



International Journal of Veterinary Sciences and Animal Husbandry



ISSN: 2456-2912
NAAS Rating: 4.61
VET 2025; 10(3): 100-110
© 2025 VET
www.veterinarypaper.com
Received: 18-01-2025
Accepted: 22-02-2025

Sanpha Kallon
Animal Science, School of
Agriculture and Food Sciences,
Njala University, Sierra Leone

Abdul Rahman Sesay
Animal Science, School of
Agriculture and Food Sciences,
Njala University, Sierra Leone

Abdulai Mahmood Conteh
Animal Science, School of
Agriculture and Food Sciences,
Njala University, Sierra Leone

Mahmud E Sesay
School of Veterinary Medicine,
Njala University, Sierra Leone

Corresponding Author:
Abdulai Mahmood Conteh
Animal Science, School of
Agriculture and Food Sciences,
Njala University, Sierra Leone

Knowledge, attitudes, and perceptions assessment of goat and sheep farmers against Peste des Petits Ruminant Disease, Sierra Leone

**Sanpha Kallon, Abdul Rahman Sesay, Abdulai Mahmood Conteh and
Mahmud E Sesay**

DOI: <https://www.doi.org/10.22271/veterinary.2025.v10.i3b.2114>

Abstract

Peste des petits ruminants (PPR) is a highly contagious and devastating small ruminant viral disease posing an unbearable threat to livestock development and human welfare. Inadequate knowledge among animal keepers, negative attitudes, and perceptions (KAP) that underestimate the disease severity can facilitate continued spread. This study aimed to assess the KAP of small ruminant farmers towards PPR in selected regions in Sierra Leone. We conducted a cross-sectional KAP survey in selected regions, using a well-structured and pre-tested open- and closed-ended questionnaire with 438 respondents. Overall, most respondents (68.0%) were males and about 64.6% had no formal education. The majority were married (79.9%), average age was 47.9%, and 44.5% had extensive experience in rearing livestock. The main severe diseases reported were PPR (96.3%), skin infection (85.6%), and foot rot (67.4%). From the survey, only a small percentage of farmers (16.5%) knew the causative agent of PPR with other livestock farmers (53.9%) being the most sources of information on PPR. All farmers could at least identify one clinical sign of PPR, including sudden death (95.9%), diarrhea (89.7%), and oral and nasal discharge (88.1%). The introduction of animals from other communities was considered the major source of PPR by 51.6% of farmers, while 42.2% had no knowledge of how it is introduced. The mixing of flocks (90.0%) and common grazing (61.6%) were considered the main route of PPR transmission. Self-treatment (73.3%), including the use of human medicine (28.1%), and selling apparently healthy animals during outbreaks (35.5%) were prevalent practices. While 47.7% were aware of the PPR vaccine, only 20.5% believed in its effectiveness, and just 28.5% vaccinated their animals. A significant proportion (64.8%) lacked trust in PPR vaccination. These findings underscore the critical need for targeted educational campaigns, trust-building initiatives, and the promotion of effective vaccination programs to combat PPR and improve small ruminant health and productivity in Sierra Leone.

Keywords: Clinical sign, PPR introduction and transmission, prevalence, susceptibility, treatment, vaccination

Introduction

Peste des petits ruminants (PPR) is a virulent-fatal and globally notifiable transboundary disease affecting both domestic and wild ruminants. The causative agent is a virus belonging to the genus *Morbillivirus* of the family *Paramyxoviridae* [1]. PPR is characterized by high morbidity (up to 100%) and mortality (100%), particularly in unprotected flocks, making it a significant threat to small ruminant populations and livelihoods [2, 3]. First reported in West Africa, PPR has since spread extensively, now endemic in over 70 countries across Africa, Asia, and the Middle East, with 50 additional countries identified as being at risk [4, 3, 5]. The virus spreads primarily through direct contact between infected animals and susceptible hosts, as well as through exposure to contaminated materials such as feed, water, and bedding. Clinically, PPR manifests with symptoms including fever, nasal and oral discharges, stomatitis, diarrhea, sunken eyes, dehydration, rough coats, abortion in pregnant animals, and sudden death. These symptoms highlight the disease's devastating impact on animal health and its significant socioeconomic consequences.

