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Assessment of zoonotic risk behaviours in particularly vulnerable tribal groups (PVTGs) from selected tribal areas of Andhra Pradesh

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Abstract

A cross-sectional study was conducted to assess the awareness regarding zoonotic diseases and potential zoonotic risk behaviours among Particularly Vulnerable Tribal Groups (PVTGs) living in selected tribal areas of Andhra Pradesh from the period of August 2025 to January 2026. A semi-structured questionnaire was used to collect information on socio-demographic characteristics and different zoonotic risk behaviours. The findings indicated that several risk practices were prevalent among the respondents, including consumption of bush meat, handling of wild or dead animals, handling of fetal membranes, improper disposal of animal carcasses, raw milk intake, sustaining animal related injuries. The study highlights the need for improved awareness programmes, safe and preventive practices and strengthening of veterinary and public health services in tribal areas to reduce the risk of zoonotic disease transmission in tribal communities.

Keywords: Zoonotic diseases, Zoonotic risk behaviours, PVTGs, Tribal areas, Public health

Introduction

Zoonotic diseases are the diseases or infections that are naturally transmissible from vertebrate animals to humans. Zoonotic pathogens may be bacterial, viral, or parasitic, or may involve unconventional agents and can spread to humans through direct contact or through food, water or the environment (World Health Organization, [WHO] 2020) ^[1]. Zoonotic diseases pose a significant public health risk, especially in rural and tribal communities residing close to wildlife and forest environments. Tribal populations living in forest fringes are particularly vulnerable due to their close interactions with both domestic and *wild animals*, traditional practices, and limited access to health education and veterinary services.

A Particularly Vulnerable Tribal Group or PVTGs (previously known as Primitive Tribal Group PTG), in the context of India, is a sub-classification of Scheduled Tribe or section of a Scheduled Tribe that is considered more vulnerable than a regular Scheduled Tribe. (Patel, 1998) ^[2](Ministry of Tribal affairs, 2022) ^[3]. Government of India identified some of the backward tribal groups as "Primitive Tribal Groups" based on low literacy, pre agricultural level of technology, hunting and gathering economy, isolated habitat etc. Based on these criteria, 12 tribal groups had been identified as Primitive Tribal groups including in the State of Andhra Pradesh (Tribal Cultural Research and Training Institute (TCRTI), 2023) ^[4]. In 2006, the Government of India renamed the PTGs as Particularly Vulnerable Tribal Groups (PVTGs)(G Muralidhar, 2014) ^[5].

Andhra Pradesh State has the largest concentration of tribal population in South India and occupies 8th position among the states having tribal population in the country. Twelve tribal groups (including sub-groups of certain main tribes) had been identified as Particularly Vulnerable Tribal Groups in Andhra Pradesh. The present study focuses on PVTGs pertaining to selected districts of Andhra Pradesh which includes Alluri Sitharama Raju (ASR) and Polavaram districts. Few mandals from the respective districts were selected for the above said study, which include Paderu, Hukumpeta, G.Madugula and Araku of ASR district. Addateegala, Y.Ramavaram and Gangavaram of Polavaram district. The main tribes in these areas include Kondareddis, Khond, Konda Savara, Gadaba and Porja.

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The livestock form an integral part of the PVTG's economic system. The animals like *cattle*, *buffalo*, *goats*, *sheep* and backyard *poultry* were reared for milk, meat, eggs and also as a ready source of income upon sale. Some animals like goat, *sheep* and fowl are considered as sacrificial animals which are sacrificed to appease malevolent spirits lest such spirits may harm them or their crops according to their traditional beliefs (TCRTI, 2023)^[4].

Zoonotic risk behaviors are defined as specific human actions or cultural practices that increase the probability of pathogen transmission at the human-animal-environment

interface. These behaviors encompass direct contact with wild or domestic animals, consumption of unpasteurized or undercooked animal products, and occupational exposures in farming or veterinary medicine without adequate biosafety measures (WHO, 2019)^[6]. According to the (CDC 2020)^[7], these risks are further exacerbated by environmental encroachment and the lack of protective hygiene practices, which facilitate the "spillover" of infectious agents from animal reservoirs to human populations. These behaviors constitute a significant public health threat, which primarily occur at the human-animal interface. Several zoonotic risk behaviours like bush meat consumption, hunting *wild animals* in the forest, consuming raw milk, washing animals near canals. Improper handling and disposal of dead carcass, unsafe handling of fetal membranes and following traditional beliefs like hanging fetal membranes to a tree, for better animal milk production were noted. PVTGs identified for their extreme socio-economic backwardness, isolation and fragile livelihoods, considering these factors, the present study was undertaken to assess zoonotic risk behaviours among PVTG communities in selected tribal areas of Andhra Pradesh and to identify potential practices that may contribute to

Zoonotic disease transmission.

