ASSESSMENT OF COMMUNITY KNOWLEDGE, ATTITUDE AND PRACTICE ON RABIES IN KONDALA DISTRICT, OROMIA REGIONAL STATE, WESTERN ETHIOPIA

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ABSTRACT: Rabies remains a significant public health challenge in Ethiopia, with the country recording the second-highest number of human fatalities in Africa. Despite being preventable, low community awareness and inadequate preventive practices perpetuate its endemicity. This cross-sectional study assessed the knowledge, attitudes, and practices of households in the community with related to rabies in Kondala District, Western Ethiopia, from November 2024 to June 2025. In the present study, a structured questionnaire survey was used. 200 participants were selected through multi stage sampling methods in the Gaba Dafino 01 and 02 kebeles. Data were analyzed using STATA version 17, with multivariate binary logistic regression models identifying associations among variables. Result revealed that, majority of respondents (57.5%, 58.5%) were males and 15–30 years' age respectively. Only 52% has awareness of rabies, and misconceptions about transmission and distribution of diseases, with 70% erroneously believing consumption of infected meat, spreads the disease. Whereas, the dominant (100%) respondents, understand as post-exposure prophylaxis prevent rabies after a bite, and 56% were aware of dog vaccination. With respect to attitudes, 98% of the participant interviewers recognized rabies as fatal if untreated early, while 5.5% perceived it as a serious community threat. Community practices were inadequate, with 88% failing to vaccinate dogs and 60% relying on herbal remedies after bites. Multivariable analysis identified younger age (Adj. OR=13.076, p =0.001), higher education (Adj. OR = 24.504, p =0.004), and male gender (Cr OR=2.512, p=0.003) as significant predictors of better preventive practices. The overall KAP scores indicated 68.5% had good knowledge, 65.5% positive attitudes, and 68% acceptable practices. The study underscores critical gaps in rabies awareness, particularly among older, less educated, and female populations. Therefore, targeted interventions, including community education, improved vaccine accessibility, and inter - sectorial collaboration, are urgently needed to enhance rabies control in Kondala District. These findings provide a foundation for public health strategies to reduce rabies-related morbidity and mortality in rural Ethiopia.

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1. INTRODUCTION

1.1. Back ground

Rabies is acute viral encephalitis caused by the rabies virus, a member of the Lyssavirus genus within the Rhabdoviridae family. The disease affects nearly all mammalian species and is invariably fatal once clinical symptoms manifest (Hosmer *et al.*, 2000). Globally, canine rabies accounts for approximately 55,000 Annual human deaths, with 56% occurring in Asia and 44% in Africa. An estimated 98% of these fatalities occur in developing countries with large populations of un vaccinated stray dogs (WHO, 1998). Rabies remains endemic in resource-limited regions of Africa and Asia, where inadequate healthcare infrastructure and limited public awareness contribute to its persistence (Tenzin *et al.*, 2012). The economic impact of rabies in these regions is significant, with annual costs estimated at US$ 583.5 million, primarily due to post-exposure prophylaxis (PEP) expenses (Knobel *et al.*, 2005).

In Ethiopia, rabies is a major public and veterinary health challenge, with approximately 10,000 human deaths reported annually (Deressa *et al.*, 2010). Domestic dogs serve as the principal reservoir, transmitting the virus to humans and livestock. Despite Ethiopia's high dog-to-human ratio (one owned dog per five households nationally), vaccination coverage remains low, particularly in rural areas. Poor dog management practices further sustain the endemicity of rabies (Deressa *et al.*, 2010).

The economic consequences of rabies extend beyond human health. In Africa and Asia, livestock losses due to rabies are estimated at US$ 12.3 million annually (Knobel *et al.*, 2005). In Ethiopia, traditional healing practices often delay access to PEP, with many patients seeking modern medical care only after fatalities occur within their households (Deressa *et al.*, 2010). Current epidemiological data on rabies in Ethiopia rely heavily on passive reports from the Ethiopian Health and Nutrition Research Institute (EHNRI), the country's sole rabies diagnostic laboratory. However, passive surveillance systems often underestimate disease incidence, particularly in settings with underdeveloped health information systems (Jackson & Wunner, 2007; Kayali *et al.*, 2003).
Rabies is transmitted primarily through the saliva of infected animals via bites or scratches. Rarely, exposure to mucous membranes or broken skin may also lead to infection. Dogs are responsible for over 99% of human rabies cases globally, though wildlife such as bats, raccoons, and foxes may also transmit the virus (CDC, 2021). In humans, clinical progression begins with nonspecific symptoms (e.g., fever, headache) and advances to neurological manifestations such as agitation, hallucinations, paralysis, and hydrophobia (WHO, 2021). Infected animals exhibit behavioral changes, including aggression, lethargy, and excessive salivation (CDC, 2021). Globally, canine rabies accounts for approximately 55,000 human deaths annually, with 56% occurring in Asia and 44% in Africa. An estimated 98% of these fatalities occur in developing countries with large populations of un vaccinated stray dogs (WHO, 1998).

Kondala District, located in the West Wollega Zone of the Oromia Region, is a high-risk area where community knowledge, attitudes, and practices (KAP) toward rabies remain inadequate. Addressing these gaps is critical for designing effective prevention strategies. This study therefore aims to assess community KAP on rabies in Kondala District to inform targeted interventions.

