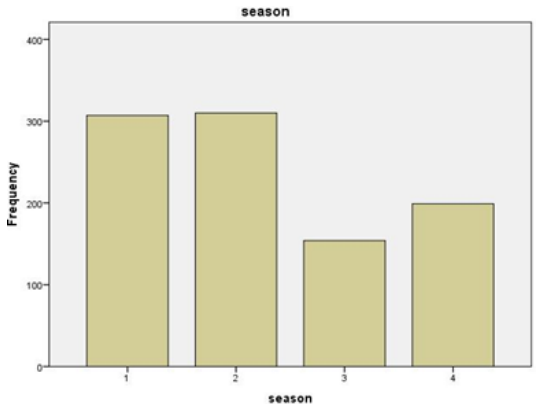

Figure 1: Temporal trend of rabies occurrence in the years of 2013-2016 in bedele health center related with seasonal bar chart.

Key: 1. Winter; 2. Spring; 3. Summer; 4. Autumn

Association between independent variables and retrospective record on rabies was assessed using Chi-square (X^2) test. In the year of 2013 high record were occurred during winter 31 (3.2%) season and low record were during the summer 12 (1.2%) seasons. In the year 2014 high record were during the period of spring 35 (3.6%) and low record were during summer 22 (2.3%), so it does not have any association. Therefore independent variable and retrospective record through my study period does not have any association (Table 2 & 3).

Variable		Season				
Year	Winter(jan-march)	Spring(april - june)	Summer(july-sebt)	Autumn(oct -decemb)	Total	Chi square test
2013	31 (3.2%)	26 (2.7%)	12 (1.2%)	14 (1.4%)	83 (8.6%)	0.031
2014	28 (2.9%)	35 (3.6%)	22 (2.3%)	31 (3.2%)	116 (12.0%)	
2015	84 (8.7%)	67 (6.9%)	45 (4.6%)	66 (6.8%)	262 (27.0%)	
2016	164 (16.9%)	182 (18.8%)	75 (7.7%)	88 (9.1%)	509 (52.5%)	

Table 2: Retrospective association and independent variable towards rabies in bedele hospital.

Result on Knowledge, Attitude and Practice of Communities Regarding Rabies in and Around Bedele.

Variable	No of respondents	Percent (%)
Residence		
Urban	77	74.0
Rural	27	26.0
Sex		
Male	60	57.7
Female	44	42.3
Age		
15-30	54	51.9
31-45	42	40.4
46-55	8	7.7
Religion		
Orthodox	43	41.3
Protestant	21	20.2
Muslim	36	34.6
Catholic	4	3.8
Education		
Elementary	15	14.4
Informal	19	12.5+5.8
High school	33	31.7
College	37	35.6

Table 3: Sociodemographic data on KAP.

Knowledge of the Community

All most all majority of non-exposed community were heard about rabies. Dogs 76 (73.1) were indicated a major source of infection for humans by all respondents followed by cat 22 (21.2%) and equine species 6 (5.7%). Bite was known as mode of rabies transmission by majority of the community (54.8%) while other means followed by inhalation (15.4%), contact (6.7%) and other respondent stated that I do not. The animal was salivate highly (40.3%) were described as a major symptoms of rabies in animals followed by lack of fear, be aggressive and disorientation (23.1%). Majority of the community with rabies can be cured by a traditional herbal medicine (37.5) like consumption of garlic and the other community followed by PEP (34.6%). Other (5.8%) less weight respondent say drinking water called hora and preserved tiger meat (quanta) with coffee and also Consumption of cooked or boiled meat from rabid animals was considered to safe human (Table 4).

Attitude of the Respondents

Around 46.2% of non-exposed respondents stated that I do not know to say rabies will completely cured after the onset of symptoms and no (39.4%) followed by yes(14.4%). The major constraint for the control of the disease was lack of awareness (42.2%) for the major non- exposed respondent. Majority of non- exposed community go health facility (59.6) and followed traditional healers (28.8).(Table 5).