Langur distribution, focusing on troop composition, sex ratios PPR is preventable through vaccination, emphasizing the importance of effective control and eradication programs to curb its spread and minimize losses.

PPR is endemic in Africa and Asia, causing severe economic losses and impacting livelihoods, food security, and global trade. Globally, Africa contributes about one-fourth of the livestock population [6], accounting for approximately 438 million of goats and 384 of sheep [7]. PPR has had a severe impact on these continents, significantly affecting resource-limited settings where small ruminants play a critical role in livelihoods. The annual global economic losses attributed to PPR are estimated to range between \$1.2 billion and \$1.7 billion [3]. These losses stem from direct effects such as high morbidity and mortality rates in infected animals and indirect effects including reduced productivity, market restrictions, and increased costs of disease control. PPR's impact extends to over 5.4 billion people living in communities affected by the disease, with more than 300 million small ruminant farmers bearing the brunt of its effects [3]. The dependence of these communities on small ruminants for income, nutrition, and social functions highlights the urgency of implementing effective measures to control and eventually eradicate the disease. Over years, livestock population especially small ruminant in Sierra Leone, has been severely impacted by preventable but neglectable diseases, including skin infections, PPR among others. The country has 2,530,790 (goats: 1,567,789 and sheep: 963,001) small ruminants predominantly managed by smallholder farmers mostly residing rural areas [8]. PPR, a highly contagious viral infection, was first confirmed in northern Sierra Leone in 2009 [9]. Despite its significant role in the country, the small ruminant sector faces numerous challenges beyond disease outbreaks. These include theft, inadequate feed, and poor husbandry practices, which further strain productivity and livelihood. The widespread prevalence of PPR has exacerbated these challenges, posing a serious threat to food security, economic stability, and social development. To combat this disease, Sierra Leone has implemented several control measures. These include mass vaccination campaigns, community education, the training of animal health workers, and stricter regulations on animal movement. In recognition of its impact, PPR has been classified as a notifiable disease and included among the 16 priority diseases in the livestock sector. However, gaps remain in understanding farmers' KAP on the disease. Data on the knowledge, attitudes, and perceptions (KAP) of small ruminant farmers regarding PPR are scarce, limiting the effectiveness of interventions. This study was therefore conducted to assess the current KAP of small ruminant farmers toward PPR in selected regions of Sierra Leone, aiming to provide actionable insights to guide future policies and interventions.

Methods and Materials

Sierra Leone is divided into five regions (eastern, northeast, northwest, southern, and western) and sixteen districts. The country borders Guinea in the north and northeast, Liberia in the south and southeast, and the Atlantic Ocean in the southwest. The study was conducted in the eastern, northeast, and southern regions representing 25.7, 17.5%, and 24.3 percent of the country's 7,541,641 population [10]. Agriculture especially crop and livestock farming is the primary source of livelihood promoting economic growth, contributing about 60% of the country's GDP [11] and employing about two-thirds of the national population. Livestock including, poultry

(chickens and ducks), goats, sheep, cattle, and swine accounts for nearly 5.7% of the national GDP [11] and largely of local breeds, are the most commonly reared.

The study used a cross-sectional design conducted in six districts from October 2021 to April 2022 to assess the knowledge, attitudes, and perceptions of small ruminant farmers against PPR. These districts were purposively selected due to the unpredictable and frequent incidents of PPR and the porous entering points across neighboring countries. In addition to inadequate unsupervised inter-district animal migration and poor veterinary delivery services, little/no KAP studies on PPR is conducted in the study areas inhibiting effective control programs in the country. The research methods adopted in this study is similar to those employed by [12, 13], which utilized a cross-sectional survey to investigate the KAP of farmers towards PPR.

The survey purposively selected small ruminant keepers that for the past two years have experienced outbreaks of PPR in their herd. Farmers with at least two years of rearing experience and were 18 years and above before the study were included. The study used a well-structured and pre-tested questionnaire with closed and open-ended questions. The tool consisted of four sections with each section accruing primary data on farmers' socio-demographics, knowledge, attitudes, and perceptions.

The study sourced information on PPR from 438 small ruminant farmers distributed in three regions, six districts, and thirty-six communities. A face-to-face approach and a house-to-house visit were adopted in gathering information from the farmers. Before the interview, community stakeholders, district livestock representatives, and livestock farmers were engaged for their approval and participation into the study.