Materials and Methods

Study area

The present study was conducted in tribal villages of Alluri Sitharama Raju (ASR) district, major part of the survey was carried out in Paderu mandal and other mandals - G.Madugula, Hukumpeta, Araku and small proportion of survey was carried out in 3 mandals in Polavaram district of Andhra Pradesh. The study area was purposively selected due to vast diversity of tribal population and unique socio-cultural landscape, which provides an environment to study traditional practices, livelihood challenges and better understanding for any research regarding indigenous development.

Alluri Sitharama Raju (ASR) district is a predominantly tribal and hilly region of Andhra Pradesh, situated on an average elevation of over 900 meters above sea level in the Eastern Ghats. The district receives substantial rainfall, with reported annual averages ranging from 1,290.6 mm to 1,700 mm in higher altitude regions (District Administration, 2026)^[8]. Agriculture remains the primary source of livelihood for these communities. The selected tribal areas for the present study are coloured in red in map Fig.1.

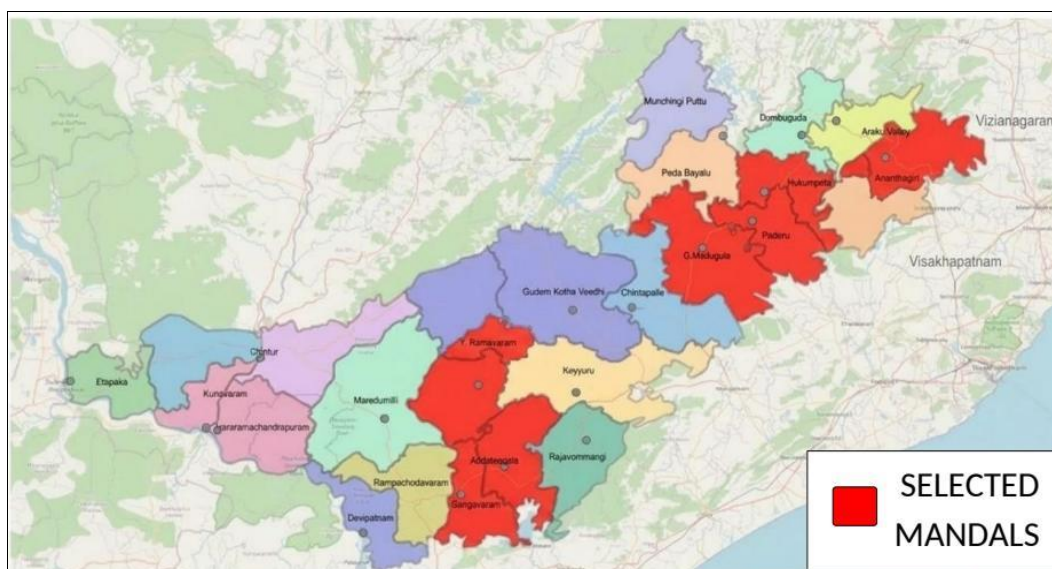


Fig 1: Geographical map of selected tribal areas for the study in Andhra Pradesh

Study design and Data collection

A cross-sectional study was conducted to assess zoonotic risk behaviours among tribal populations. A semi-structured questionnaire was prepared with both open and close ended questions, in the local language to ensure easy understanding among tribal people. The questionnaire included details on socio-demographic characteristics, type of domestic animals, vaccinations, health care facilities, and

practices of animal handling, food habits and zoonotic risk behaviours. Data were collected through personal interviews with the respondents at their household/work place. After interviewing every questionnaire was checked thoroughly, questions containing obscure or any misunderstood questionnaire was excluded in the final analysis. The final answers were entered into a computer spreadsheet, Microsoft Excel.