Practice of the Respondent on Rabies

Around 81.7% of non-exposed respondents have home pets and majority of the dog are free to roam around (39.4%). Many of the respondents never take the pet for vaccination (52.9) and the other

Variables	Non exposed	Percent (%)
Did you heard about rabies		
Yes	104	100
What is the cause of rabies		
Spiritual	30	28.8
Germ	44	42.3
Heredity	15	14.4
I don't know	15	14.4
How do people get rabies		
Contact with rabies animal	38	36.5
By eating rabid animal meat	30	28.8
Living with animal	28	26.9
I don't know	8	7.7
Which animal species was the most common for transmitting the disease		
Dog	76	73.1
Cat	22	21.2
Equine	6	5.7
Is it transmitted from human to human		
Yes	69	66.3
No	29	27.9
Uncertain	6	5.8
What is the means of transmission		
Bite	57	54.8
Inhalation	16	15.4
Contact	7	6.7
I don't know	24	23.1
In what season of the year this disease was common		
Winter	54	51.9
Spring	23	22.1
Summer	13	12.5
Autumn	14	13.5
How can some with rabies be cured		
Herbal remedies	39	37.5
Praying	4	3.8
PEP by health center	36	34.6
Holy water	18	17.3
Other(eating a garlic, by drinking a water called Hora and keeping a tiger muscle for long time then drinking with coffee)	6	5.8
What happens if rabies exposure goes untreated		
The person survives	22	21.5
The person dies	58	55.8

The person heals but not the same as before	16	15.4
I don't know	8	7.7
Symptoms of rabies in humans		
Fever	6	5.8
Headache	20	19.2
Muscle pain	20	19.2
Altered mental status	26	25.0
Paralysis	11	10.6
Hydrophobia	7	6.7
Hyper salivation	9	8.7
Photophobia	5	4.8
Symptoms of rabies in animals		
Animals behave abnormally	17	16.3
Show lack of fear, be aggressive and seem disoriented	24	23.1
Paralyzed or partially paralyzed	5	4.8
Salivate excessively	42	40.3
Pawing at the ground	7	6.7
Hydrophobia	6	5.8
Photophobia	3	2.9
How can rabies be prevented in animals		
Eliminate stray dog	40	38.5
Vaccination	26	25.0
Application of herbal remedies	33	31.7

Table 4: Knowledge toward Rabies by Non exposed-respondents.

Variable	Frequency of Non exposed	Percent (%)
Do you believe that rabies patient will be completely cured after the onset of symptoms		
Yes	15	14.4
No	41	39.4
I don't know	48	46.2
What do you think are the necessary action to be taken to supervise dogs so that they do not bite humans		
Vaccinate regularly	8	7.7
Eliminate stray dog	43	41.3
Always keep dog tied	44	42.3
What do you think are the major constraints to control rabies		
An insufficient budget	6	5.8
Trained professionals (human to veterinary side)	11	10.6
Religious taboo	4	3.8
Lack of appropriate legislation	12	11.5
Awareness	44	42.3
Lack of rabies vaccine	16	15.4
Where should person go if he or she is bitten by animal		
Traditional healers	30	28.8
Spiritual healer	6	5.8
Health facilities	62	59.6
I do not know	6	5.8

Table: 5 Attitude toward Rabies by Non exposed-respondents

respondents were take to vaccination after the pet sick. Majority of non-exposed community (93.3%) were saying that no known government intervention for the prevention and eradication the disease from the country (Table 6)

Variables	Non-exposed	percent
Do you have home pets		
Yes	85	81.7
No	19	18.3
Pet dogs are housed		
In confined manner	21	20.2
Dog is free to roam around	41	39.4
Tied outside the house	33	31.7
Cohabit with owner	5	4.8
Cage and free roam some times	4	3.8
Do you take your pet (dog) for vaccination		
Yes	49	47.1
No	55	52.9
When did you take your pet for vaccination		
After it is sick	48	46.2
Never take to vaccination	55	52.9
Vaccine at three months of age	1	1.0
Is there any known government intervention for the prevention and eradication of the disease from the country		
Yes	7	6.7
No	97	93.3

Table 6: practice toward rabies by non-exposed respondents.

Association between Kap and Associated Risk Factor

Twenty seven questions were asked for each 104 non exposed respondent regarding cause, sources and mode of transmissions, clinical signs and prevention and treatment measures of rabies. Scores were given according to the completeness and accuracy of respondents' answers, ranging from zero to five depending on the nature of the question Which was resulted in a response of either, choose the correct answer (had got one mark) or wrong answer (had got zero mark) according to the nature of the question. The number of questions for which the respondent gave correct responses was counted and scored. This score was then pooled together and the mean score was computed to determine the overall KAP of non-exposed

respondents. Respondents who score greater than or equal to the mean value grouped to be good KAP and less than the mean value Poor KAP level for each.