The collected data was checked for completeness, cleaned, coded, and entered into an SPSS statistical package (version 23.0) for Windows and analyzed. Descriptive statistics (frequency and percentages) were generated for each variable of interest. The statistical significance of the differences in the responses between the variables of was assessed using the Pearson's Chi-square test. A P value less than or equal to 0.05 was considered statistical significance.

Results

A total of 438 respondents participated in the survey, with men comprising the majority (68.0%). The average age of respondents was 47.9 years, and more than half (59.6%) were under 40 years old. Most respondents were married (79.9%) as compared to the widow/er (13.0%) and single (7.1%). A higher proportion of the respondents (64.6%) reported having no formal education. Only 3.7% had higher education while 21.9% and 10.7% had primary and secondary education.

These results imply that education is a major component farmers lack which could probably affect their production potential. About half of the study population (44.5%) reported rearing animals for more than 30 years while 30.8% and 24.7% have reared livestock from 1-15 and 16-30 years respectively. The primary income source for most respondents in the study areas was mixed-crop and livestock farming representing 41.8% of the respondents. Also, 22.8%, 17.8%, 7.5%, 6.4%, and 3.7% obtained their income animal rearing, crop production, mining, trade, and formal job indicating economic diversification among farmers. Additionally, fish was identified as the most common source of household protein among the surveyed population (61.0%). Chicken meat accounted for second major source of protein (24.6%), followed by wild meat (14.4%)

Table 1: Respondents' characteristics

Variable	Frequency	Valid Percent
Gender		
Male	298	68.0
Female	140	32.0
Age category		
Average		47.9
>40	177	40.4
>20≤40	261	59.6
Marital status		
Widow/er	57	13.0
Married	350	79.9
Single	31	7.1
Educational profile		
Primary	92	21.0
Secondary	47	10.7
Tertiary	16	3.7
No formal education	283	64.6
Animal rearing experience		
1-15	135	30.8
16-30	108	24.7
>30	195	44.5
Income source		
Mixed-crop and livestock	183	41.8
Livestock	100	22.8
Crop	78	17.8
Mining	33	7.5
Trade	28	6.4
Formal job	16	3.7
Protein source		
Fish	267	61.0
Wild meat	63	14.4
Imported chicken	108	24.6

The table below (Table 2) presents the most prevalence diseases of livestock in the areas. From the table, PPR (23.6%) and skin infections (22.4%) were the most devastating diseases recalled reported (22.4%) followed by bloat (7.5%), reproductive infections (6.2%) and Orf (3.4%). All respondents for the three regions identified PPR as a

major concern for goats and sheep productivity. The prevalence of skin infection was more noticed in the south than in the north and east. Reproduction infections (2.2%) and Orf (1.8%) appeared more frequent in the south and north respectively compared to the east.

Table 2: Livestock diseases in the study area

Diseases	East		North		South		Overall	
	Tally	Percent	Tally	Percent	Tally	Percent	Tally	Percent
Skin Disease	141	7.6	130	7.0	146	7.9	417	22.4
Newcastle Disease	109	5.9	128	6.9	140	7.5	377	20.3
PPR	146	7.9	146	7.9	146	7.9	438	23.6
Orf	10	0.5	33	1.8	21	1.1	64	3.4
Fowl Pox	74	3.9	100	5.4	88	4.7	262	14.1
Bloat	56	3	45	2.4	39	2.1	140	7.5
Coccidiosis	9	0.5	15	0.8	22	1.2	46	2.5
Reproductive Infections	13	0.7	62	3.3	40	2.2	115	6.2

Other livestock diseases causing serious damages include Newcastle disease (20.3%) fowl pox (14.1%) and coccidiosis (2.5%).

As presented in Figure 1, nearly all respondents (97.5%) reported of rearing poultry in addition to other livestock.

Among the different livestock reared, 71.2% reared both goats and sheep; 17.8%, 11.0%, and 5.5% reared goats, sheep, and cattle respectively, while 5.0% swine.

The results in Table 3 showed a significant variation between respondents' knowledge and the assessed variables. About 55.5% of the outbreaks reported in this study occurred in 2021 with the south experiencing the highest (37.7%) and the north reporting the lowest (5.7%). In 2020, the east recorded the highest number of outbreaks (17.6%) followed by the south (13.5%) and the north (8.4%).

