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Review Article

Knowledge, Attitude and Practice Related to Dog Bite Victims Attending at Anti-Rabies Post Exposure Vaccine Taker in Poly Health Center in Gondar Town, Amhara Region, Northwest Ethiopia

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Abstract

Rabies is a neglected worst infectious disease with high case fatality rate, human deaths and economic losses. The virus affects all warm-blooded animals including humans and invariably dies from the disease once clinical signs are manifested. A cross-sectional study was conducted from January 2023 to March 2024 in Gondar town, Amhara Region, Northwest Ethiopia, with the objectives to investigate their Knowledge, Attitudes, and Practices (KAP) of dog bite victims using questionnaire survey. Simple random sampling procedure was used for recruiting study participants. A total of 384 study participants were selected through face-to-face interview using pretested structured questionnaires. The quantitative KAP score were dichotomized as adequate and inadequate knowledge, desirable and undesirable attitude, and good and poor practice. Descriptive statics and mixed effect logistic regression considering individual dog bite victims as a random effect was used to see the association of predictor variables towards adequate knowledge, desirable attitude and good practice. The Majority of respondents (64.3%) were males and 49.7% were aged greater than 45 years. About (80.02%) the respondents were married and 41% of respondents were illiterate. About 82.6% of the respondents have adequate knowledge. About 100% the respondent was heard about rabies. From a source of information for rabies 53.65%, 26.56%, 11.72% and 8.02% of the dog bite victims were heard about rabies from health practioners, mass media, conference meeting and personal efforts respectively. All (100%) of the respondents knew that the main source of transmission for rabies in humans is dog bites. About 88.02% of dog bite victims believed that rabies cannot be treated after the onset of clinical signs. About 10.42% of the respondents do not practice immediate washing the wound with water at the site of infection. Majority of the study participant (44.3%) dog bite victims were used traditional treatment as the best option for dog bites. The study revealed that the dog bite victims have good knowledge and desired attitude and high-risk behavioral practices which call for awareness creation and education towards rabies transmission and control and prevention practices.

Keywords: Dog bite victims; Ethiopia; Gondar town; KAP; Rabies; Risk factors

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Abbreviations: CNS: Central Nervous System; CSA: Central Statistical Agency; CSA: Central Statistical Agency; DALYs: Daily Adjusted Life Years; FAO: Food Agricultural Organization; FAT: Florescent Antibody Test; KAP: Knowledge Attitude and Practice; MoA: Ministry of Agriculture; MoARD: Ministry of Agriculture and Rural Development; NTDs: Neglected Tropical Diseases; OIE: World Animal Health Organization; ORV: Oral Rabies Virus; PEP: Post Exposure Prophylaxis; RIDT: Rapid Immune Diagnostic Test; RIG: Rabies Immune Globulin; WHO: World Health Organization

Introduction

Background

Rabies is one of the worst infectious diseases, which has a 100% case fatality rate [1]. It is a negative-sense, single-stranded Lyssa virus (genotype 1) with a roughly 12-kb genome. The genus Lyssa virus, which belongs to the Rhabdo viridae family, is the cause of rabies. Clinically, it manifests as meningoencephalitis or acute incurable viral encephalitis [46].

It infects all warm-blooded animals and Domestic dog bites are the predominant source of infection to humans, Up to 99% of human infections with the rabies virus occur in endemic areas and are mostly caused by domestic dog bites [80]. Animals, especially carnivores like canids, are the carriers of this virus [41]. Instances where saliva, cerebral or spinal fluid, tears, or nervous tissues from an animal or person suspected or confirmed to be rabid enter an open wound, are transplanted into, or come into contact with the mucous membrane of another animal or person, are the most frequent ways that infections are spread [57].

It is a neglected and underreported disease of developing countries where the majority of human deaths and economic losses associated with rabies are recorded [29,68]. Globally, the annual impact of rabies is quantified as a cause of the death of 59,000 people, 3.7 million Disability Adjusted Life Years (DALYs) and economic loss of US $8.6 billion per year due to premature death and costs for post exposure treatment [81].

Vaccination of dogs at risk and treatment of humans with pre- and post-exposure vaccine can readily reduce diseases in humans [22]. There are problems associated with the use of Post-Exposure Prophylaxis (PEP) in developing countries, for example, a study in Senegal it indicates with good public awareness on its dangerous and fatal nature of rabies; only half of the patients completed the full schedule of PEP [16]. This indicates the need for repeated awareness creation about preventive measures of the disease and cautions to be taken on the appropriate time to seek treatment options and the need to complete full scheme of the treatment [7]. Some rabies Knowledge, Attitude and Practice (KAP) studies are available in Ethiopia [17,26,83]. A study in South Gondar, Ethiopia, indicated low public awareness hindered the use of rabies preventive measures [9]. These studies showed that rabies is familiar for most members of the community but have gaps in knowledge and practice in terms of its prevention and control. However, these studies were limited to small geographic areas (mostly to a single district) and only describing the proportion of respondents in terms of certain rabies related knowledge and practices. The current study was conducted to comprehensively assess community Rabies KAP and their drivers in a country Ethiopia. Vaccination, wound care, and the injection of rabies immunoglobulin are examples of preventive methods. However, in many developing countries, where canine rabies causes the majority of human cases, deaths occur mostly due to a lack of access to affordable biological agents needed for effective post-exposure prophylaxis. A reduction in the number of human deaths due to rabies has to begin with the elimination of canine rabies. The feasibility of eliminating canine rabies in Africa is predicated on understanding and counteracting the many reasons that canine rabies control has failed in Africa. Domestic dog vaccination offers a cost-effective strategy for the prevention and elimination of human rabies mortality, and it is epidemiologically and practically feasible to eradicate canine rabies through mass vaccination of domestic dogs [42].

The WHO has established the "zero by 30" global strategy plan, which aims to eradicate endemic rabies globally by 2030 by preventing human deaths caused by dog-mediated rabies [75]. Even though widespread vaccination is the most well-known and effective strategy, there is still a lot that can be done to make it even more effective. Economic, cultural, social, educational, and technological issues must also be considered, particularly in Asia and Africa, where the rabies burden is significant, including Ethiopia [31].