1.2. Statement of the problem

Rabies is a fatal zoonotic disease caused by the rabies virus, which affects virtually all mammals and leads to inevitable death once clinical symptoms appear. Despite being preventable, rabies remains a significant public health challenge, particularly in developing countries in Africa and Asia, where the majority of human rabies cases occur. Ethiopia, as one of the highly endemic countries, faces a severe rabies burden, with an estimated 10,000 human deaths annually. Dogs are the primary reservoir and source of infection for humans and livestock, yet dog management and vaccination efforts remain inadequate, especially in rural areas.
In Ethiopia, traditional practices of seeking treatment from healers often delay access to post-exposure prophylaxis (PEP), leading to preventable deaths. Additionally, the lack of robust surveillance systems and reliance on passive reporting underestimate the true burden of rabies, hindering effective control measures. The economic impact of rabies is also substantial, with significant losses in livestock and high costs associated with PEP.
In Gaba Dafino Kondala district, West Wollega Zone, community knowledge, attitudes, and practices regarding rabies are poorly understood and often unsafe. This lack of awareness and inappropriate practices contribute to the persistence of rabies in the region. Understanding the community's knowledge, attitudes, and practices is essential for designing targeted interventions to control and prevent rabies. Therefore, this study aims to assess the level of community knowledge, attitudes, and practices related to rabies in Kondala district, West Wollega Zone, to inform effective rabies control and prevention strategies.

1.3 .Objective

1.3.1. General objective

To assess the knowledge, attitudes, and practices of the community regarding rabies in Kondala District, Oromia Regional State, Western Ethiopia, in order to identify gaps in awareness and inform effective public health interventions and educational programs aimed at rabies prevention and control.

1.3.2. Specific Objectives

- ✓ To assess the knowledge of community members regarding the transmission, symptoms, and prevention of rabies.
- ✓ To explore the attitudes of community members towards rabies and its prevention.
- ✓ To evaluate the practices of community members in relation to rabies prevention, including vaccination of pets and response to animal bites.

2. MATERIAL AND METHODS

2.1. Study area

The study was conducted at Kondala district, which is one of the districts of the West Welega Zone, Oromia Region. Gaba Dafino is an Administrative center it was established in December 2005 after being separated from the Begi woreda. It was bounded by the Benishangul-Gumuz Region and Mana Sibu in the north, Kelem Welega Zone in the south and southeast, Begi in the west, and Babo Gambel in the northeast (CSA, 2007).
The 2007 national census reported a total population for this woreda 96,253 in which 18,286 households, of whom 48,612 were men and 47,641 were women; 3,117 or 3.24% of its population were urban dwellers. The majority of the inhabitants observed Islam, with 85.39% reporting that as their religion, while 7.92% observed Ethiopian Orthodox Christianity, and 6.61% were Protestants.
According to the Kondala District Agriculture Office's 2024 animal population data, the study area had a livestock population comprising approximately 289,675 cattle, 128,210 sheep, 190,789 goats, 6,028 equines, and 243,701 poultry.

2.2. Study Population

The study participants were chosen from the communities of Gaba Dafino town who were above 15 years old and had lived in the district for at least six months. A total 200 participants were interviewed.

2.3. Study Design

A community-based cross-sectional study was conducted from november-2024- June-2025 to assess the knowledge, attitudes, and practices (KAP) on rabies in Kondala district, Gaba Dafino town 01 and 02 kebeles.

2.4. Sample size determination and Sampling Technique

The required number of the population to be sampled was calculated using the formula given by Arsham (2005): $N = 0.25/SE^2$, where N = sample size and SE = standard error of 5%. Accordingly, the required sample size was 100. However, to increase the precision and representativeness, the sample size was doubled to 200. The calculated sample was proportionally distributed to the selected kebeles.

A multi-stage sampling technique was used to select study participants. In the first stage, Kondala District was selected purposively due to accessibility. In the second stage, two kebeles of the town were randomly selected from the district. Finally, households within the selected kebeles were selected using a systematic random sampling technique.

2.5. Data Collection

Data we're collected through face-to-face interviews with household heads or key informants in the selected households. The questionnaire included questions on Socio demographic characteristic (Seven question), knowledge about rabies transmission, symptoms, prevention, and treatment, (Ten question) as well as attitudes towards rabies (include four question)and practices related to rabies prevention and control(Five Question),totally twenty six question. The questionnaire was first developed in English and then translated in to Afan Oromo language (native language) for appropriateness and easiness in approaching the study participants(Annex-I)

2.6. Data Analysis

Data of each questionnaire was checked for completeness and consistency by investigator. The collected data was entered into Microsoft Excel-10 Spread Sheet, coded and summarized using Descriptive statistics. All statistical analyses were done using STATA statistical software package version 17. Correlation, confounding and interaction tests were checked. Multivariable logistic regression model were used to assess the strength of association of risk factors. The socio-demographic questions were included respondents' sex, age category, educational status, Occupation, 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 uni variable analysis were incorporated into the full multivariable logistic regression model. In the multivariable logistic regression, P-value < 0.05 was considered as cut off for statistical significance and odds ratio (OR) and 95% CI were also calculated. 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