Knowledge score				
Variables	Good knowle dge (%)	Poor knowledge (%)	P- value	Odds ratio (95 CI)
Residence				
Urban	44 (42.3%)	33 (31.7%)	0.420	1.436 (0.596-3.460)
Rural	13 (12.5%)	14 (13.5%)		
Age				
15-30	31 (29.8%)	23 (22.1%)	0.786	0.809 (0.175-3.733)
31-45	21 (20.2%)	21 (20.2%)	0.519	0.600 (0.127-2.838)
> 46	5 (4.8%)	3 (2.9%)		
Sex				
Male	29 (27.9%)	31 (29.8%)	0.123	1.871 (0.844-4.147)
Female	16 (15.4%)	28 (26.9%)		
Educational status				
Informal	8 (7.7%)	11(10.6%)	0.637	0.625 (0.089-4.401)
Elementary	9 (8.7%)	6 (5.8%)	0.677	1.500 (0.223-10.077)
College	19 (18.3%)	18 (17.3%)	0.951	1.056 (0.188-5.926)
High school	21 (20.2%)	12 (11.5%)	0.531	1.750 (0.304-10.075)

Table 7: Knowledge of non-exposed respondents and independent variable association toward rabies, in and around bedele town.

Association between independent variables and knowledge scores on rabies was assessed using p-value test. There was significantly association between knowledge scores and residence (p- value <0.05 in the urban areas. Association between urban and rural knowledge on rabies was no association. The good scores were higher in urban 44 (42.3%) than rural 13(12.5%).The majority of non-exposed respondents of all groups had good knowledge. Educational level was insignificantly associated with knowledge. Respondents with high school education (20.2%) and college education levels had higher percentages of good rabies knowledge compared with those who had only finished informal school (7.7%) and elementary school (8.7%)had statistically insignificant association with knowledge levels (p>0.05) as shown in the above table 7.

There is significantly association between attitude scores of the age of 15- 30 (0.039) and 31-45 (0.353) and sex (0.17), means p-value <0.05. The good scores attitude were higher in urban 43 (41.3%) than rural 17 (16.3.) Educational level was insignificantly associated with knowledge (p-value >0.05) Table 8.

There was insignificantly association between practice scores and educational status (p- value >0.05 in the informal, elementary, college and high school). The good scores were higher in urban 30 (28.8%) than rural 16(15.4%). Educational level was insignificantly associated with knowledge (p-value >0.05). Respondents in the urban, between the age of 15-30, 31-40 and both sex was insignificant association with practice (p-value <0.05) as shown in the above table 9.

Attitude score				
variables	**Good attitude (%)**	**Poor attitude (%)**	**P-value**	**Odds ratio (95 CI)**
residence				
Urban	43 (41.3%)	34 (32. 7%)	0.520	0.744 (0.302-1.832)
Rural	17 (16.3%)	10 (9.6%)		
Age				
15-30	30 (28.8%)	24 (23.1%)	0.309	0.417 (.077-2.253)
31-45	24 (23.1%)	18 (17.3%)	0.353	0.444 (0.080-2.465)
>46	6 (5.8%)	2 (1.9%)		
Sex				
Male	38 (36.5%0	22 (21.2%)	0.17	1.73 (0.78-3.80)
Female	22 (21.2%)	22 (21.2%)		
Education status				
Informal school	6 (5.8%)	7 (6.7%)	0.855	1.114 (0.348-3.571)
Elementary	13 (12.5%)	2 (1.9%)	0.086	4.225 (0.816-21.875)
College	15 (14.4%)	22 (21.2%)	0.096	0.443 (0.170-1.155)
High school	20 (19.2%)	13(12.5%)		

Table 8: Attitude of non-exposed respondents and independent variable association toward rabies, in and around bedele town.

Practice score				
Variables	**Good practice (%)**	**Poor practice (%)**	**P- value**	**Odds ratio(95 CI)**
Residence				
Urban	30 (28.8%)	47 (45.2%)	0.071	0.439 (0.180-1.073)
Rural	16 (15.4%)	11 (10.6%)		
Age				
15-30	21 (20.2%)	33 (31.7%)	0.218	0.382 (0.82-1.767)
31-45	20 (19.2%)	22 (21.2%)	0.445	0.545 (0.115-2.581)
>46	5 (4.8%)	3 (2.9%)		
Sex				
Male	30 (28.8%)	30 (28.8%)	0.168	1.750 (0.790-3.879)
Female	16 (15.4%)	28 (26.9%)	0.074	
Education status				
Informal school	11 (10.6%)	8 (7.7%)	0.637	1.600 (0.227-11.266)

Elementary	7 (6.7%0	8 (7.7%)	0.890	0.875 (0.132-5.819)
College	16 (15.4%)	21 (20.2%)	0.758	0.762 (0.135-4.287)
High school	12 11.5%)	21 (20.2%)	0.531	0.571 (0.099-3.290)

Table 9: Practice of non-exposed respondents and independent variable association toward rabies, in and around bedele town.