Ethiopia ranks fourth on the globe and has the second-highest number of rabies mortality rates on the African continent, after Nigeria [23]. Due to a large dog population that is poorly managed, rabies has been recognized as the most common disease in Ethiopia for many centuries [24]. It is primarily a disease of dogs in the country because access to suspected domestic canids and pets is not controlled indoors or by immunization. In the past two decades, a high number of animal rabies cases have been confirmed in Addis Ababa, the capital city of Ethiopia, and the majority of rabies cases were confirmed in dogs [5]. Understanding communities' perceptions of the cause, mode of transmission, symptoms, treatment, and possible intervention measures of rabies is an important step towards developing strategies aimed at controlling the disease, determining the level of implementation of planned activities in the future, and creating responsible pet ownership, routine veterinary care and vaccination, and professional continuing education [14]. Poor public awareness of rabies is considered one of the challenges to disease prevention and control in Ethiopia, including the study area.

Knowledge and attitude are promoting people to take protective measures at work and actively participate in disease control programs, thus greatly assisting the development of rabies control strategies. So far, in Ethiopia, different studies have been done on the prevalence, knowledge, attitude, and practice about rabies among the public. However, the findings of these different studies show that there is a high variability in the level of the knowledge, attitude, and practice across the regions of the country and unclear. The general objective of this study was to undertake to estimate the level of knowledge, attitude and practice of peoples towards rabies in Ethiopia.

Statement of the Problem

Rabies is one of the Neglected Tropical Diseases (NTDs), accounting for over 80% of human cases and primarily affecting

poor and vulnerable communities [10]. Domestic dog bites are the predominant source of infection to humans; 99% of human cases are originated from dog bite [80]. This disease causes the major impediments to human health and economic losses mainly in developing countries [29,68]. Globally, it causes the death of 59,000 people, 3.7 million Disability Adjusted Life Years (DALYs) and an economical loss of $8.6 billion due to premature death and costs for post exposure treatment. In low-income countries where the majority of economic losses and human deaths associated with rabies are recorded [7].

In Ethiopia, large number of dogs and their wider use as home pets in towns and as an important guard for livestock and home in many areas of the countries. In addition the country has limited laboratory capacity and human rabies management. Some rabies Knowledge, Attitude and Practice (KAP) studies are available in Ethiopia [17,26,83]. These studies showed that rabies is familiar for most members of the community but have a limited gap in knowledge, attitude and practice in terms of its prevention and control. However, in order to address the above problems, a study is required to fill the gaps in knowledge, attitude and control practice about the rabies disease and its reservoirs in order to create baseline information that can be used to develop efficient disease control and prevention program. So, because of these problems the following research questions are formulated.

Research Questions

This research work was attempted to answer the following research questions.

✓ What are the levels of knowledge, attitude, and control practices in dog bite victims in the study areas?

✓ What are the associated risk factors in dog bite victims in the study area?

Objectives

General objective:

➢ The aim of this study was conducted comprehensively to assess the KAP of dog bite victims their drivers in Gondar town poly health center, Amhara region, Northwest Ethiopia.

Specific Objectives

The specific objectives of this study are:

• To measure the level of dog bite victims' knowledge and control practices towards rabies in the study area.

• To determine the associated risk factors in dog bite victims in the study area.

Significance of the Study

Poor public awareness of rabies is considered one of the challenges to disease prevention and control in Ethiopia, including the study area. This study would be used conducted comprehensively to assess about dog bite victims' knowledge and control practices towards rabies in the study area. To update the required bodies about the important risk factors responsible for the occurrence of rabies in the communities. The study would be promoted to future researchers to use the gap for further investigating the occurrence of rabies. It measured the level of dog bite victim's perceptions about rabies about the cause, mode of transmission, symptoms, treatment and possible intervention measures of rabies in communities. It also an important step towards to determining the level of implementation of planned activities in the future, and creating responsible pet ownership, routine veterinary care and vaccination and professional continuing education. Therefore, this study would facilitate zonal and regional health sectors used to designing and implementing effective control and prevention strategies of rabies diseases.

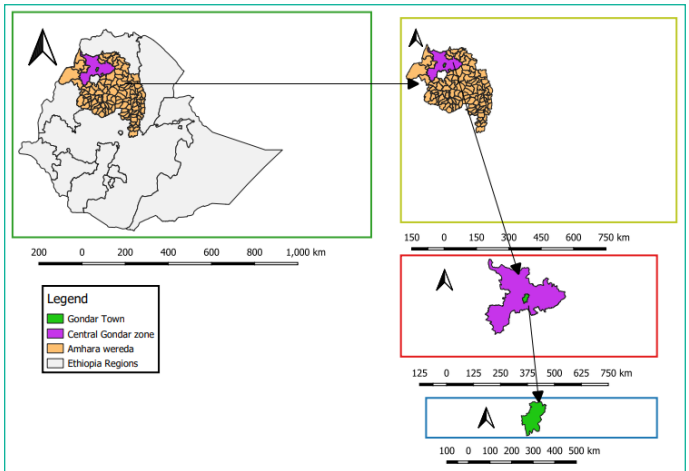

Figure 1: Maps of the study area.
Sources: QGIS software version 3.22

Literature Review

Etiology

The causative agent of rabies is a member of the Lyssavirus genus of the Rhabdo viridae family of bullet-shaped viruses, which have a single-stranded RNA genome [53,55]. The genus includes the classical rabies virus (genotype 1) and six so-called rabies-related viruses, Lagos bat virus (genotype 2), Mokola virus (genotype 3), Duvenhage virus (genotype 4), European bat Lyssa viruses 1 and 2 (genotypes 5 and 6), and the recently discovered Australian bat genotype 7 [72].

The genus Lyssa virus comprises rabies virus and closely related viruses, including Mokola virus, Lagos bat virus and Duvenhage virus from Africa, European bat virus 1 and 2 and Australian bat Lyssavirus. Each of these viruses is considered capable of causing rabies like disease in animals and humans [53]. It can be inactivated by sodium hypochlorite, 45-75% ethanol, iodine preparations, quaternary ammonium compounds, formaldehyde, phenol, ether, trypsin, β-propiolactone, and some other detergents. It is also inactivated by a very low pH (below 3) or very high pH (greater than 11). This virus is susceptible to ultraviolet radiation. It is rapidly inactivated by sunlight and drying, and (in dried blood and secretions) it does not survive for long periods in the environment (CFSPH, 2012).

Epidemiology

Geographic Distribution: Rabies virus is distributed worldwide with the exception of islands. Some countries such as the United Kingdom, Ireland, Sweden, Norway, Iceland, Japan, Australia, New Zealand, and Singapore, most of Malaysia, Papua, New Guinea, Pacific Islands and some Indonesian islands have been free of this virus for many years [56]. It is a serious disease threat to humans, domestic animals and wildlife. Worldwide rabies kills about 50,000 – 100,000 people/year and countless domestic and wild animals [13].