Table 1: Questionnaire for the study in selected tribal areas of Andhra Pradesh

Name:	Age:	Gender: ☐ Male ☐ Female ☐ Other														
Educational qualifications: ☐ Illiterate ☐ Primary ☐ High school ☐ Graduate ☐ PG																
Village name:	Mandal:															
District:	Occupation:															
Do you keep / rear animals?	☐ Yes ☐ No If yes, which animals? ☐ Cow ☐ Buffalo ☐ Goat ☐ Sheep ☐ Poultry ☐ Pig ☐ Pets ☐ Others:															
Number of animals:	<table border="1"> <tr> <th>Cow</th> <th>Buffalo</th> <th>Goat</th> <th>Sheep</th> <th>Poultry</th> <th>Pig</th> <th>Others</th> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Cow	Buffalo	Goat	Sheep	Poultry	Pig	Others							
Cow	Buffalo	Goat	Sheep	Poultry	Pig	Others										
Purpose of animal keeping:	☐ Milk ☐ Meat ☐ Farming ☐ Sale/Income ☐ Rituals ☐ Others															
Method of animal feeding:	☐ Grazing ☐ Intensive ☐ Semi intensive ☐ Free range															
Source of water:	☐ Public water supply ☐ Wells ☐ Canal ☐ Tank / Pond															
For both humans and animals?	☐ Reservoirs ☐ Dams															
Do you regularly Deworm and vaccinate your animals	☐ Yes ☐ No ☐ Don't know If yes Vaccines: FMD/LSD/Brucella/BQ/HS/BT/Goat pox/Sheep pox/RDK/fowl pox/ ARV															
No. of vaccinated animals:																
No. of unvaccinated animals:																
Annual vaccination:	☐ Yes ☐ No															
Regular deworming:	☐ Yes ☐ No															
Regular general animal health checkup	☐ Yes ☐ No															
Animal health (visible):	☐ Healthy ☐ Sick ☐ Weak ☐ Injured															
Where do you go when your animal is sick?	☐ Veterinary doctor ☐ Traditional healer ☐ Animal husbandry assistant ☐ No treatment ☐ Others: ____															
Supplements and medicines availability:	☐ Yes ☐ No															
Handling of sick animals:																
Where are animals kept?	☐ Near the house ☐ Separate shed ☐ Open field ☐ Tied outside															
Whether sanitation of water tanks and sheds is regularly followed?	☐ Yes ☐ No															
Handling of dead carcass, infected fetal membranes, placenta & aborted fetus:	Disposal with bare hands - ☐ Yes ☐ No															
Assisting cow / animal during calving:	☐ Yes ☐ No															
Whether are you sleeping near animal sheds or near fields at night times?	☐ Yes ☐ No															
Do you have the habit of washing/cleaning of animals near ponds, tanks, canals?	☐ Yes ☐ No															
Do you participate in hunting?	☐ Yes ☐ No Knife/bow & arrows/spear/axe Sale/trade/eating/hobby															
i. Whether hunting was practiced throughout the year or seasonally? ii. Whether the hunt was shared among all the people in community or restricted to a family only? iii. The leftover hunt was stored for how many days/ sold to public? iv. What animals do you hunt? v. What weapons do you use? vi. What is the purpose of hunting?																
Whether home butchering of animals is practiced or not?	☐ Yes ☐ No															
If yes, how do you handle the animal?	Bare hands / gloves / cloth															
Whether butchering is practiced near any canals?	☐ Yes ☐ No															
Carcass disposal methods.	Burning / Burial / disposed / thrown away															
Do you practice culling of sick animals from healthy animals?	☐ Yes ☐ No															
Consumption of bush meat:	☐ Yes: Wild animal / bird ☐ No															
Consumption of dead animal meat	☐ Yes ☐ No															
Type of meat consumed:	Beef / boar / sheep / goat / poultry / wild animal															
Consumption of raw milk	☐ Yes ☐ No															
Do you practice any food taboos or avoid certain foods?	☐ Yes ☐ No If yes mention:															
Eaten fresh killed wild animals or its organs	☐ Yes ☐ No															
Handled a fresh killed wild animal or any part of it	☐ Yes ☐ No															
Had wild animals as pets	☐ Yes ☐ No															
Scratched or bitten by wild animals	☐ Yes ☐ No															
Wounded when butchering wild animal	☐ Yes ☐ No															

Risk assessment

A risk scoring method was applied to identify potential zoonotic risk behaviours among the respondents. Risk behaviours such as consumption of bushmeat, hunting of *wild animals*, handling of animal carcasses and fetal membranes (assisting animals during calving), consuming raw milk, improper disposal of carcasses were assessed.