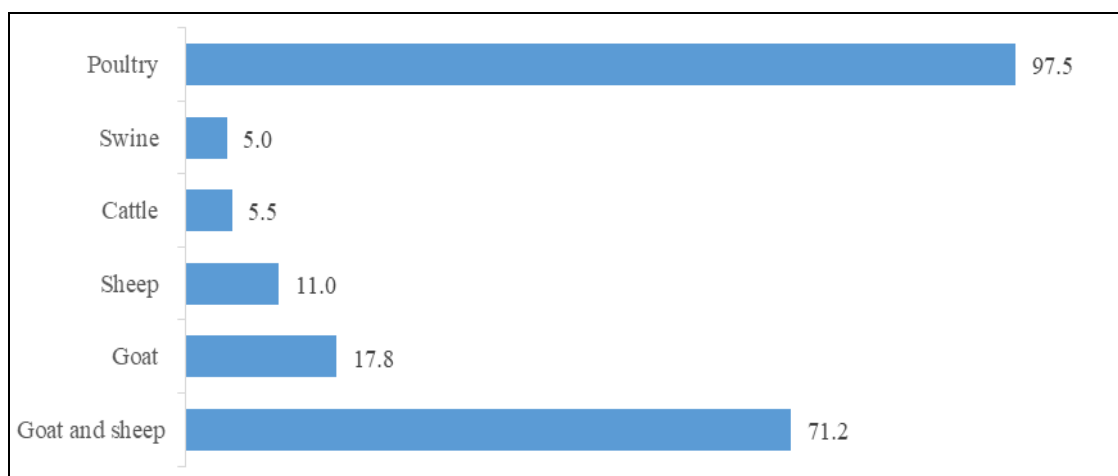


Fig 1: Livestock rear by farmers in the study areas

Table 3: Farmers' knowledge of PPR causative agent, sources of information, and seasonal patterns

Variable	East	North	South	Overall	X ² Value	P-Value
Outbreak period						
2021	12.1	5.7	37.7	55.5	46.45	0.000
2020	17.6	8.4	13.5	39.5		
Causative agent						
Virus	5.3	11.4	8.2	24.9	7.529	0.023
Do not know	21.9	5.3	25.1	75.1		
Sources of information by farmers on PPR						
Livestock keepers	62.3	42.5	56.8	53.9	48.160	0.000
Neighbor or friends	9.6	13.0	11.6	11.4		
Media	11.0	5.5	4.1	6.8		
AHW	6.8	24.7	4.8	12.1		
Livestock traders	10.3	14.4	22.6	15.8		
PPR prevalence season						
Cold dry season	39.7	32.2	33.6	35.2	28.717	0.000
Rainy season	15.8	21.9	21.9	19.9		
Festive season	11.0	14.4	3.4	9.6		
Dry season	12.3	18.5	9.6	13.5		
Exchange season	21.2	13.0	31.5	21.9		

The proportion of respondents who correctly identified the causative agent of PPR was significantly small (24.5%) with the east accounting for the lowest (5.3%) and the north showing the highest (11.4%). The most common sources of information on PPR as mentioned in the study areas was obtained from other livestock farmers (35.2%). Other sources identified were livestock traders (15.8%), community animal health workers (CAHW, 12.1%), neighbor or friends (11.4%) with media being the least source (6.8%). Knowledge on seasonal occurrence revealed that PPR is endemic and occurs at any time of the year. From the results, 35.2% described cold dry season as the most prevalence season followed by exchange season (21.9%), rainy season (19.9%), dry season (13.5%) while the least was reported for the festive period (9.6%).

Figure 2 summarizes the knowledge of farmers on small ruminants' susceptibility towards PPR infection. From the results obtained, close to half of the respondents (43.6%) agreed that goats are more susceptible to PPR than sheep (22.4%) while 34.0% said both species are at high risk to PPR. Also, 59.8% of the respondents reported that both male and female can be infected by PPR while 21.7% and 18.5% said PPR poses higher risk to males or females. Age wise, most respondents explained that all age category of small

ruminants are susceptible to PPR (53.2%). However, 25.3% considered adult animals of being at higher risk compared to young animals (21.5%).