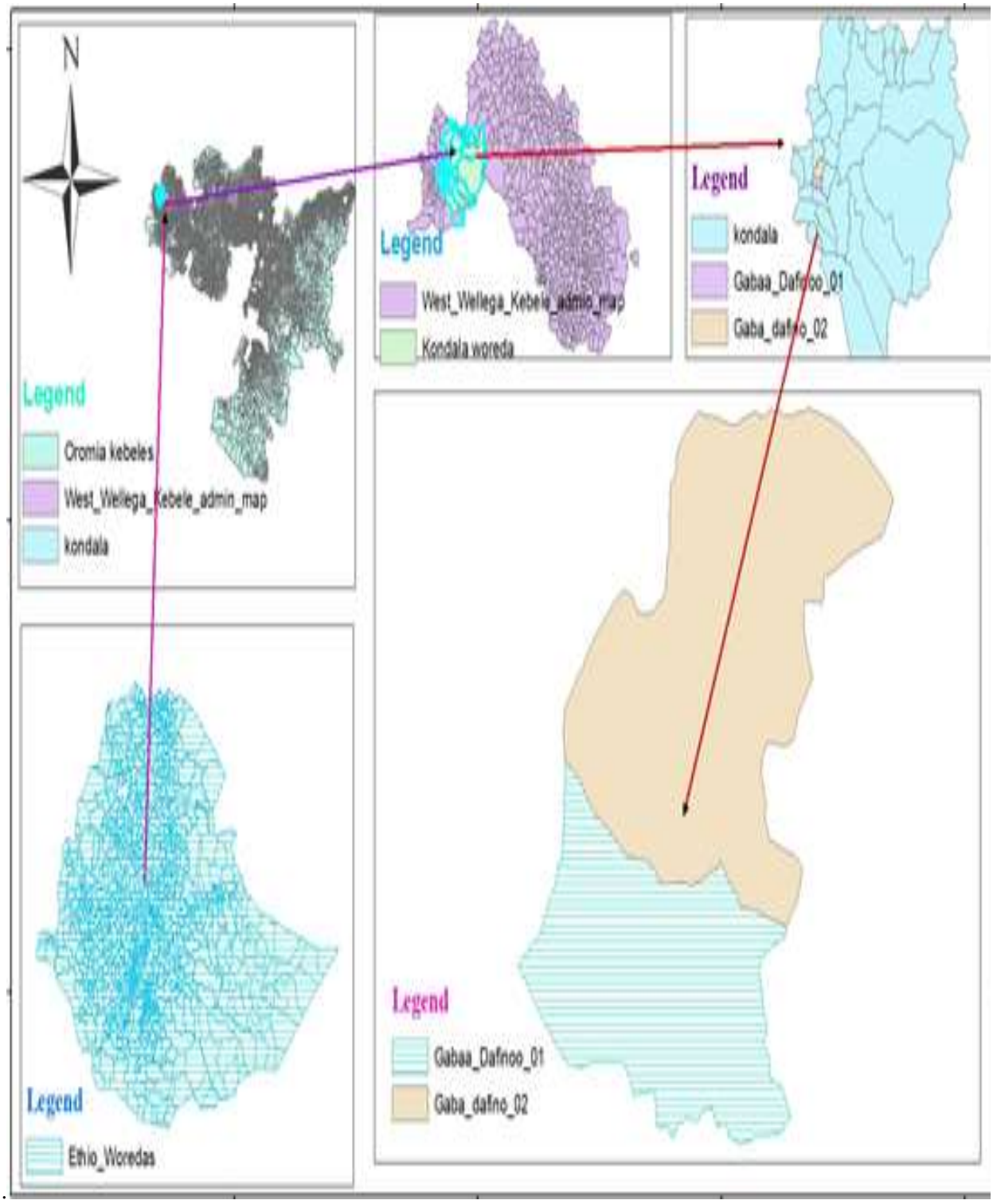

Figure 1.Map of the Study Area

2.7. Ethical Considerations

To ensure the privacy and integrity of participants, their consent and permission were secured prior to embarking on the study. Throughout the process, they were informed about the objectives of the study, were treated with respect, and the information they provided was kept confidential.

3. RESULT

This presents the findings of current study in accordance to the research objectives and research questions. The analyses and interpretation of the data collected from the respondents was presented. Finally, the statistical methods of analysis were discussed, which included a descriptive analysis, a regression analysis through STATA version 17. All tables in the analysis were generated from survey data by using the STATA software after being coded.

3.1. Socio-Demographic Characteristics of Study Participants

The total number of study participants (200) were selected from the Kondala district were interviewed. The demographic characteristics of the participants includes: gender, age, level of education, household size, occupation and religion. In this study the majority of participants were male (57.5%), while females constituted 42.5%, indicating a slightly higher representation of males in the study. The largest age group was 15–30 years (58.5%), followed by 31–50 years (34.5%). Only 7.0% of participants were above 50 years old, suggesting a relatively young study population, with most participants being of working age.

A significant proportion of participants were illiterate (37.5%), followed by those with primary school education (27.5%). Only 16.0% had higher education, while 19.0% had completed secondary school, highlighting a relatively low level of formal education among respondents. Government employees constituted the largest occupational group (32.0%), followed by the unemployed (30.0%). Farmers accounted for 20.0%, while merchants and housewives represented smaller proportions (10.0% and 4.0%, respectively), reflecting diverse occupational backgrounds. Nearly half of the participants (46.0%) had a household size of 1–3 members, while 32.0% had 4–8 members. A smaller proportion (22.0%) had households with more than 8 members, indicating variability in family sizes within the study area. The majority of participants were Muslim (66.0%), followed by Protestants (18.0%) and Orthodox Christians (16.0%), reflecting the religious composition of the study area, with Islam being the dominant religion. Participants were evenly distributed between Gaba Dafino 01 and Gaba Dafino 02, with each kebele contributing 50.0% of respondents, ensuring balanced representation. A large majority of participants (88.0%) reported owning dogs, while only 12.0% did not. This high rate of dog ownership is significant in the context of rabies, as dogs are the primary vectors of the disease. The sociodemographic characteristics reveal a predominantly young, male population with relatively low formal education. The majority of respondents were Muslim, and dog ownership was widespread. The even distribution of respondents from Gaba Dafino 01 and 02 ensures balanced representation. These factors are critical when interpreting the study's findings on knowledge, attitudes, and practices (KAP) regarding rabies, as socio-demographic variables may influence perceptions and behaviors related to the disease.