Data analysis

The collected data were compiled and analyzed using descriptive and statistical data analysis like frequency, percentage, mean, median, chi-square test and fisher's exact test (pvalue). Associations between socio-demographic

variables and risk factors were assessed using chi-square test and Fisher's exact test where applicable.

Results

A total of 266 respondents participated in the study. Among them, 186 (70%) were males and 80 (30%) were females. Regarding educational status, 37.6% of respondents were illiterate, 27% had completed primary education, and 26% had secondary education. The majority of the respondents (88.7%) were engaged in farming as their primary occupation. The distribution of participants according to age group revealed that the highest proportion (60.9%) was observed in the 20-45 years age group.

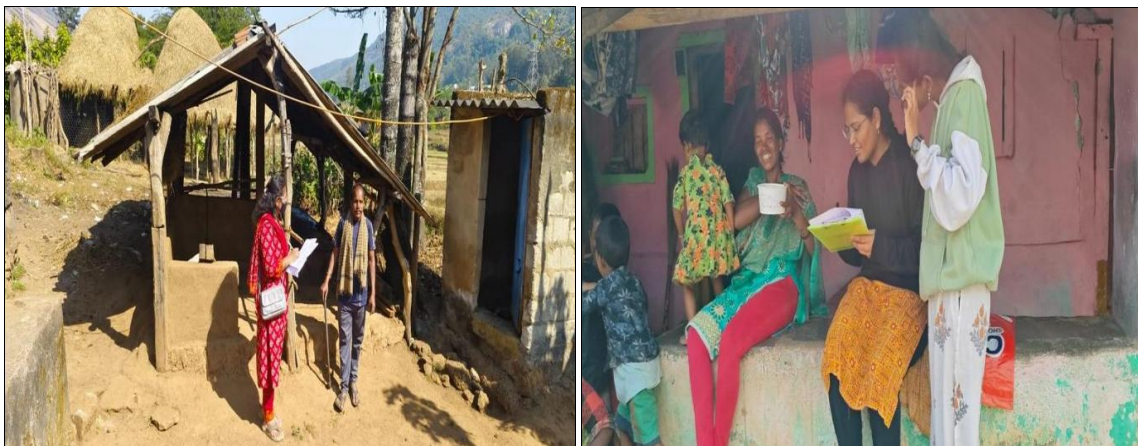


Fig 2: Interviewing the respondents from study areas

Out of 266 total respondents, 62.4% reported owning animals, with a total of 1736 animals recorded. Details of different type of animals reared by respondents are given in Fig 3. The primary purpose of animal rearing was farming (67.5%), followed by both farming and milk purpose (11.4%), only for sale (7.8%) and milking only (7.2%), while a smaller proportion used animals for meat (6%).

Regarding feeding practices, most animals were grazed (90.4%), whereas 6.6% were maintained under semi-intensive systems and only 3% under intensive systems. For water supply, the majority of respondents depended on public water supply (96.6%), while 10.5% used canals, ponds, or tanks as an additional source.

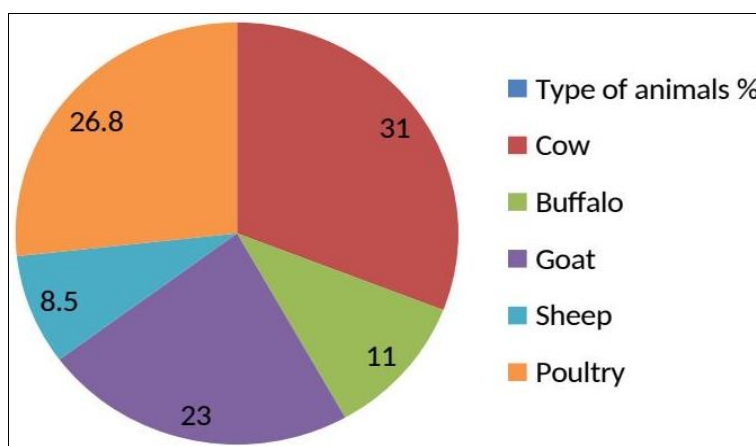


Fig 3: Details of animal reared by respondents in the study area

Among the respondents, 51% reported regular deworming and vaccination of animals. However, only 45% of animals were vaccinated, while 55% remained unvaccinated. Regular deworming was practiced by 51% of respondents,