In Europe the red fox is the most important reservoir host and vector of rabies. An increase in incidence of rabies in foxes result in an increase in incidence of rabies in domestic animals

such as cattle, sheep, horse, cat, dog and others [76]. Sylvatic and urban rabies cycles occur concurrently in some regions, while the sylvatic cycle predominates in others. For example, wild animals accounted for more than 90% of the animal rabies cases reported in the U.S. and Canada in 2010. Vampire bat transmitted bovine paralytic rabies, which is endemic in tropical regions extending from Northern Mexico to Southern Argentina and Island of Trinidad and Tobago [58]. Rabies can be a serious concern in some rare or endangered species.

In Africa, the Ethiopian wolf (Canis simensis) and African wild dogs (Lycaon pictus) are threatened by this virus. Although cases of rabies tend to be sporadic, epizootics are possible (CFSPH, 2012). The first rabies outbreaks in dog were reported in many parts of Ethiopia in 1884, especially in the former province of Tigray, Begemder, Gojjam and Wollo. In Addis Ababa the capital city of Ethiopia, rabies problem has been greatest where the disease had been well established and become endemic. The reviewed rabies situation in Ethiopia revealed that 2172 cases of animal rabies had been confirmed in and around Addis Ababa during 1990-2000, where dogs constituted 89.83 % with the incidence rate of 73.2 % [5,15].

Host Range: All warm- blooded animals are susceptible to rabies [52], but only a limited number of species also act as reservoir hosts. They include members of the families Canidae (dogs, jackals, coyotes, wolves, foxes and raccoon dogs), Mustelidae (skunks, martens, weasels, ferrets stoats etc.), Viverridae (mongooses, meerkat etc.), Procyonidae (raccoon etc.), and Chiroptera (> 1,200 species of bats) [14].

Many animal species can be regarded as accidental hosts or 'dead end' hosts and these species have no epidemiological significance in sustaining rabies epidemics. These include humans and other primates, horses, cattle, sheep and pigs. The most common hosts are domestic dogs, cattle and man in Ethiopia [53].

Transmission: Rabies virus is usually transmitted from animal to animal through bites [26,82]. A rabies exposure is any bite, scratch, or other situation in which saliva, cerebral spinal fluid, tears, or nervous tissue from a suspect or known rabid animal or person enters an open wound, is transplanted into, or comes in contact with mucous membranes of another animal contamination of scratch wounds by virus infected saliva [14] and of both wild and urban rabies occurs mainly when an animal that is shedding virus in its saliva bites another susceptible animal or humans. 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 (Shite et al., 2015).

Rabies virus is transmitted by contamination of a fresh wound with infected saliva from the bite of a rabid animal or from licking abraded skin or mucous membranes. Respiratory and oral transmission can also occur. The main determinant of transmission is the population density of non-immunized susceptible key host species that are free roaming within an ecosystem [52]. The animal usually contracts rabies from the bite of an infected animal. The virus may also enter the body if the mucous membranes (the wet part of the eyes, nose, or mouth) or a scratch or break in the skin have contact with saliva containing the rabies virus [82,15].

Once the rabies virus enters the body, it begins to multiply in the area near the entry site [15,53]. Usually transmission occurs by bite with rabid canine and also under unusual circumstances by inhalation of large amounts of aerosolized rabies virus and through organ transplantation from rabies infected patients [38]. Rabies-infected animals have rabies virus in their salivary glands at high titers which can be even greater than in the brain [21].

The presence of high population of dogs with improper management contributes for high endemic condition of canine rabies in Ethiopia. In canine rabies endemic countries like Ethiopia, rabies has also significant economic importance by its effect on livestock, and in Africa and Asia, the annual cost of livestock losses as a result of rabies is estimated to be US$ 12.3 million [26,38,63]. Rabies is mainly rural transmitter, the hematophagous bat (Desmodus rotundos), that transmits the disease to herbivores, as these are the most common food source. Cycle in wild disease is transmitted to animals like fox, wolf, monkey, coon, skunk, among others. These animals can be a source of food for the hematophagous bat (Shite et al., 2015).

Transmission to people occurs predominantly via infected animal bite or scratch as well as via their saliva through mucosa and broken skin (Tschopp et al., 2015). Rabid dogs are the principal sources for the transmission to human. The transmission almost always occurs by an animal bite that inoculates the virus into the wounds. Virus inoculated into a wound does not enter the bloodstream directly bur is taken up at a nerve synapse to travel to the brain; it causes encephalitis [63].

Pathogenesis: Rabies virus enters the body through wounds or by direct contact with mucosal surfaces, but cannot cross intact skin. The highly neurotropic RABV replicates in the bitten muscle tissue (local viral proliferation in non-neural tissue) and enters peripheral nervous system (viral attachment) where it remains localized for periods ranging from days to months. Bites in areas rich in nerve fibers, such as the hands and face, are especially dangerous, and the resulting incubation period tends to be short. At this stage the immune response is ineffective because the viruses are introduced into the wound in numbers too low to provoke it; also, they do not travel through the bloodstream or lymphatic system, where the immune system could best respond. Then after the virus is transported along afferent axons (centripetal spread) to reach the central nervous system [7].

The rate of centripetal progress of the virus along the axons of the peripheral nerve has been estimated experimentally in mice as 3 mm per day. Thereby the virus spreads to the spinal cord and ascends to the brain where it causes encephalitis. In people infected by aerosols, e.g. in bat-infested caves or in laboratory accidents, the virus probably reaches the CNS via nerves supplying the conjunctiva or the upper respiratory tract, including the olfactory nerves [83].

Once the virus replicates in the spinal cord and throughout the CNS, it may disseminate rapidly (centrifugal spread) along the neuronal axons of the peripheral nerves to other tissues, including the salivary glands and hair-bearing tissues. The dissemination of virus in peripheral tissues outside the CNS depends on the inoculums dose and the length of the incubation period. Large inoculums produce a short incubation period and a rapid course of illness leads to death before spread of virus throughout the brain; dogs die suddenly after a short incubation period and without showing any signs of illness. The presence of virus in saliva, especially in carnivores, is an important factor in rabies transmission. Inoculation dogs with various doses of canine

street rabies virus will excrete virus in their saliva up to 14 days before signs appear.

The severity of infection and, in some measure, the location of changes depends for the most part on the inoculums dose. A small dose of virus can produce longer incubation periods and results in more pathologic changes. The degree of inflammation of the brain and, less commonly, the spinal cord is directly proportional to the length of the incubation and morbidity periods. Neuronal degeneration in the CNS ranges from minimal to severe, with satellitisms and neurophagia is evidence of early neuronal necrosis, Negri bodies can be found in the brain stem, pons, cerebral cortex, and cervical part of the spinal cord. In general, the number of Negri bodies present is directly proportional to the severity of inflammation.