Table 1: **Socio demographic characteristics of the study Respondents**

Variable	Group	Frequency N(200)	Percentage%
Sex	Male	115	57.5%
	Female	85	42.5%
Age	15-30	117	58.5%
	31-50	69	34.5%
	> 50	14	7.0%
Educational status	Higher Education	32	16.0%
	Secondary school	38	19.0%
	Primary School	55	27.5%
	Illiterate	75	37.5%
Occupation	Government employees	64	32.0%
	Un employees	60	30.0%
	Farmers	40	20.0%
	Merchants	20	10.0%
	House wifes	8	4.0%
	Others	8	4.0%
Household size	. 1-3	92	46.0%
	4-8	64	32.0%
	>8	44	22.0%
Religion	Protestant	36	18.0%
	Orthodox	32	16.0%
	Muslim	132	66.0%
Residential	Gaba Dafino 01	100	50.0%
	Gaba Dafino 02	100	50.0%
Dog Ownership	No	24	12.0%
	Yes	176	88.0%
Total		200	100.0%

3.2. Knowledge of Respondents towards Rabies

This study showed that study participants response towards questions “Awareness of Rabies” Only 52.0% of respondents were aware of rabies, indicating a significant gap in basic knowledge about the disease. Regarding Causes of Rabies: study participants response indicated that 58.0% correctly identified the virus as the cause, misconceptions such as starvation/thirst (16.0%), spiritual causes (10.0%), and bacteria (14.0%) were prevalent. study participants response concerning ‘Transmission of Rabies’, A majority of participants (70.0%) believed that eating infected meat was a mode of transmission, while only 20.0% identified bites from infected animals. Regarding question of Prevention and Treatment of rabies, all respondents knew that rabies can be prevented after a bite through post-exposure prophylaxis (PEP), but only 56.0% were aware of rabies vaccination for dogs. The participants of study response about Vaccine availability reported as "sometimes available" by 60.0% of respondents. Based on Knowledge Score, 68.5% of respondents had a "good" knowledge towards to the disease, while 31.5% had a "poor" score. Misconceptions about transmission and causes of rabies highlight the need for targeted educational campaigns. The high awareness of PEP is positive, but the limited knowledge about dog vaccination and vaccine availability suggests gaps in preventive measures.

Table 2: Knowledge of respondents towards Rabies

Characteristics	Categories	Frequency N(200)	Percentage
Are you aware of rabies?	Yes	104	52.0%
	No	96	48.0%
What causes rabies?	Virus	116	58.0%
	Starvation or thirst	32	16.0%
	Spiritual causes	20	10.0%
	Bacteria	28	14.0%
	I don't know	4	2.0%
Which species can be affected by rabies?	Dogs only	44	22.0%
	Dogs and humans	64	32.0%
	Humans and other domestic animals	92	46.0%
How is rabies transmitted to humans?	Bite from an infected animal	40	20.0%
	Contact with saliva on broken skin/mucous membranes	12	6.0%
	Eating infected meat	140	70.0%
	All of the above	8	4.0%
Which animals commonly transmit rabies to humans?	Dogs only	128	64.0%
	Dogs and cats	52	26.0%
	Other domestic animals	20	10.0%
What are the signs of rabies in animals?	Excessive salivation (foaming at the mouth)	64	32.0%
	Sudden aggression or unusual calmness	20	10.0%
	Both 1 and 2	116	58.0%
Can rabies be prevented after a bite through post-exposure prophylaxis (PEP)?	Yes	200	100.0%
Are you aware of rabies vaccination for dogs?	Yes	112	56.0%
	No	88	44.0%
Is the rabies vaccine available in your area?	Always available	48	24.0%
	Sometimes available	120	60.0%
	Never available	32	16.0%
Have dog bites been reported in your community in the past year?	Yes	200	100.0%
Knowledge score of rabies	Good	137	68.5%
	Poor	63	31.5%
Total		200	100.0%

3.3. Association between Knowledge Score **and Independent Variables**

As indicated in table: 3 below males had significantly higher good knowledge (Adj. OR = 2.614, , p = 0.024).Younger respondents (15-30 years) had significantly better knowledge compared to older age groups (Adj. OR = 25.791, p = 0.001).Based on Education status of study participants:, these This study revealed that the was strong association between knowledge score and education status of study participants. Higher education graduate study participants were strongly associated with good knowledge (Adj. OR = 5.556, , p = 0.033). the study showed that no significant associations were found between knowledge score and Occupation and Household Size of study participants, According this study being dog Ownership we're No significant association with knowledge scores. Younger, educated males are more likely to have good knowledge about rabies. Interventions should focus on older individuals, females, and those with lower education levels to improve knowledge.

Table 3: Association between knowledge score of respondents towards Rabies and independent variables

Variables	Groups	Good (%)	Poor (%)	Univariate analysis		Multivariate analysis	
				Cr. OR (95% CI)	p-value	Adj. OR (95% CI)	p-value
Sex	Male	91(66.4%)	24(38.1%)	3.215(1.729-5.975)	0.001	2.614(1.132-6.034)	0.024
	Female	46(33.6%)	39(61.9%)	-			
Age	18-30	109(79.6%	8(12.7%)	27.250(11.357-65.382)	0.001	25.791(10.265-64.801)	0.001
	31-50	23(16.8%)	46(73.0%)	24.525(6.631-90.701)	0.001	26.387(6.693-104.029)	0.001
	>50	5(3.6%)	9(14.3%)	-			
Educational status	Higher Education	28(20.4%)	4(6.3%)	5.667(1.661-19.336)	0.006	5.556(1.154-26.758)	0.033
	Secondary school	21(15.3%)	17(27.0%)	5.031(1.551-16.320)	0.007		
	Primary School	32(23.4%)	23(36.5%)	2.375(0.737-7.650)	0.147		
	Illiterate	56(40.9%)	19(30.2%)	-			
Occupation	Government employees	47(34.3%)	17(27.0%)	1.489(0.691-3.207)	0.310		
	Unemployees	39(28.5%)	21(33.3%)	1.049(0.431-2.550)	0.916		
	Farmers	29(21.2%)	11(17.5%)	1.843(0.643-5.281)	0.255		
	Merchants	12(8.8%)	8(12.7%)	1.659(0.357-7.700)	0.518		
	House wifes	5(3.6%)	3(4.8%)	1.659(0.357-7.700)	0.518		
	Others	5(3.6%)	3(4.8%)	-			
Household size	1-3	63(46.0%)	29(46.0%)	0.850(0.422-1.712)	0.649		
	4-8	46(33.6%)	18(28.6%)	1.241(0.583-2.642)	0.575		
	>8	28(20.4%)	16(25.4%)	-			
Religion	Protestant	25(18.2%)	11(17.5%(	1.364(0.498-3.735)	0.546		
	Orthodox	20(14.6%)	12(19.0%)	0.988(0.444-2.200)	0.977		
	Muslim	92(67.2%)	40(63.5%)	-			
Residential	Gaba Dafino 01	71(51.8%)	29(46.0%)	1.261(0.693-2.294)	0.447		
	Gaba Dafino 02	66(48.2%)	34(54.0%)	-			
Dog Ownership	No	16(11.7%)	8(12.7%)	0.909(0.367-2.251)	0.837		
	Yes	121(88.3%	55(87.3%)	-			