and annual vaccination was reported by 50.6%, indicating moderate adoption of preventive healthcare practices. Deworming and vaccination details of animals in Fig. 4.

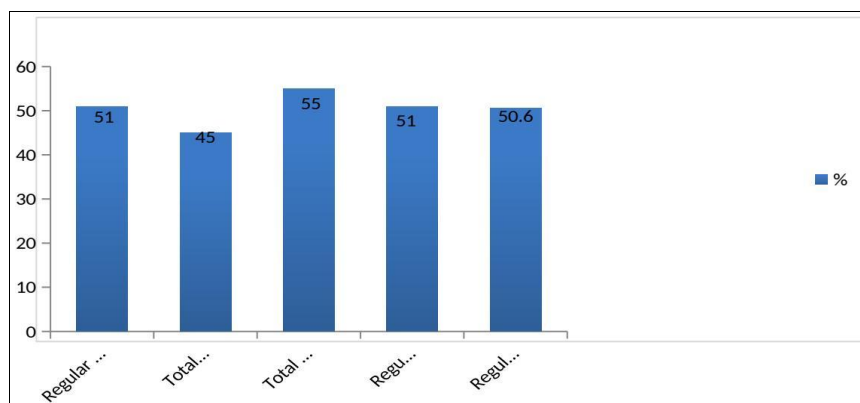


Fig 4: Details of deworming and vaccination of livestock in the study area

Regular animal health check-ups were reported by 53% of respondents. Most respondents reported having healthy animals (90.4%), with 4.8% each of sick and injured animals during the study period. When animals fell sick, the majority of respondents (54.8%) approached animal

husbandry assistants for treatment. However, a considerable proportion relied on traditional healers (21.7%) followed by veterinary doctors (17.5%) and while a small percentage (6%) did not seek any treatment. Treatment seeking for livestock were depicted in Fig 5.