Clinical signs and symptoms: The clinical course in domestic carnivores, which usually lasts for days or for a few weeks, may encompass prodromal, furious (exitative) and dumb (paralytic) phases. In certain rabid animals, some of these phases may not be observed. In the prodromal phase affected animals are often confused and disorientated; shows behavioral changes such as aggressiveness and no fear of humans in wild animals or abnormalities in appetite [14]. The period lasts approximately 1-3 days, animals show only vague central nervous system signs, which intensify rapidly [26,53].

The furious phase is characterized by an increase in aggressiveness and hyperexitability and there is a tendency to bite at inanimate objects and at other animals [14]. Affected animal may roam over long distances and characterized by restlessness, wandering (aimless movement with speed), howling, polypnea, drooling and attacks on other animals, people or inanimate objects [53]. Affected animals often swallow foreign objects such as sticks and stones [52].

Nocturnal animals may be visible during the day [14]. In paralytic (dumb) phase muscle weakness, difficulty in swallowing, profuse salivation and dropping of the jaw are the usual features. Those clinical signs may be mistaken for those caused by a foreign body in the throat or mouth [40].

Diagnosis: Rabies can be difficult to diagnose clinically, because in the early stages, it is easily confused with other diseases. Therefore, suspected and probable clinical cases of rabies should be confirmed by laboratory tests. Rabies diagnosis is primary analytical ante mortem and postmortem testing of samples collected from suspect animals and humans [79].

It is used to detect rabies virus infection both before rabies specific signs (hydrophobia or aerophobia) are present or post mortem through detecting the whole viruses, viral antigens, or nucleic acids in infected tissues. The best sample for diagnosis of human rabies is the skin biopsy from a richly innervated zone. Saliva is the second-best sample for rabies diagnosis. Secretions and biological fluids, such as saliva, spinal fluids, and tears are used to test rabies while the animal is alive [77].

In Ethiopia, the experience of sending the suspected and dead animal's brain for examination was very low due to the limited available diagnostic center in the country [5]. There are different rabies diagnosis methods, including virus isolation, virus and its antigens detection, detection of anti-rabies antibodies, and detection of viral nucleic acid [50].

Fluorescent Antibody Test (FAT): The Fluorescent antibody Test (FAT) is the recommended gold standard for rabies diagnosis. In this method, rabies virus is detected by binding fluoresce in isothiocyanate with rabies specific antibody to form conjugate, and rabies antigen is observed under fluorescent microscopy. The fresh brain tissue sample is preferable for diagnostic of rabies to get result within 3 hours (Rupprecht et al., 2018). Based on the result, there is no need for PEP treatment when FAT results with sensitivity of 100% are negative [18].

Rapid Immunodiagnostic Test (RIDT): Rapid Immunodiagnostic Test (RIDT) is the method of antigen detection in fresh animal brain tissue. It is important for the field and frontline laboratories. The result of all positive RIDT tests requires being confirmed employing direct fluorescent anti-body testing at a qualified laboratory [12].

Microscopic analysis of samples: This method is the direct diagnostic approach used for the identification of rabies virus-specific antigen in a short time with limited cost, disregarding geographical origin. It has to be considered as the first step in diagnostic procedures for all laboratories. The sample used for this technique can be taken from saliva, urine, and cerebrospinal fluids, but less sensitive and reliable than brain samples [12].

ELISAs and direct rapid immune histochemistry tests: These tests have provided consistently reproducible results in several laboratories [51]. Virus might have to be isolated to confirm the results of antigen detection tests and for further amplification or characterization of an isolate. Virus can be isolated in cell cultures, such as neuroblastoma cells, or by intracranial inoculation into mice. Virus isolation in animals should be replaced by alternative methods, whenever possible [17].

Molecular methods: The Reverse Transcription Polymerase Cain Reaction (RT-PCR) and other amplification techniques are playing an increasingly important role in many countries but are not recommended currently for routine post-mortem diagnosis of rabies if brain tissue is available, when the direct fluorescent antibody test should be used Matter et al., (2000).

Differential Diagnosis: Rabies must be considered in the differential diagnosis of any suspected mammalian meningitis/encephalitis cases. Among this, the followings are mostly misdiagnosed with rabies virus.

1. Equine encephalitis virus: Misdiagnosed with RABV due to the stage of paralysis, unable to swallow, weakness, recumbency and death within 2–4 days after onset. But Equine encephalitis virus causes impaired eyesight, circling and Recovery rate (60–75%); which are mostly absent in case of RABV.

2. Canine distemper virus in dogs: Misdiagnosed with RABV due to neurological signs. This disease can cause uveitis, sudden blindness, and respiratory signs.

3. Coughing and nasal discharge: puppies are mostly affected showing signs of pneumonia, diarrhea, and dehydration and vomiting.

4. Botulism in cattle: Misdiagnosed with RABV due to signs of weakness, stumbling and recumbency. But in Botulism, normal mentation, paralysis of tongue and thoracic muscles and some recoveries are mostly evident.

5. Aujeszky's disease (pseudo rabies)- Misdiagnosed due to signs of intense and local pruritus at site of bite, excitement, bellowing, convulsions, paralysis, and death within 2–3 days after onset. But pseudo rabies mostly affects pigs and cattle and responds to magnesium sulphate early.

6. Lead poisoning (in acute and sub-acute) in cattle: Misdiagnosed because the clinical findings are similar to those of furious and dumb rabies. In acute lead poisoning, the common clinical findings are blindness, convulsions, death within 2 and 4 days after onset, pharyngeal paralysis, dysphagia, weakness and recumbency.

7. Vitamin A deficiency in cattle: occurs in groups of young cattle from 6 months to 18 months of age not receiving adequate carotene intake or vitamin A supplementation and is characterized by blindness in the ocular form and episodes of tremors and convulsions.

Treatment: No treatment should be attempted after clinical signs are evident; hence rabies is fatal once clinical signs are seen. Only high-risk individuals, such as laboratory workers, animal control professionals, and veterinarians, are routinely vaccinated against rabies before known exposure. If a person is bitten, immediately the wound should be thoroughly washed with 20% soft soap, water (for about 15 minutes) and 40% to 50% alcohol solution of all bite wounds and scratches is perhaps the most effective measure for preventing rabies in people bitten by rabid animals. The proper cleaning of the wound would remove most of the virus but these simple and cheap treatment procedures are often omitted in most cases [51].