In this survey, farmers knowledge evaluated against a number of PPR clinical signs as shown in table 4. From our assessment, nearly all respondents (95.9%) described increased-sudden death as the most notable signs of the disease. Additionally, diarrhea, oral and nasal discharge, and poor body condition were described as another main detectable clinical signs representing 89.7%, 88.1%, and 62.1% of the respondents. Other clinical signs like ocular discharge (43.6%), difficult breathing (35.8%), abortion (17.4%), and rough coat (14.1%) were also observed. Geographically, differences in knowledge on clinical signs were significantly recorded across the regions. For the east, the number of respondents that reported diarrhea (97.3%), labored breathing (49.3%) and rough coat (17.8%) were in the majority. For the north, increased-sudden death (97.3%), ocular discharge (61.6%), and abortion (27.4%) were most described compared to other regions. On the other hand, high knowledge on oral and nasal discharge (95.2%) and poor body condition (70.5%) were higher in the south than were in the east and north.

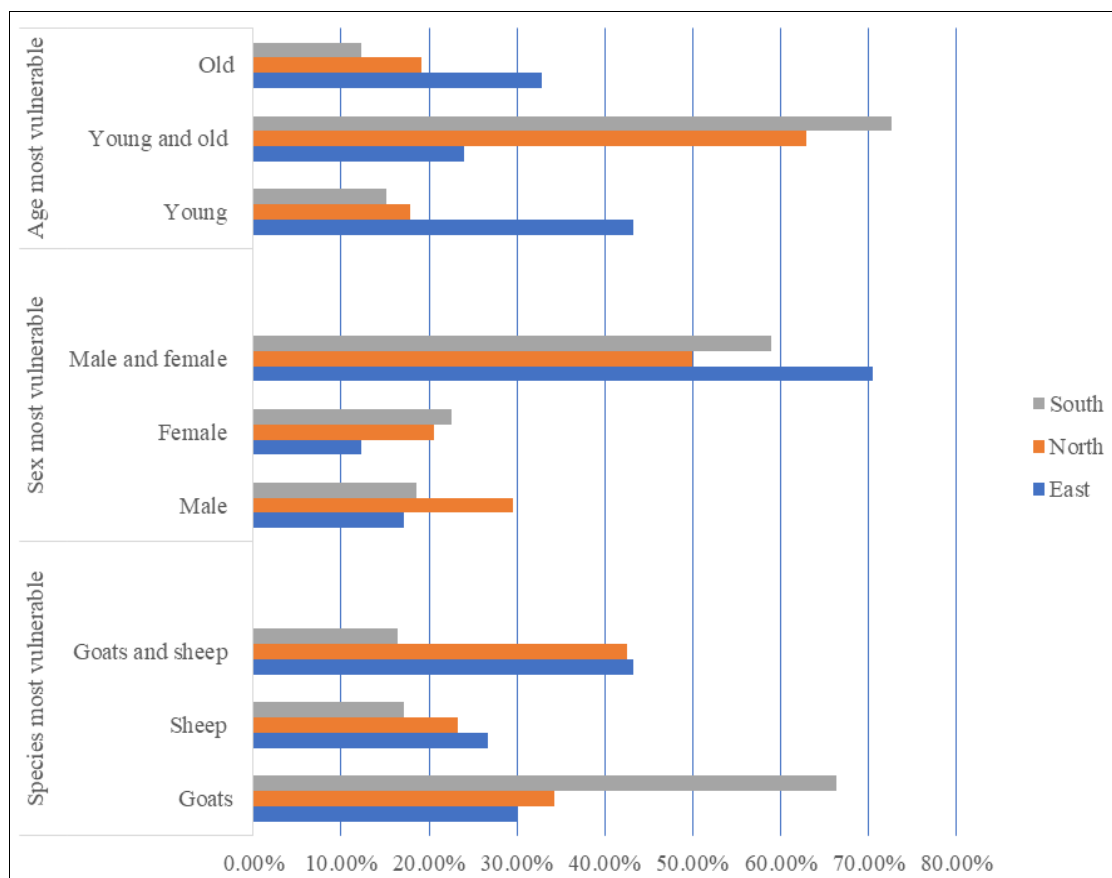


Fig 2: Vulnerability of species, sex, and age to PPR infection

Table 4: Farmers' knowledge of PPR clinical signs

Clinical signs	East	North	South	Overall	X ² Value	P-Value
Diarrhea	82.2	97.3	89.7	89.7	17.981	0.000
Oral and nasal discharge	94.5	74.7	95.2	88.1	38.013	0.000
Ocular discharge	32.9	61.6	36.3	43.6	29.319	0.000
Labored breathing	49.3	32.2	26.0	35.8	18.486	0.000
Sudden/increased death	97.3	98.6	91.8	95.9	9.733	0.008
Abortion	12.3	27.4	12.3	17.4	15.411	0.000
Rough coat	17.8	15.1	10.3	14.4	3.448	0.178
Poor body condition	65.1	50.7	70.5	62.1	13.057	0.001

Respondents' knowledge pertaining PPR introduction and transmission are shown in table 5. From our survey, all respondents were able to identify at least one way by which PPR can be introduced in communities. Over half of the respondents mentioned that introduction of new animals among other means of introduction such as interaction between wild and domestic animals (25.3%) and unprotected animal sales (14.8%) was the easiest mechanism of PPR introduction. However, more than one-third of the