Variable	Numbers of non-exposed community (frequency)	Percent (%)
Knowledge		
Poor knowledge	47	45.2
Good knowledge	57	54.8
Attitude		
Poor attitude	44	42.3
Good attitude	60	57.7
Practice		
Poor practice	58	55.8
Good practice	46	44.2

Table 10: KAP of non-exposed respondent's related to summery on rabies in and around bedele town.

Most of all majorities of non-exposed respondents had good knowledge and good attitude but less weight community had poor practice as indicated in table 10 above

Discussion

Animals are source of rabies infection to human, mainly through biting and they play crucial role in maintenance and spread of the virus in the areas. From the retrospective record review a total of 970 human rabies exposure cases were recorded from bedele hospital from the year of 2013 to 2016. It was observed that the distributions of human rabies exposure cases from 2013 to 2016 were increased from time to time among study years. This current study indicates that dogs (87.3) were the primary cause for the human rabies post exposure prophylaxis in bedele hospital.

This survey indicated that almost all (99.99%) of the surveyed respondents were heard about rabies. Dogs were mentioned as the most common source for rabies infection by 73.1% of respondents followed by cat (21.2%). Dogs were mentioned as the cause of infection for most fatal human rabies cases and cat also mention as second important source of human infection. In addition, rabies in other domestic animals like cattle, sheep, goats, and equines were also mentioned as risk for human. These findings were also reported in southern African study china and Korean study,were domestic dogs have been reservoir of rabies and a source of rabies infection to humans and other animals [54 -56]. And also it is consistent with a study conducted in the city of New York, USA reported that 94.1% of the study participants know rabies as a killer disease and study conducted in bahir dar, more than 99% of the respondents identified that dogs are major sources for the spread of rabies in human population [53]. However this current study is lower when compared with USA and bahir dar finding. In addition, rabies in other domestic animals like, cats and equine were also mentioned as risk for human.

This study found that males (56.4%) were statistically more likely to have experienced dog bites than female. This has been presented in a number of different epidemiological studies on dog bite characteristics as from the of Spain, India and china. This can be due to boys are being more

Likely to display risk behaviour, and boys being more willing to take risks in a supervised environment to impress peers and teachers (Rosado *et al*., 2009; [57- 60].

Regarding age; children less than 15 years of age were the mostly affected (52.7%) group. As well as the number of rabies exposure increased from children, young and adult this is might be because of most children were play with dogs. The finding agreement with [61], who report major numbers (52.6%) of human rabies cases, were recorded in children aged 1-14 years, while small numbers in adult above 50 years of age. Additionally agreement with Deressa, showed that the most fatal cases were 42% from the age group 0-14 category and the minimum (15.54%) deaths were recorded in 50 years and above age category [62].

The occurrence of rabies in other domestic and wild animals could be due to spillover of infection from canine rabies and domestic animals might get infected with rabid wild life at grazing site. This study indicated that there is rabies in both domestic and wildlife in and around bedele town. This study was an agreement with the study of Tadale kebeta and his colleagues (Tadale *et al*., 2014). This may be due to the fact that the South western part of Ethiopia was covered by forest and consist different species of wild life especially foxes, which might play crucial role in maintenance and spread of the virus among pets, other domestic animals and wildlife in the areas.

Children are a major risk group for rabies. In this study, the majority of the bedele community (59.6) believed that a person potentially exposed to rabies should seek medical evaluation promptly. This study was an agreement with the recommendations of Ethiopian study that anyone who has been bitten by an animal, or who otherwise may have been exposed to rabies, should seek medical attention immediately (WHO, 2013). However, 28.8% of the community believed that traditional healers like drinking a preserved tiger muscle with coffee and herbal medicine like eating garlic could cure rabies. This was supported by Ethiopian study which indicated that the wide spread use of traditional, anti-rabies herbal remedies is common in Ethiopia and noted that some exposed individuals discontinue the vaccination regime to start these herbal remedies [63-70].