If the animal is positive for rabies, the person must undergo PEP -meaning a series of anti-rabies vaccine and immune globulin injections is recommended. "Another indication for anti-rabies treatment is any unprovoked bite by a skunk, bat, fox, coyote, bob-cat, or raccoon not available for examination. Treatment after a dog or cat bite, if the animal cannot be found, is determined by the prevalence of rabies in the area. Euthanasia of suspect animals must be avoided, particularly if human exposure has occurred, because the development of the disease in the animals is necessary to establish a diagnosis.

Control and Prevention: Domestic animal vaccination: The primary components of a rabies control program for companion animals are immunization and licensing; stray animal control; reporting, investigation, and isolation of animals involved in bite incidents; and public education [14]. 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 one to 4 years; and products with varying minimum age of vaccination [26,53].

Animal control: Principles of rabies prevention should focus on excluding wild animals from areas of human and domestic animal habitation and activity, and avoidance of contact with possibly rabid wild animals. Immunization of wildlife by widespread distribution of vaccine impregnated oral baits has shown variable success toward arresting the propagation of rabies in raccoons and coyotes in other states. The use of oral rabies vaccines (ORV) for the mass vaccination of free-ranging wildlife should be considered in selected situations [14,37].

Public health education: 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 [6] and creating responsible pet ownership, routine veterinary care and vaccination, and professional continuing education. Having about controlling animal and human exposures to rabies can be prevented by raising awareness concerning: rabies transmission routes, and avoiding contact with wildlife. Public education on the risks of rabies transmission from wild animals is paramount to effective disease prevention [2,14,26,63].

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 [26]. It is better to register, license and immunize all dogs in enzootic countries, collect and euthanize ownerless animals and stray dogs. To create awareness, pet owners and the public should be educated to educate about the importance of restriction for dogs and cats and advise them against keeping wild animals as a pet [53]. According Chernet and Nejash (2016), rabies control strategies include quarantine, confirmation of diagnosis, determining the origin and spread of an outbreak, and specific measures to terminate transmission. All local jurisdictions should incorporate stray animal control, leash laws, animal-bite prevention and training of personnel in their programs [26].

Pre exposure prophylaxis vaccine in human: Pre exposure vaccination is indicated for persons whose occupation, travel, or recreational activities place them at higher risk of exposure to rabies. Occupational groups include veterinarians, veterinary technicians, animal control officers, bat researchers, wildlife workers, and animal disease laboratory workers. International travelers are recommended to receive pre-exposure vaccination if they are likely to come in contact with animals in countries where canine or other animal rabies is prevalent, and immediate access to appropriate medical care, including rabies vaccine and immune globulin, might be limited [8].

Pre-exposure prophylaxis is given for two reasons: To provide protection against unrecognized or unapparent exposures to rabies and to simplify Post-Exposure Prophylaxis (PEP) by eliminating the need for Rabies Immune Globulin (RIG) and by decreasing the number of required vaccine doses when an exposure occurs. Pre-exposure immunization does not eliminate the need for prompt post exposure prophylaxis following a recognized exposure; it only reduces the PEP regimen. Anyone who receives the pre-exposure prophylaxis series is considered immunologically primed against future rabies exposure. Therefore, if they are exposed to a rabid animal, they simply require PEP for a person previously vaccinated (i.e., days 0 and 3 vaccination) it explained on table1 below [8].

Post exposure prophylaxis treatment in human: The essential components of rabies post-exposure prophylaxis are wound treatment and, for one previously unvaccinated persons, the administration of both human Rabies Immune Globulin (RIG) and vaccine are present [7]. Local treatment of wounds, thorough washing and flushing (for about 15 minutes, if possible) with soap or a cleansing agent and copious amounts of water of all bite wounds and scratches should be done immediately or as early as possible. Where available, an iodine containing, or similarly veridical, topical preparation should be applied to the wound, Tetanus prophylaxis and measures to control bacterial infection should be given as indicated [78].

Specific treatment, the immediate treatment is started after exposure, is the better. Post-exposure anti-rabies vaccination should always include administration of both passive antibody and vaccine, with the exception of persons who have ever previ-

ously received complete vaccination regimens (pre-exposure or post-exposure) with a cell culture vaccine or persons who have been vaccinated with other types of vaccines and have previously had a documented rabies virus neutralizing antibody titer. These persons should receive only vaccine, when get pre-exposure before. The combination of RIG and vaccine is recommended for both bite and non-bite exposures reported by persons who have never been previously vaccinated for of prophylaxis. If post-exposure prophylaxis has been initiated and appropriate laboratory diagnostic Testing (FAT) indicates that the exposing animal was not rabid, post-exposure prophylaxis can be discontinue [44]. Post exposure vaccination is usually accompanied by injection of anti-rabies immunoglobulin of either human (HRIG) or equine (ERIG) origin, and is referred to collectively as PEP [45]. Rabies Immune Globulin (RIG), a recombinant monoclonal antibody targeting a specific epitope of the G protein, is highly effective in neutralizing RABV in vitro or before the virus enters the CNS [39].

It is an essential component of PEP, since it delivers passive immunity which is particularly important at early stages, before the host develops active immunity to the vaccine. However, once the virus accesses the CNS, these antibodies are restricted to crossing the immune-privileged BBB to neutralize virus infection. Although, in theory, the antibody could be given intracerebrally, it is definitely not a practical therapy. On the other hand, it has been firmly established that enhancement of BBB permeability is required to allow the passage of VNAs into the CNS of activated B cells, in order to cross the BBB and release antibodies in situ for RABV clearance [34,35,43]. RIG is also an important component of post-exposure prophylaxis to inhibit viral spread in the interval before sufficient immunity is developed in response to vaccination. It should be injected into and around the wound site, ideally on the day of exposure or up to 7 days after the initial dose of vaccine [73]. Twenty IU/kg on day zero in conjunction with the first vaccine one dose. If possible, the full calculated dose of RIG should be used to infiltrate the wound. If it is two not possible to do so, any remaining portion of the dose should be administered intramuscularly at a site different from the site used to administer the vaccine. Because, the antibody response following the recommended vaccination regimen with HDCV has been satisfactory, routine post-vaccination serologic testing is not recommended. Serologic testing is indicated in unusual circumstances, as when the patient is known to be immune suppressed (Beyene et al., 2018).