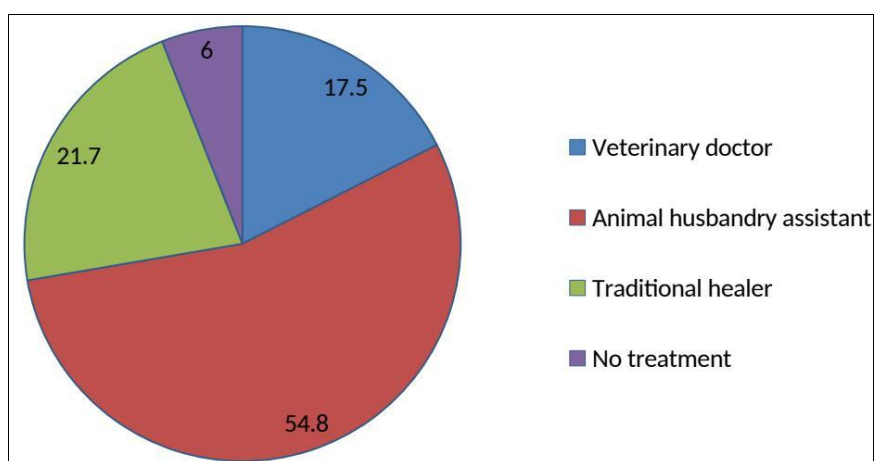


Fig 5: Details of treatment seeking for livestock in the study area

Majority of respondents (82.5%) kept livestock in separate sheds with relatively hygienic surroundings. Handling of dead carcasses with bare hands was reported by 30% of the respondents indicating a potential risk practice. Very few respondents (17.4%) assisted animals during calving. Washing of animals near canals was reported by 45%. Risky practices such as hunting (17%), home butchering (13.5%), and butchering near canals (7.9%) or throw the slaughter waste or offals near water bodies like streams, canals, ponds and rivers were observed. Carcass burial was practiced by 96%, while 96.4% respondents reported culling of sick animals from healthy animals and take precautions. Consumption of dead animal meat was reported by 12.4%, drinking raw milk was reported by (7.9%), taboos related to food consumption was reported by 4.1% and bush meat consumption was also prevalent but could not be quantified. Consumption and handling of fresh killed wild animal meat has been documented, while negligible proportion of respondents 1.1% kept *wild animals* as pets. About 3.3% reported being scratched or bitten by *wild animals* or *dogs*. A very small proportion (0.8%) reported sustaining injuries while butchering animals.

Risk scoring

A numerical risk scoring system has been developed to

identify the risk levels related to zoonotic risk behaviours.

Table 2: Risk scores

Answer	Risk score
Yes	1
No	0

Table 3: Risk level with risk score

Risk score	Risk level
0	Low, Very low
1	High, Low
2	Moderate
3	High

Table 3 shows the risk scoring for zoonotic risk behaviours based on the response (Yes/No) of the respondents, whereas Table 4. gives the information on risk levels of the different zoonotic risk behaviours. Table 5. shows that risk behaviours such as bushmeat consumption, hunting of wild animals, dead meat consumption and raw milk consumption, scratched or bitten by wild animals/dogs, handling of fetal membranes, and improper carcass disposal were commonly observed among males, aged between 20-45 years and from the study area Paderu followed by G.Madugula. Illiterate respondents and farmers reported comparatively high risk behaviours.

Table 4: Risk scoring of zoonotic risk behaviours

S.no	Risk behavior	Response	Score	Risk level	(n)frequency	%
1.	Consumption of bushmeat	Yes	1	High	115	43.2
		No	0	Low	151	56.8
2.	Hunting of wild animals	Yes	1	High	60	22.6
		No	0	Low	206	77.4
3.	Consumption of dead animal Meat	Yes	1	High	33	12.4
		No	0	Low	233	87.6
4.	Consuming raw milk	Yes	1	High	18	6.8
		No	0	Low	248	93.2
5.	Scratched or bitten by wild animals	Yes	1	High	11	4.1
		No	0	Low	255	95.9

Table 5: Risk levels of different zoonotic risk behaviours

S.No	Risk behaviour	Risk behaviour response	Score	Risk level	(n)frequency	%
1.	Handling dead carcass	Do not handle dead carcass	0	Very low	78	29
		With gloves/safety precautions	1	Low	125	47
		Direct bare hands handling	2	Moderate	54	20
		Handling and /(distribution to others) consuming dead animal meat	3	High	9	3.4
2.	Carcass disposal	Burning/incineration	0	Very low	3	1.1
		Burial	1	Low	172	64.7
		Disposed /thrown in open field/forest	2	Moderate	3	1.1
		Thrown in water bodies/open area near houses	3	High	6	2.3
3.	Handling fetal membranes	No contact	0	Low	91	34
		Handled with precautions/stick	1	Moderate	124	46.6
		With bare hands	2	High	51	19.2

Table 6: Comparative risk analysis of zoonotic risk behaviours based on socio-demographic characteristics

Risk behaviour	Gender	Age group	Education	Occupation	Place
Consumption of bushmeat	Males	20-45	Illiterate	Farmer	Paderu
Hunting of wild animals	Males	20-45	Secondary	Farmer	Paderu
Consumption of dead animal meat	Males	20-45	Illiterate & primary	Farmer	G.Madugula
Consuming raw milk	Males	20-45	Illiterate & Secondary	Farmer	G.Madugula
Scratched or bitten by wild animals or dogs	Males	20-45	Illiterate	Farmer	G.Madugula
Handling dead carcass with bare hands	Males	20-45	Illiterate	Farmer	Paderu
Improper carcass disposal	Males	20-45	Illiterate	Farmer	Paderu
Handling fetal membranes with bare hands	Males	20-45	Illiterate	Farmer	Paderu

Statistical analysis of the study

The chi-square and Fisher's exact test analysis was performed to understand the zoonotic risk behaviours given in Table 6. The analysis revealed that among the variables studied the variable study area was very strongly significant for consumption of dead animal meat ($p > 0.003$) ast ast. Sex of the respondents was strongly significant for hunting *wild animals* ($p < 0.001$) ast ast, handling fetal membranes ($p < 0.001$) ast ast and carcass disposal method ($p < 0.004$) ast ast.