respondents (42.2%) expressed lack of knowledge on PPR introduction means. When farmers were asked of how PPR is transmitted among animals, 90.0%, 61.6%, and 42.2% said free-grazing, mixing of different herds, and overcrowding are the main routes of transmission. Other routes of transmission such as direct contact with body discharge (35.65), drinking from one source (17.8%), and methods of handling infected carcass (14.2%) were further stated.

Table 5: Farmers' knowledge of PPR introduction and transmission

Variable	East	North	South	Overall	X ² Value	P-Value
Means of PPR introduction						
Introduction of new animals	30.8	27.4	68.5	51.6	62.231	0.000
Unsafe animal sales	63.0	37.7	54.1	14.8	19.326	0.000
Intermingling of wild and domestic animals	24.7	17.1	34.2	25.3	11.367	0.003
No idea	27.4	11.0	6.2	42.2	28.652	0.000
Transmission of PPR						
Free-range grazing	93.2	78.8	97.9	90.0	32.188	0.000
Flock interaction	63.7	32.2	89.0	61.6	100.172	0.000
Housing method	27.4	50.0	49.3	42.2	19.783	0.000
Common drinking source	16.4	12.3	24.7	17.8	7.862	0.020
Carcass handling	5.5	15.1	21.9	14.2	16.384	0.000
Contact with body discharge	29.5	47.9	29.5	35.6	14.516	0.000

Regarding PPR means of transmission, 90.0% and 61.6% mentioned free-range grazing and

In Figure 3, we present findings on farmers knowledge to contain the disease during suspected outbreak. Among the various responses gathered, treating sick animals 73.3% and

selling of apparently uninfected animals 35.8% were the most common actions. Some farmers, around 21.2% move animals to safe areas, 12.1%, slaughtered their animals as food, while only 8.2% reported outbreaks to healthcare workers, and a further 12.3% mentioned that they took no action at all.