Post exposure prophylaxis treatment in animal: Any animal potentially exposed to rabies virus (Rabies Exposure) by a wild Carnivorous mammal or a bat that is not available for testing should be regarded as having been exposed to rabies. Unvaccinated dogs, cats, and ferrets exposed to a rabid animal should be euthanatized immediately. If the owner is unwilling to have this done, the animal should be placed in strict isolation for 6 months and vaccinated one month before being released. Protocols for the post exposure vaccination of previously unvaccinated domestic animals have not been validated, and there is evidence that the use of vaccine alone will not prevent the disease [71].

Materials and Methods

Study Area

The study was conducted in Gondar town poly health center in Amhara region, Northwest Ethiopia from January 2023 to March 2024. The study area was selected purposively based on their availability of post exposure nervous tissue vaccines in poly health center in Gondar town. Gondar town is found in northwestern part of Ethiopia at 748km away from Addis Ababa and 180km from Bahir Dar the administrative center of Amhara region. The estimated human population is of the estimated to be 230,315 and the total area of the city covers 5560 ha (CSA, 2022).

Gondar town is located between 12◦ 36’ North latitude and 27° 2’ East longitude. The annual mean minimum and maximum temperature vary between 12.3–17.7°C and 22–30°C, respectively, with an annual average temperature of 19.7°C. It is located 749 kilo-meters away from Addis Ababa, the capital city of the country, and 207 kilo-meters away from Bahir Dar, the capital city of the region (Demeke *et al*., 2020). The estimated human population is of the estimated to be 230,315 and the total area of the town covers 5560 hectare (CSA, 2022).

Study Design and Data Sollection

A cross-sectional study was conducted over a period of three months from September to November 2023 among dog bite cases attending Gondar town poly health center using a semi-structured questionnaire. The questionnaire was designed to collect quantitative data on dog bite victims' knowledge, attitude and practice related to rabies (Annex 1). The questionnaire had 4 sections such as socio-demographic characteristics, knowledge, attitude and practices of respondents regarding on dog bites and rabies. Depending on the option of each questionnaire sections in related questions about knowledge and practice, respondents were asked to answer ‘yes’ or ‘no’ or to choose from a list of options provided. Attitude questions were developed by Likert’s scale having five components, strongly disagree, disagree, uncertain, agree and strongly agree. The socio-demographic questions included were respondents' sex, age, socioeconomic status, marital status and educational status. Age class of the respondents was classified to three groups as less than 30 years, 30–45 years and greater than 45 years following previous recommendations for social science research [83]. Before collecting the actual data, it was pre-tested and corrected based on the feedback of pre-test. The pilot testing was primarily targeted to test clarity of questions, to estimate the time needed to administer the questions and enough to acquire the required information. The final questionnaire was administered by face-to-face interviews using the local language (Amharic). The selected victims were individually interviewed using questionnaire. Both open and closed ended questions were included in the questionnaire.

Sampling Methods and Sample Size Determination

Simple random sampling was used to select study participants. First, administrative zones and the study area were selected purposively based on their ease of accessibility and availability of nervous tissue vaccines. Next Individuals within health center were selected purposively targeting household heads having dog bite victims. Individual having dog bite victims in the health center were selected randomly using computer based random numbers. Individual in the vicinity were substituted when no one is unwilling to participate.

Sample size was calculated using the method described by [69].

$$n = \frac{1.96^2\ P\ (1-P)}{D^2} = \frac{1.96^2\ 0.5(1-0.5)}{0.5^2} = 384$$

Where:

n = sample size

P = expected prevalence

D = standard error

We used 50% expected prevalence (P) and a 5% standard error (d), which were estimated using formula above. Therefore, 384 sample sizes were considered for this study.

Data Analysis

The collected data was entered into Microsoft Excel, coded and summarized using descriptive statistics. All statistical analyses was done using Stata 17 statistical software. A mixed effect logistic regression model (dog bite victims was taken as random effect). Correlation, confounding and interaction tests were checked.

The socio-demographic questions were included respondents' sex, age category, educational status, marital status, religion, dog ownership and rabies knowledge level (for desirable attitude and good practice) were the predictor variables where associations were examined. Factors with a p-value of less than 0.25 in the univariable analysis were incorporated into the full multivariable mixed effect logistic regression mode. In the multivariable mixed effect logistic regression, P-value < 0.05 was considered as cut off for statistical significance and Odds Ratio (OR) and 95% CI were also calculated. Age class of the respondents was classified to three groups as less than 30 years, 30–45 years and greater than 45 years following previous recommendations for social science research [83]. The responses for KAP questions were given scores and dichotomized using cut off 50% of the maximum obtainable score reflecting good and poor KAP levels. The binary knowledge questions were given score of 1 when correctly answered 0 when answered incorrectly. Respondents who scored yes and/correct responses were considered as having adequate knowledge and those who scored no and/ incorrect responses were considered as having inadequate knowledge. Similarly, respondents who scored yes and/correct responses were categorized as having good practice and individuals scored no and/ incorrect responses as having poor practice. The attitude questions were set in Likert scale and were scored as 1 = strongly disagree, 2 = disagree, 3 = uncertain, 4 = agree and 5 = strongly agree which depends on the nature of the statement. A dog bite victims' attitude was determined good attitude as a proportion of agree and strongly agree greater than 50%, poor attitude as a proportion of disagree and strongly disagree less than 50% and neutral attitude based on the scores by respondents given for questions measuring attitude by Likert scale.

Results

Socio-Demographic Characteristics of the Respondents

A total of 384 dog bite victims were interviewed during the study period. Majority of respondents (64.3%) were males and 49.7% were aged greater than 45 years. About (80.02%) the respondents were married and 41% of respondents were illiterate. Besides, 73.7% of the study respondents were farmers and 76.6% were from rural areas. Most of the respondents were Christians. Two third of the study participants were lived in rural areas. About 81.5% of the respondent owned dogs (Table 1).

Table 1: Socio-demographic characteristics of the respondents.

Variables	Categories'	Proportion (%)
Sex	Male	247 (64.3)
	Female	137 (35.7)
Age	<30 year	40 (10.42)
	30-45 year	153 (39.84)
	>45 year	191 (49.74)
Marital status	Single	37 (9.6)
	Married	338 (88.02)
	Divorced	6 (1.56)
	Windowed	3 (0.78)
Level of educated	Illiterate	157 (41)
	read and write	110 (28.65)
	1- 4 grades	67 (17.45)
	5-8 grades	36 (9.38)
	9-12 grades	10 (2.6)
	college/university	4 (1.04)
Religion	Christians	316 (82.29)
	Muslim	65 (16.93)
	Protestant	3 (0.78)
Occupational status	Farmer	283 (73.7)
	Merchant	52 (13.5)
	Labor	41 (10.7)
	Student	6 (1.6)
	Gov't employer	2 (0.5)
Residence	Rural	294 (76.6)
	Urban	90 (23.4)
Dog ownership	Yes	313 (81.5)
	No	71 (18.5)

Table 2: Assessment of knowledge questions for dog bite victims' response on rabies.