3.4. Attitudes of Respondents toward Rabies

This study revealed that only 6.0% study participants had received Training on Rabies Prevention that indicating a lack of community-level education. Regarding the severity of the disease, 98.0% of respondents knew rabies is fatal if un treated, only 5.5% believed it was a serious public health problem in their community. Concerning the question related to 'prevention through dog Vaccination', Only 26.0% study participants believed that rabies could be prevented by vaccinating dogs, while 62.0% were unsure. Regarding the attitude Score of the respondents, 65.5% had a "good" attitude score, while 34.5% had a "poor" score. Implications, despite high awareness of rabies severity, there is a lack of perceived urgency and understanding of preventive measures. Community education programs should emphasize the importance of dog vaccination and rabies as a public health issue.

Table 4: Attitudes of respondents toward Rabies

Characteristics	Categories	Frequency N(200)	Percentage
Have you received any training on rabies prevention?	Yes	12	6.0%
	No	188	94.0%
Is rabies always fatal if untreated?	Yes	196	98.0%
	No	4	2.0%
Can rabies be prevented by vaccinating dogs?	Yes	52	26.0%
	No	24	12.0%
	I don't know	124	62.0%
Do you believe rabies is a serious public health problem in your community?	Yes	11	5.5%
	No	155	77.5%
	I don't know	34	17.0%
Attitude score of rabies	Good	131	65.5%
	Poor	69	34.5%
Total		**200**	**100.0%**

3.5. Association between Attitude Score and Independent Variables

The current study showed that Younger interview respondents (15-30 years) had significantly better attitudes (Adj. OR = 8.448, , p = 0.001) than the older one. Also Higher education graduate interview respondents were had good attitude score (Adj. OR = 14.068, p = 0.003) than illiterate and lower school graduate study participants. According to this study, Respondents without dogs Ownership had better attitudes (Adj. OR = 4.513, p = 0.042) than dog owned study participants. No significant associations were found between Sex, Occupation, and Household Size of interview respondents and attitude score:. This study revealed that Younger, educated individuals and those without dogs study participants are more likely to have positive attitudes toward rabies prevention. Targeted interventions should address older, less educated populations and dog owners.

Table 5: Association between attitude score of respondents towards Rabies and independent variables

Variables	Groups	Good (%)	Poor (%)	Univariate analysis		Multivariate analysis	
				Cr. OR (95% CI)	p-value	Adj. OR (95% CI)	p-value
Sex	Male	81(70.4%)	34(29.6%)	1.668(0.925-3.006)	0.089		
	Female	50(58.8%)	35(41.2%)	-			
Age	15-30	99(84.6%)	18(15.4%)	8.556(4.261-17.179)	0.001	8.448(3.943-18.101)	0.001
	31-50	27(39.1%)	42(60.9%)	9.900(2.973-32.970	0.001	14.111(3.411-58.375)	0.001
	>50	5(35.7%)	9(64.3%)	-		-	
Educational status	Higher Education	30(93.8%	2(6.3%	10.909(2.271-52.412)	0.003	14.068(2.422-81.709)	0.003
	Secondary school	22(57.9%)	16(42.1%)	12.500(2.716-57.531)	0.001	10.044(1.698-59.422)	0.011
	Primary School	30(54.5%)	25(45.5%)	7.959(1.761-35.967	0.007		
	Illiterate	49(65.3%)	26(34.7%)	-		-	
Occupation	Government employees	41(64.1%)	23(35.9%)	1.188(0.575-2.457)	0.641		
	Unemployees	36(60.0%)	24(40.0%)	0.594(0.247-1.431)	0.246		
	Farmers	30(75.0%)	10(25.0%)	0.960(0.335-2.746)	0.939		
	Merchants	13(65.0%)	7(35.0%)	0.594(0.111-3.188)	0.544		
	House wifes	6(75.0%)	2(25.0%)	1.070(0.234-4.889)	0.931		
	Others	5(62.5%)	3(37.5%)	-			
Household size	1-3	61(66.3%)	31(33.7%)	0.894(0.452-1.771)	0.749		
	4-8	44(68.8%)	20(31.3%)	1.362(0.650-2.856)	0.413		
	>8	26(59.1%)	18(40.9%)	-			
Religion	Protestant	25(69.4%)	11(30.6%)	1.033(0.369-2.895)	0.951		
	Orthodox	22(68.8%)	10(31.3%)	1.299(0.588-2.870)	0.518		
	Muslim	84(63.6%)	48(36.4%)	-			
Residential	Gaba Dafino 01	67(67.0%)	33(33.0%(	1.142(0.637-2.047)	0.655		
	Gaba Dafino 02	64(64.0%)	36(36.0%)	-			
Dog Ownership	No	19(79.2%)	5(20.8%)	2.171(0.774-6.094)	0.141	4.513(1.060-19.222)	0.042
	Yes	112(63.6%	64(36.4%)	-			