More recently study stated that, most fatal human rabies cases recorded at the Ethiopian Health and Nutrition Research Institute were associated with herbal remedies where the majority of human rabies cases were treated by traditional healers [71]. Individuals who use herbal remedies and do not develop disease may believe that they did not contract rabies due the use of the remedy after exposure. However, this may be a false association because not all animal bites will cause rabies. The fact that the majority of the respondents concurrently believed that herbal remedies cure rabies contributes to unnecessary deaths and underestimation of the burden of rabies, since these cases remain unreported to the health centers. This belief was significantly more common among rural residents and points to the need for specific measures to counter this attitude in these areas.

In this study I found moderately good levels of knowledge and attitude regarding the role of dogs in transmission as well as

clinical signs in both animals and humans. However, poor practices were found in terms of the need for appropriate first aid, medical care and animal management. Good level of knowledge of on preventive measures, were poorly practiced among dog owners. Only 31.7% of pet owners tied up outside their dogs during the whole day and dog is free to roam around (39.4%). The remaining 28.9% of dog owners reported that their dogs were in confined manner cage and free some times and cohabit with the owner. Likewise, only 25% of pet owners in the present study vaccinated their dog.

This is similar to findings from Addis Ababa Likewise, only 5% of pet owners in the present study vaccinated their dog and again this is considerably lower than that reported for Addis Ababa, where vaccine is more easily available and also consistence with results recorded in Bahir Dar who report majority of the owner not vaccinate their pets. This could be due to study area and community awareness difference (Yimer, 2012) [3]. The remaining 38.5% was eliminating (culling) stray dog. But it is in agreement with the study of partners for rabies prevention and control. Participants also identified eliminating strays or free roaming dogs as a possible control measure. Dog culling is not recommended as a rabies control strategy on its own (Partners for Rabies Prevention, 2014). However, along with dog vaccination, removal of strays or free roaming dogs may form part of an initial rabies control program in this particular setting where the number of unwanted dogs is considered problematic.

The finding indicate that, good knowledge (54.8), good attitude (57.7) and poor practice (55.8) with in non-exposed community. This finding has minor limitations due to ethical considerations I did not interview children < 15years because children less than years do not able to explain their ideas about the disease

Conclusion and Recommendation

Rabies though a vaccine preventable disease, it is a serious public health problem in which children are more affected. Dogs were mentioned as primary source of infection to human as well as animals.

As the recorded data reveal that a total of 970 people bitten and treated with post exposure vaccine, and of these total reported fatal human rabies cases 52.7% were children (less than 15years age), 27.0% were young (16-30) years of age and 10.6% were adult people (31-45 years) and 9.6 were older people greater than 46 years of age. The Association between independent variables and retrospective record on rabies was assessed using Chi-square (X^2) test. In the year of 2013 high record were occurred during winter 31 (3.2%) season and low record were during the summer 12 (1.2%) seasons. In the year 2014 high record were during the period of spring 35 (3.6%) and low record were during summer 22 (2.3%), so it does not have any association.

From the total of rabies suspected individuals 847 (87.3%) were bitten by dogs. The majorities of the respondents have good knowledge and attitude about rabies but have poor practice. The presence of low vaccination coverage and high dependency on traditional medicine especially in the rural area, were also well indicated. Such type of activities pose a health hazard and makes difficult the control of rabies in the area. The result of the current study indicates that the existence of high risk of the disease and low level of awareness of the community. Generally there is a difference on the level of awareness of rabies and receptiveness to rabies control measures between urban and peri urban areas. The poor and mal practice would hinder

Community participation in rabies control, regarding the modes of rabies transmission clinical signs of rabies, prevention methods after exposed to rabies suspected animal, the first action taken in the home after bitten by a suspected animal like wound washing with soap and water. However, control of the disease can be best achieved combination of vaccination, killing of stray dogs and training of community. Therefore In light with the above conclusion the following recommendations are forwarded:

- Increasing awareness of the community about the disease should be considered for controlling the disease.
- Scientific evaluation of the herbs used for treatment and prophylaxis purpose should be done rather than traditional method.
- Awareness creation should be conducted to the public particularly on children because children less than 15 years were more commonly exposed to rabies.
- Regular intervention targeted at controlling stray dogs and vaccination of dogs should be employed to control the disease.
- For human victims, proper post exposure treatment should be performed.
- Bedele Health Office Administration should provide periodic education to raise community knowledge on rabies and provide accurate information targeted to people who have lower educational level, housewives or females more commonly present at home and small number of children in the household.

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