Variables	Category	Proportion (%)
Heard about rabies virus	Yes	384 (100)
	No	0(0)
Source of information for rabies	Health practioners	206(53.65)
	Mass media	102(26.56)
	Conference meeting	45(11.72)
	Personal effort	31(8.07)
rabies is a zoonotic disease	Yes	344 (89.58)
	No	40(10.42)
Causes of Rabies virus	virus	263 (68.5)
	Bacteria	97 (25.26)
	Parasites	24 (6.25)
susceptible animal species	Dog and cat	384 (100)
	Human	384(100)
	Cattle	367 (95.6)
	Equine	284 (73.96)
	Shoat	276 (71.88)
mode of rabies transmission	Bite	384 (100)
	Contact with dog saliva	262 (68.23)
	Skin scratch	79(20.6)
	Others	35(9.11)
clinical signs observed	Aggressiveness	378 (98.44)
	Profuse salivation	314 (81.77)
	Dropping of tail and head	235 (61.2)
	Eating of abnormal items	169 (44.01)
	Hydrophobia	26 (6.77)
	Difficulty in swallowing	19 (4.95)
	Paralysis	11(2.86)
curable after clinical Signs observed	Yes	36 (9.4)
	No	341 (88.8)
	Don't know	7 (1.82)
source of rabies infection	Stray dog	304 (79.17)
	Free ranging dog	291 (75.78)
	Red fox	93 (24.22)
rabies control measures applied	Vaccination	347 (90.36)
	Treatment	155 (40.36)
	Traditional remedies	357 (92.97)
	Don't know	24 (6.25)
Actions taken immediately after dog bite	Washing wound with soap	278 (72.4)
	Use traditional medicine	357(92.97)
	Immediate came to health center	84(21.88)
	Nothing done	17(4.43)

Table 3: Summary of respondents for attitude questions.

Attitude Questions	Response categories n (%)						
	Negative attitude		Proportion (%)	Uncertain	Positive attitude		Proportion (%)
	Strongly disagree	Disagree			Agree	Strongly Agree	
Rabies is fatal.	11 (2.86)	17 (4.43)	28 (7.29)	18 (4.69)	142 (37)	196 (51.04)	338 (88.02)
Rabies is notifiable diseases	7 (1.82)	11 (2.86)	17 (4.43)	8 (2.08)	160 (41.67)	198 (51.56)	358 (93.23)
Rabies is not treatable after onset of clinical signs	18 (4.7)	22 (5.73)	40 (10.42)	6 (1.56)	138 (35.94)	200 (52.08)	338 (88.02)
Habit of eating dead animal meats is a source of infections for rabies	26 (6.8)	33 (8.6)	59 (15.56)	23 (6)	118 (30.73)	184 (47.92)	312 (81.25)
Vaccination of human and dogs are a better method for rabies control measures.	18 (4.7)	20 (5.21)	38 (9.9)	18 (4.7)	132 (34.38)	196 (51.04)	328 (85.42)
Crossing river within 40 days of bite inactivate the effect of PEP/traditional treatment	110 (28.65)	132 (34.38)	242 (63.02)	51 (13.28)	47 (12.24)	44 (11.46)	91 (23.7)

Table 4: Assessment of practice questions for dog bite victims' response on rabies.

Variables	Category	Proportion (%)
Purpose of owning dogs	Guarding	216 (56.25)
	Hunting	153 (39.84)
	Don't know	15(3.91)
Dog management system	Indoor	98 (25.52)
	Outdoor	245 (63.8)
	Nothing done	31 (8.07)
Can your Dogs vaccinate per year	Yes	131 (34.11)
	No	253 (65.9)
Avoid contact from unknown dogs or wild animals	Yes	162 (42.2)
	No	222(57.81)
Take any safety measure for caring your dogs	Yes	48 (12.5)
	No	336 (87.5)
Safty measures applied	No use safety measures	336 (87.5)
	Protect from bite	32 (8.33)
	Avoid contact with saliva	16 (4.17)
Take actions after rabid dog bites	Yes	286 (74.48)
	No	68 (17.71)
	Don't know	30 (7.81)
Actions applied after rabid dog bites	Immediate washing the wound	40 (10.42)
	Killed immediately	134 (35)
	Came to health center	30 (13.02)
	Use herbal Rx	170 (44.3)

Assessment of Knowledge's for Dog Bites Victims' Response on Rabies.

About 100% of the participants heard about rabies virus. Regarding source of information for rabies, 53.65% of respondent's perceived health practitioners are the most information sources followed by mass media, conference meeting and personal effort with a proportion of 26.56%, 11.72% and 8.07%, respectively. About 73.3% of the participants reflected that rabies is zoonotic and 68.5% of them caused by virus. Regarding susceptible animal species, about 100% of the participants knew dog and cat and humans highly susceptible to rabies virus. Regarding transmission, 100% of respondents knew dog bite is the main means of transmission and 68.23% and 20.6% of them perceived that wound contact with dog saliva and skin scratches, respectively were also routes for the transmission of rabies. About 98.44% of the participants knew that aggressiveness the most of the clinical signs associated with rabies followed by profuse salivation, dropping of tail and head, abnormal eating habit, hydrophobia, difficulty of swallowing and paralysis with a proportion of 81.77%, 61.2%, 44.01%, 6.77%, 4.95% and 2.86% respectively. About 88.8% of the participants perceived that rabies were not curable after developing overt clinical signs (Table 2).

Assessment of Attitudes for Dog Bites Victims' Response on Rabies

Over 88% of the participants perceived as rabies can be a fatal disease. Over 93% of the participants were agreed that rabies were notifiable diseases. About 88.02% of the respondents were agreed with that rabies is not treatable after onset of clinical signs. Over 81% of participants believed that habit of eating dead animal meats is a source of infections for rabies virus (Table 3).

Assessment of Practice for Dog Bites Victims' Response on Rabies

About 56.25% of the participants practiced that the purpose of owning dogs for guarding and 63.8% of dog owner uses outdoor dog management system. Regarding vaccination, about 65.9% of the participants do not vaccinate their dogs once per year unless the rabies virus outbreaks were epidemic in the area (Table 4).