3.6. Practices of Respondents toward Rabies

The result of this study showed that, none of the respondents vaccinated their dogs, and 88.0% did not register their dogs with local authorities. Regarding dog Management, 57.5% of interviewed participants let their dogs roam freely, increasing the risk of rabies transmission. Concerning the response to rabid animals, 84.0% of study participants kill an animal showing signs of rabies, while only 4.0% were restrain it. In this study participant's response regarding Post-Bite Practices showed that, 60.0% relied on herbal remedies, while only 30.0% would visit a health center immediately. The interview respondents Practice Score towards the disease showed that, 68.0% had a "good" practice score, while 32.0% had a "poor" score. Implications, Poor dog vaccination and management practices, along with reliance on traditional remedies, highlight the need for improved rabies control measures. Public health campaigns should promote responsible dog ownership and proper post-bite care. (Table 6)

Table 6: Practices of respondents towards Rabies

Characteristics	Categories	Frequency N (200)	Percentage
Have you vaccinated your dog(s) against rabies?	Have no dog	24	12.0%
	No	176	88.0%
How do you typically manage your dog(s)?	Have no dog	24	12.0%
	Let them roam freely	115	57.5%
	Keep them indoors/confined	61	30.5%
Is your dog officially registered with local authorities?	Have no dog	24	12.0%
	No	176	88.0%
What action would you take if an animal shows signs of rabies?	Have no dog	24	12.0%
	Tie/restrain the animal	8	4.0%
	Kill the animal	168	84.0%
What is the first thing to do if someone is bitten by a suspected rabid animal?	Visit a health center immediately	60	30.0%
	Apply herbal remedies	120	60.0%
	Use holy water/spiritual treatment/Wash the wound with soap and water	20	10.0%
Practice score of rabies	Good	136	68.0%
	Poor	64	32.0%
Total		200	100.0%

3.7. Association between the study participants Practice Score and Independent Variables

In this study male study participants had better practices score toward the disease which is statistically significant (Cr. OR = 2.512, p = 0.003).The good practice score is high in the Younger respondents (15-30 years) (103(88.0%) which is statistically significant (Adj. OR = 13.076, p = 0.001). Good practice score is high in illiterate interview respondents (53(70.7), Respondents from Gaba Dafino 01 had better good practices score (Adj. OR = 2.821, p = 0.011) than 02. This study revealed that no significant association between dog Owned and non-dog owned participates toward good

practice scores. Implications, Younger, educated, and males residents of Gaba Dafino 01 are more likely to adopt good practices. Interventions should focus on older individuals, females, and residents of Gaba Dafino 02 to improve rabies-related practice.

Table 7: Association between Practice score of respondents towards Rabies and independent variables

Variables	Groups	Good (%)	Poor (%)	Univariate analysis		Multivariate analysis	
				Cr. OR (95% CI)	p-value	Adj. OR (95% CI)	p-value
Sex	Male	88(76.5%)	27(23.5%)	2.512(1.368-4.615)	0.003		
	Female	48(56.5%)	37(43.5%)	-			
Age	15-30	103(88.0%	14(12.0%)	12.168(5.801-25.523	0.001	13.076(5.697-30.015)	0.001
	31-50	26(37.7%)	43(62.3%)	7.357(2.245-24.114)	0.001	8.851(2.321-33.759)	0.001
	>50	7(50.0%)	7(50.0%)	-		-	
Educational status	Higher Education	31(96.9%)	1(3.1%)	27.900(3.449-225.718)	0.002	24.504(2.718-220.913)	0.004
	Secondary school	20(52.6%)	18(47.4%)	22.281(2.834-175.193)	0.003	15.581(1.788-135.751)	0.013
	Primary School	32(58.2%)	23(41.8%)	12.868(1.653-100.200)	0.015	11.788(1.364-101.909)	0.025
	Illiterate	53(70.7%)	22(29.3%)	-		-	
Occupation	Government employees	46(71.9%)	18(28.1%)	1.480(0.694-3.153	0.310		
	Unemployees	38(63.3%)	22(36.7%)	0.969(0.401-2.343)	0.945		
	Farmers	29(72.5%)	11(27.5%)	1.704(0.598-4.856)	0.319		
	Merchants	12(60.0%)	8(40.0%)	1.533(0.332-7.092)	0.584		
	House wifes	5(62.5%)	3(37.5%)	0.852(0.157-4.619)	0.853		
	Others	6(75.0%)	2(25.0%)	-			
Household size	1-3	60(65.2%)	32(34.8%)	0.792(0.398-1.573)	0.505		
	4-8	45(70.3%)	19(29.7%)	0.786(0.362-1.710)	0.544		
	>8	31(70.5%)	13(29.5%)	-			
Religion	Protestant	26(72.2%)	10(27.8%)	1.362(0.485-3.821)	0.557		
	Orthodox	21(65.6%)	11(34.4%)	1.256(0.556-2.838)	0.583		
	Muslim	89(67.4%)	43(32.6%)	-			
Residential	Gaba Dafino 01	77(77.0%)	23(23.0%)	2.326(1.260-4.294)	0.007	2.821(1.269-6.270)	0.011
	Gaba Dafino 02	59(59.0%)	41(41.0%)	-			
Dog Ownership	No	15(62.5%)	9(37.5%)	0.758(0.312-1.837)	0.539		
	Yes	121(68.8%	55(31.3%)				

4. DISCUSSION

The present study highlights the critical role of rabies remains one of the most devastating yet preventable zoonotic diseases, with an estimated 59,000 human deaths annually worldwide, predominantly affecting rural communities in Africa and Asia (Hampson *et al*., 2015). The disease's near 100% fatality rate once clinical symptoms appear makes prevention through proper knowledge, attitudes, and practices (KAP) absolutely critical (World Health Organization (WHO, 2018). In the Kondala District context, our findings reveal a complex interplay between socio demographic factors and rabies prevention behaviors that mirror global patterns while Deep unique local challenges that demand targeted interventions.