Considerable significance was observed for sex with consumption of dead animal meat ($p < 0.045$) ast. Study area was also significant with hunting *wild animals* ($p < 0.010$) ast, carcass disposal ($p < 0.014$), *handling fetal membranes with bare hands* ($p < 0.033$) and consumption of bushmeat ($p < 0.040$) ast. Occupation shows significant association with carcass disposal ($p < 0.010$) ast and handling fetal membranes ($p < 0.038$) *.

Table 7: Statistical analysis of zoonotic risk behaviours with relationship to socio-demographic characteristics

Zoonotic risk behaviour	Variable	Category	Yes / Risky n (%)	No / Safe n (%)	χ^2 /Fishers	p-value
Hunting wild animals	Sex	Male	57 (30.6)	129 (69.4)	23.50	<0.001**
	Study area (7 locations)	-	-	-	15.04	0.010*
	Age	>45 yrs	25 (24.0)	79 (76.0)	0.36	0.835
	Education	Literate	44 (26.5)	122 (73.5)	-	0.328 ^a
Carcass disposal	Sex	Male	137 (73.7)	49 (26.3)	8.11	0.004**
	Occupation	Farmer	169 (71.6)	67 (28.4)	11.20	0.010*
	Study area (7 locations)	-	-	-	14.16	0.014 ^a *
	Education	Illiterate	69 (69.0)	31 (31.0)	-	0.082 ^a
Handling fetal membranes	Sex	Male	41 (22.0)	145 (78.0)	-	<0.001***
	Occupation	Farmer	48 (20.3)	188 (79.7)	-	0.038 ^a *
	Study area (7 locations)	-	-	-	12.06	0.033*
	Age	>60 yrs	7 (33.3)	14 (66.7)	4.87	0.087
Dead animal meat consumption	Sex	Male	28 (15.1)	158 (84.9)	4.01	0.045*
	Study area (7 locations)	-	-	-	17.54	0.003**
	Education	Illiterate	12 (12.0)	88 (88.0)	-	0.884 ^a
Bush meat consumption	Study area (7 locations)	-	-	-	11.64	0.040*
	Sex	Male	87 (46.8)	99 (53.2)	3.15	0.076
Raw milk intake	Education	Illiterate	8 (8.0)	92 (92.0)	-	0.097 ^a
Wild animal bites	Sex	Male	8 (4.3)	178 (95.7)	0.02	0.836

Discussion

In the present study, among the 266 respondents, 51% reported regular deworming and vaccination of animals which is much lower than respondents in Tamil Nadu which is 92.6% reported by Mariasusai *et al.* (2025) ^[9] and vaccination levels (82%) reported by Munyaneza *et al.* (2025) ^[10] in Rwanda's Bugesera district.

The present study revealed that regular veterinary health check-ups were inadequately practiced in tribal areas. This finding is in agreement with studies conducted by Rajkumar *et al.* (2016) ^[11] in Puducherry, and Singh *et al.* (2019) ^[12] in Punjab, which reported poor adoption of preventive animal health practices among livestock farmers.

The present study revealed that only 17.5% of respondents consulted veterinary doctors when animals were sick, whereas a majority (54.8%) depended on veterinary assistants for treatment. This indicates a greater reliance on para-veterinary services rather than qualified professionals. Similar trends have been reported in rural and tribal settings, where livestock owners prefer veterinary assistants due to easy accessibility, lower cost, and immediate availability of services. The findings for traditional healers (21.7%), which is higher than those reported in Vizianagaram by Kulakarni *et al.* 2018^[13] that is (13.8%). Meanwhile, a small percentage (6%) did not seek any treatment for sick animals, which is considerably lower compared to 19% reported by Kulakarni *et al.* 2018^[13] in Vizianagaram.

Majority 99% respondents regularly maintain hygienic surroundings in animal sheds and sanitize animal sheds which is almost similar to reports by Mariasusai *et al.* 2025^[9] that is 94.6% in Tamil Nadu. Handling of dead carcasses with bare hands was reported by 30% of the respondents indicating a potential risk practice which is lower than findings by Abunna *et al.* 2024 ^[14] (77.3%) in Ethiopia, without using any personal protective care handling sick animals.