Disscussion

A community-based cross-sectional study was conducted to assess rabies prevention and control practices and associated factors among Dog bite victims in poly health center in Gondar Town, Amhara region, North West Ethiopia. A total of 384 dog bite victims were selected using simple random sampling methods. In the present study, most of the respondents had good knowledge and a desirable attitude towards rabies, whereas their preventive practice was poor. About 82.6% of the respondents have adequate knowledge. The current study is consistent with reports in previous studies reported by Ali et al. (2018) and Digafe et al. (2015) who reported 83% and 90.8% of having adequate knowledge from Addis Ababa and Gondar, respectively. However, it was higher than 64.1% reported from Bahir Dar by Guadu et al. (2014) and 56.1% from Mekelle by Hagos et al. (2020). The result in the current study is roughly similar reports in the previous studies conducted by Digna et al. (2015), Moran et al. (2015) and Sambo et al. (2014) who reported 82.6%, 82% and 86% from Indonesia, Guatemala and Tanzania respectively. The study indicates the disease is endemic in the study area and there is adequate knowledge in dog bite victims.

The present study revealed that (100%) were heard about rabies and this was in agreement with the previous studies reported by Shumuye et al. (2014), Bahiru et al. (2022) and Moran et al. (2017) respectively. The present finding was disagree with the previous study reported by Matibag et al. (2007), Ali et al. (2013) and Sumon et al. (2017) which is 75.2%, 73%, 76.5% in Sri Lanka, Ethiopia and Bangladesh respectively. These differences could be due to the information access and awareness level of the dog bite victims in its community. Regarding the source of information for rabies 53.65%, 26.56%, 11.72% and 8.02% of the dog bite victims were heard about rabies from health practitioners, mass media, conference meeting and personal efforts respectively. This difference is most likely explained by low media coverage and other awareness creation sources in the community in the study district.

In the present study, 89.58% of respondents recognize rabies as a zoonotic disease. The current finding was in line with the study conducted in Bahir Dar town (94.5%) by Tadesse et al. (2014) and New York, USA (94.1%) by Eidson et al. (2004). However, this result was disagreed with the study reports 30.97% from Addis Ababa by Ali et al. (2013). The main reason for the difference could be nearest approach to animal health practitioners and health worker, so that they could consult animal health practitioners and health workers for the health care to community for rabies zoonosis.

In this study, all (100%) of the respondents knew that the main source of transmission for rabies in humans is dog bites. This is in agreement with the WHO report that 99% of rabies in humans is from rabid dog bites [77]. Non negligible numbers (15.7%) of respondents believe that species other than a dog can never be a threat for human rabies. This is not consistent with the epidemiology of the disease as it can also be contracted from other rabies susceptible species [30]. This suggests the need for creating awareness about the potential sources of rabies to humans other than dogs.

About 98.9% of the respondents knew the clinical signs of rabies in dogs. Among this aggressiveness, profuse salivation and dropping of tail and head were the most clinical signs observed in dogs with a proportion of 98.44%, 81.77% and 61.2% respectively. Most of the dog bite victims were identify clinical signs of the rabies disease in dogs because humans living with dogs in home and observed the signs in their day-to-day life.

About 88.02% of dog bite victims believed that rabies cannot be treated after the onset of clinical signs. This is consistent with the facts that once the clinical signs are seen there is no way for recovery [29]. This is due the fact that the dog bite victims observe up to date once animals and humans can not treat after onset of clinical signs developed.

Majority of the present study participants (81.25%) believed consumption of meat from an animal that died of rabies is a source of infection. This could be taken as a good attitude to minimize risk of rabies. In this study, most of (85.42%) the respondents believed that vaccinating their dogs are a better method for rabies control measures. The present finding was agreed with the previous studies reported by Ahmed et al. (2022), Ahmed et al. (2012) and Hagos et al. (2020) which is 71.1%, 79% and 85.3% in Adigrat, Mekelle and chiro towns. The present study was disagreement with the study conducted by Degife et al. (2015), Gashaw and Edaso (2023) and Gebeyaw et al. (2020) which is 18%, 36.8% and 60.83% in Shone, Jima and Mersa town in Ethiopia respectively. The variation may be due to the availability of vaccines or lack of awareness in the communities in the study area. About 10.42% of the respondents do not practice immediate washing the wound with water at the site of infection. The result is in agreement with previous studies in Ethiopia reported by Digafe et al. (2015) and Bahiru et al. (2022) where proper wound washing after a dog bite was not practiced. The WHO recommends that an immediate washing at the site of bite is the first and most important component of PEP [29]; wound washing and flushing reduces the impact of the disease by five folds [77]. The low-level wound washing practice in this study indicates the important and easily accessible portion of the PEP is missed. Therefore, the community needs detailed training awareness about proper washing with soap after immediate dog bites. About 35% of the respondents practice an immediate killing of the dog when they encounter a bite of human. This finding is in agreement with previous reports in Ethiopia reported by Herbert et al. (2012) and WHO (2010) which is 42% and (47.7%) respectively. However, it contradicts the recommended measure that a dog bitten a human should be tied for ten days and monitored to see overt clinical signs [12].

The present finding indicates that 44.3% dog bite victims were used traditional treatment as the best option for dog bites. The present finding was consistent with the previous study conducted by Shumuye et al. (2014), Sekhon et al. (2002) and Rumana et al. (2023) from Ethiopia, India and Bangladesh respectively. This is due to negative beliefs among respondents associated with dog bite management and lack of education about post exposure vaccine in health center and financial limitations of dog bite victims for accessing vaccines in hospital.

Conclusion and Recommendations

Rabies is a fatal viral zoonotic disease and had a serious public health problem. The present study revealed that there is a good level of knowledge and attitude whereas the level of preventive practice was low in the study area. The majority of animal and human exposures to rabies can be prevented by raising awareness about community on rabies transmission and avoiding contact with wildlife. The communities should be killing stray dogs in order to reducing risk of rabies disease outbreak in their locations. Attention should be given by public health authority to create awareness in the community about simple but important rabies preventive measures such as immediate washing of wound following dog bite and quarantine of the biting dog. However, it should be giving high focusing points when they are washing their hands after touching their dogs. Generally, play a principal role in mass vaccination of dogs, proper post exposure management, appropriate surveillance system, and increasing the awareness of the community about the disease needs special attention for prevention and control of the disease.

Based on the above conclusions the following recommendations are forwarded;

- Strategic rabies control measures should be carried out mainly stray and free-ranging dogs.
- Post exposure treatment should be given after immediately exposure to dog bite or scratch by rabid animals.
- The public health and economic impacts of rabies should be further studied at zonal and regional level.
- Further research works should be carried out.

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