However, as compared to the present findings the earlier works of Adane *et al*.(2022) in Amhara region, indicated that, about 31.8% of respondents believe that rabies can be treated after the onset of clinical signs. Contrary to this, Hampson *et al*.,(2015) reported, ones the clinical signs are seen there is no way for recovery. The respondents argue that traditional healers can diagnose the formation of puppies in the stomach of the victims due to rabid dog bites and they can treat the victims.

The study's most alarming finding was the profound knowledge gap: only 52% of respondents demonstrated basic rabies awareness. This stands in stark contrast to urban Ethiopian settings like Kombolcha (85.7%; Addis et al., 2019) and Bahir Dar (64.1%; Guadu *et al*., 2014), where better healthcare infrastructure and education access exist. The urban-rural disparity becomes particularly concerning when examining specific misconceptions - 70% of respondents erroneously believed rabies could spread through eating infected meat, a dangerous fallacy also documented in Kersa District (Adem *et al*., 2024) and rural India (Sudarshan *et al*., 2007). These persistent myths likely stem from limited health education combined with traditional beliefs about disease transmission (Sambo *et al*., 2014), suggesting current awareness campaigns fail to penetrate rural communities effectively.
The result is consistent with previous studies of KAP on public health important issues conducted in Ethiopia (Gebeyehu *et al*.,2021;Bihon *et al*.,202) and other countries including China (Xiang *et al*.,2016), India (Tiwari *et al*., 2019). This is not surprising as most public health education and accessibility to health infrastructures are concentrated in urban than rural areas and this allows them to have better preventive practice measures. Urban residents have greater resources, higher density and better infrastructures to have better access to health service and education (Matibag *et al*., 2007, WHO, 2016).

As compared to the present findings, the findings of Weldegerima *et al.*, (2020) in mekelle city indicated that, among household respondents, 88.2% had heard about rabies before exposure, suggesting that victims are aware of the presence of rabies in their area. And also majority (88.9%) of the victims had heard about rabies from informal sources (family, friends and neighbors), which is similar with study conducted in Tanzania (Sambo *et al*., 2014).

Socio - demographic analysis revealed striking disparities in knowledge distribution. Educated individuals showed a 25.8 times greater likelihood of proper understanding (Adj. OR = 25.791, , p = 0.001; Teklu *et al*., 2017), mirroring findings from Nigeria (Okoh, 2016) and Bangladesh (Hossain *et al*., 2012) that confirm education as the strongest predictor of health literacy. The gender gap was equally concerning, with males demonstrating 2.6 times better knowledge than females (Adj. OR = 2.614, p =0.024; Wolelaw *et al*., 2022), reflecting deep-seated inequalities in education access and health decision-making power for rural Ethiopian women (Maes *et al*., 2015). Youth (15-30 years) consistently outperformed older adults across all KAP metrics, likely benefiting from Ethiopia's recent education expansion that has raised youth literacy rates to 70% compared to 40% among older generations (Central Statistical Agency [CSA] of Ethiopia, 2021).

Comparably, Weldegerima *et al*., (2020) in mekelle city among household, revealed that female household heads were 1.5 times more likely (AOR = 1.5, 95%CI = 1.05, 2.13) to have good knowledge towards rabies as compared to male household heads. It was agreed with study conducted in Addis Ababa (Ali *et al*., 2013) and Jimma town (Kabeta *et al*., 2015). This could be due to the reason that females get awareness about rabies from house to house by urban health extension workers, women development army, giving health education in health institution and better chance of acquiring correct information about rabies.

However, Weldegerima *et al*.(2020) reported, household heads with good knowledge about rabies were 56.1% (95% CI = 52.2, 59.9), which was lower than studies conducted in SriLanka (89.6%) (Widyastul *et al*.,2015), Guatemala (82%) (Maran *et al*.,2015), Tanzania (96%) (Sabo *et al*.,2014), Addis Ababa (83%) (Ali et al.,2013), Bahir-Dar (60.1%) (Guadu *et al*., 2014), Gondar (90.8%) (Reta *et al*.,2015) and Debretabor (65.1%) (Ali *et al*.,2015). The possible reasons for this difference could be due to low health promotion particularly regarding rabies in this study area.

Weldegerima *et al*.(2020) reported , among the household heads , 56.2% (95%CI = 52.4, 60.1) had positive attitude about rabies, in Bahir-Dar (42.8%) (Ali et al., 2013), Addis Ababa (52.3%) (Ali *et al*., 2013) and Debretabor (40.6%) Ali *et al*, 2015). This difference probably might be explained by the lack of health education about rabies in the study site. Moreover, attitude of the current finding is greater than the study conducted and the time difference which could bring a difference on awareness of study participants.

The study uncovered a disturbing paradox in risk perception: while 98% correctly identified rabies as invariably fatal without treatment - matching awareness levels in Adigrat Town (Sayid *et al*., 2021) - only 5.5% considered it a serious community concern. This complacency mirrors findings from Haiti's cholera outbreaks (Rouzier *et al*., 2013) and Liberia's Ebola epidemic (Abramowitz *et al*., 2015), where communities developed "hierarchies of fear" that prioritized immediate visible threats over statistically greater but less conspicuous dangers. The prevalent reliance on traditional remedies (60%), including practices like "koso" (local cauterization) documented in Bahir Dar (Guadu *et al*., 2014), represents rational health-seeking behavior in contexts where biomedical care is inaccessible or unaffordable (Birhanu *et al*., 2016). This is exacerbated by the 62% uncertainty about dog vaccination's role in prevention, knowledge gap that similarly hampered Uganda's rabies control efforts (Wallace *et al*., 2017).