Very few respondents (17.4%) assisted animals during calving in the present study which is much lower than study conducted by Lindahl *et al.* 2015^[15] (56%) in Tajikistan, whereas Moutos *et al.* 2022^[16] in Greece reported no precautionary measures when assisting animals in parturition or in the handling of birth material.

Risky practices such as hunting (17%) in present study is very much lower (81%) as compared to Subramanian *et al.* 2012^[17] in Sierra Leone. Dead animal carcass burial was practiced by 96% of respondents which are higher than the practices reported by Dutta *et al.* 2021^[18] (82.54%), Pattnaik *et al.* 2022^[19] (83%), and Sambo *et al.* 2014^[20] (75%) in Bangladesh, Odisha and Tanzania respectively.

Regular isolation of sick animals from healthy animals reported by 96.4% respondents which is higher than the (64.3%) reported by Mariasusai *et al.* 2025^[9] in Tamil Nadu.

The present study revealed that 12.4% proportion of tribal respondents consumed meat from dead animals, which is a significant zoonotic risk behavior which is higher than findings reported by Pattnaik *et al.* 2022 ^[19] that is 4.2% of respondents in Odisha tribal communities. Such behaviours prevalent in tribal areas due to socio economic constraints and cultural practices which increase the risk of contracting certain zoonotic diseases like Anthrax.

A smaller proportion 7.9% of respondents in the present

study reported consumption of raw milk which was lower than the reports of Shukla *et al.* 2019 ^[21] (15%) in Surajpur district of Chattisgarh, Abunna *et al.* 2024 ^[14] (68.3%) and Tseyega *et al.* 2012 ^[22] (94.3%) in Ethiopia.

In the present study 3.3% reported being scratched or bitten by *wild animals* or *dogs* compared to studies reported by Ozioko *et al.* 2018 ^[23] (88.2%) in South Nigeria. A very small proportion (0.8%) reported sustaining injuries while butchering animals than reported by H Li *et al.* 2021^[24] (13.5%) in Southern China.

The present study identified sex as the primary determinant of high-risk zoonotic risk behaviours, with males showing strong significance with hunting *wild animals* ($p < 0.001$), handling fetal membranes ($p < 0.001$) ast ast and improper carcass disposal ($p < 0.004$) ast ast. A significant association was observed with consumption of dead animal meat ($p < 0.045$) ast which is similar to the study conducted in Sierra Leone by Subramanian 2012 ^[17], where men dominated in hunting, whereas Makhija *et al.* 2020 ^[25] in Odisha, showed significant association between men and carcass disposal ($p < 0.001$) ast ast.

The variable study area is significant with hunting *wild animals* ($p < 0.010$) ast and carcass disposal ($p < 0.014$) * while no statistical significant association was noticed between socio-demographic characteristics on hunting and handling carcasses ($p > 0.01$) reported by Maideen *et al.* 2021 ^[26] in Malaysia.

Consumption of dead animal meat ($p < 0.003$) ast ast is strongly significant with the study area, in which similar findings in Odisha reported significant association with sex (male), employed and among illiterate people ($p < 0.001$) ast ast by Makhija *et al.* (2020) ^[25] and study in Ethiopia, showed that frequency of raw meat consumption were significantly higher in males ($p < 0.045$) ast.

Occupation (farmer) shows significant association with carcass disposal ($p < 0.010$) ast and handling fetal membranes ($p < 0.038$) * as compared to the study conducted by Makhija *et al.* 2020 ^[25] in Odisha, males, occupation (employed) and illiterate respondents showed significant association ($p < 0.001$) ast ast.

Conclusion

The present study highlights the awareness on zoonotic diseases and zoonotic risk behaviours among Particularly Vulnerable Tribal Group (PVTG) in selected areas of Andhra Pradesh. The observed risk patterns in the study was proven to be associated with illiteracy, low socioeconomic status, poor resources and limited accessibility to the veterinary care. The study recommends setting up surveillance and creating awareness at community level to minimize the zoonotic risk behaviours and promoting the public health.

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