Preventive practices revealed systemic failures at multiple levels. The complete absence of dog vaccination in the study population reflects economic realities where the 50 ETB vaccine cost represents nearly 10% of a pastoralist's monthly income (Behnke & Metaferia, 2012). The 88% non-registration of dogs parallels challenges in Kenya (Kitala *et al*., 2002) but contrasts with Tanzania's successful registration programs (Sambo *et al*., 2014), suggesting policy rather than cultural barriers. Free-roaming dogs (57.5%) create transmission dynamics identical to Nepal's Kathmandu Valley (Tiwari *et al*., 2019), where street dogs maintain rabies reservoirs despite vaccination campaigns. Post-exposure practices were particularly alarming - 60% relied on herbal treatments while only 30% sought medical care, rates comparable to Delhi (Lai *et al*., 2005) but far below Sri Lanka's 89% PEP compliance (Matibag *et al*., 2009).

The result is much higher compared to reports in previous studies where only 56.2% of the respondents had a positive attitude towards rabies (kabeta *et al*., 20150). This can indicate that the community has a better chance of implementing control measures if the concerned bodies are doing their best in this regard. However, observations in this study showed that only 43% of the respondents had good practices towards rabies. This is much lower than previous reports in Ethiopia such as 61.3% in Mekelle town (kabeta *et al*., 2015) and also in other African country, Nigeria (74%) (Edukugho *et al*.,2018). The lower preventive practice score in the current study might be associated with the involvement of participants from rural areas whereas in previous studies (e.g. in Mekelle, Ethiopia), participants were drawn from urban areas. Previous studies reported showed that pet care practices are better in urban than rural areas (Matibag *et al*., 2007).

Comparably, Weldegerima *et al*., (2020) in mekelle city, indicated, 79% of household heads had vaccinated their dogs. Similarly, with study conducted in SriLanka (76%) (Widyastul *et al*., 2015) ; in Kenya (35%) (Mucheru *et al*., 2014), Jimma (4.8%) (Kabeta *et al*., 2015), Gondar 42% (Reta *et al*.,2015) and Dessie (35.8%) towns in Ethiopia (Shumuye *et al*.,2016). This may be attributed to a number of factors that include availability of animal vaccines, the study time and good information sharing in this study area.

The study's most promising finding - universal PEP awareness (100%) - may reflect Ethiopia's recent investment in rabies centers (Vigilato *et al*., 2013), though the 30% care-seeking rate shows knowledge doesn't translate to action when faced with transportation costs averaging 150 ETB per hospital visit (Yibrah & Damtie, 2015). The geographic disparity favoring Gaba Dafino 01 residents (Adj. OR = 2.821, p = 0.011) mirrors Mozambique's experience where each kilometer from a health center reduced PEP compliance by 3% (Hampson *et al*, 2015).

These findings demand innovative, context-specific solutions. Mobile technology could bridge knowledge gaps - SMS alerts increased vaccination rates by 22% in Malawi (Sambo *et al*., 2017). Community-based dog vaccination - successful in Chad (Mbaipago *et al*., 2020) - could overcome infrastructure limits. Most critically, interventions must address the "know-do gap" through behavioral nudges - Tanzania's "One Health" clubs improved bite reporting by 40% (Mazet *et al.*, 2014). Without such multifaceted approaches, rabies will remain a tragic example of how poverty and inequity perpetuate preventable suffering in rural Ethiopia.

Adane *et a*l., (2022) among residents of Amhara region, reported, most of the respondents understand that rabies is a fatal disease and cannot cure without treatment. And 89.2% of them understand the availability of PEP as a treatment for rabies exposed individuals. This favorable knowledge is helpful to implement the recommendations that any individual with a bite suspected of having rabies should seek medical attention as quickly as possible (WHO, 2010). However, 63.7% of the respondents accept that traditional treatments are more effective, but this is problematic as the effectiveness of most of traditional treatments is not known. Generally, the community has good knowledge of the availability of modern medical treatment and the fatal nature of the disease if left untreated. However, this favorable knowledge is masked by their treatment options which incline to traditional treatments and there is a need to create awareness among the public to drive their demand for modern medical options.

5. CONCLUSION AND RECOMMANDATION

The study revealed significant gaps in knowledge, attitudes, and practices related to rabies in the study area. Misconceptions about transmission, low dog vaccination rates, and reliance on traditional remedies are major concerns. Younger, educated males tend to have better knowledge, attitudes, and practices, while older individuals, females, and those with lower education levels require targeted interventions. Public health campaigns should focus on improving awareness, promoting dog vaccination, and encouraging proper post-bite care to reduce the burden of rabies in the community.

Based on the above conclusion the following Recommendations were forwarded:

- ✓ **Public Health Campaigns**: Develop culturally tailored educational campaigns to address misconceptions and improve awareness of rabies transmission, prevention, and treatment.
- ✓ **Access to Healthcare and Vaccines:** Improve access to PEP and dog vaccination services, particularly in rural and underserved areas.
- ✓ **Community Engagement:** Engage community leaders and traditional healers to promote modern medical practices alongside traditional remedies.
- ✓ **Targeted Interventions**: Focus on older, less educated populations and geographic areas with poor practices to reduce disparities in KAP outcomes.
- ✓ Research inter sectoral collaboration between, Agriculture office, Human Health and Environmental Health sectors to optimize rabies elimination Strategy.
- ✓ Collaborate with traditional healers to **One Health Approach** promote post-bite medical care alongside cultural practices.

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