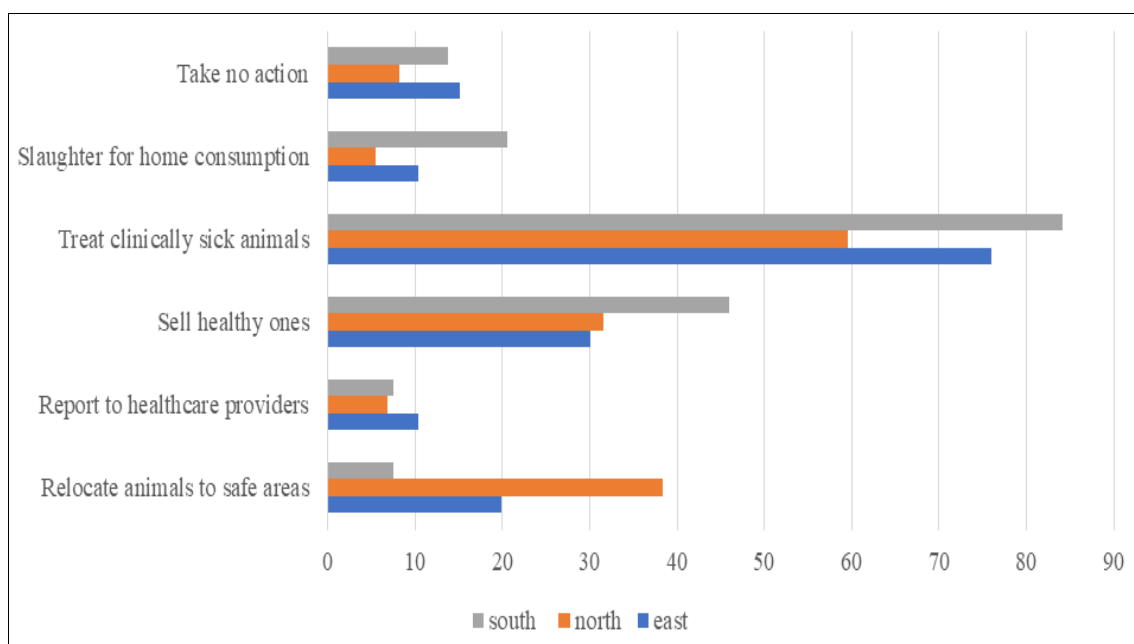


Fig 3: Farmers' knowledge in containment practices during suspected outbreak of PPR

For attitude evaluation, table 6 highlights the various practices farmers undertakes when they suspect outbreaks of diseases like PPR. According to the results, the use of human medicine (28.1%) was more common compared to local treatment (13.7%) and veterinary medicine (11.9%) while 20.3% used different treatment methods. In handling carcasses of

suspected animals, 49.2% agreed of disposing them. However, 36.1% said they consumed them, 9.1% give away while 5.5% sell. Results further revealed that majority of the farmers did not isolate (65.3%) and quarantine sick animals (75.1%) from those that were healthy.

Table 6: Farmers' response towards PPR outbreaks in the study area

Variable	East	North	South	Overall	X ² Value	P-Value
Type of treatment offer						
Vet medicine	7.5	21.2	6.8	11.9	18.374	0.000
Local medicine	12.3	13.7	15.1	13.7	0.463	0.793
Human medicine	29.5	16.4	38.4	28.1	17.567	0.000
Combined treatment	26.7	8.9	25.3	20.3	17.711	0.000
Carcass management						
Dispose of	41.8	67.1	39.0	49.3	40.089	0.000
Consume	37.7	21.9	48.6	36.1		
Sell	5.5	3.4	7.5	5.5		
Give away	15.1	7.5	4.8	9.1		
Isolation						
Practices	12.3	24.7	21.2	19.4	58.644	0.000
Sometimes practice	3.4	11.6	30.8	15.3		
Do not practice	84.2	63.7	47.9	65.3		
Quarantine						
Practices	11.0	17.1	15.1	14.4	5.253	0.262
Sometimes practice	14.4	8.9	8.2	10.5		
Do not practice	74.7	74.0	76.7	75.1		

This study further assessed the perceptions of respondents against PPR and the distribution of responses from each question is presented in table 5. From the results, 83.6% of the respondents believed that PPR is a major threat for small ruminant production. The perception on PPR as a major threat was significantly higher in the south (91.1%) than observed in the east (83.6%) and the north (76.0%). In the study, most of the respondents (52.3%) were not aware of PPR vaccine with

those in the east being in majority (65.8%). Among those who claimed to be aware of the vaccine, only 20.5% believed it is the most effective means of preventing PPR. This perception was significantly higher in the north (34.2%) and lower in the east (11.0%).

On the other hand, 71.5% have never vaccinated the animals against PPR due to poor knowledge (64.8%), lack of trust in (21.5%), lack of access (6.8%), and poor vaccination planning

(5.0%). No significant relationship was observed among the three regions. From those that have vaccinated their animals, 47.95% were the north, 28.5% and 15.1% from the south and east. Results further show that most respondents (61.4%) were in disagreement with the statement carcasses of infected animals are possible route of disease transmission. Additionally, 88.8% agreed that PPR can be controlled and prevented among livestock population.

The study further explored concerns of farmers that may be of relevance in the control and eradication of the disease as summarized in figure 4. From their concerns, 44.5% demanded basic information on how to treat PPR related cases, place to channel their complain on animal health issues (14.5%), ways to prevent and control the disease (11.4%). A smaller percentage also requested knowledge on disease detection (7.1%) and its sources (6.6%).

Table 7: Farmers' perceptions of PPR disease

Variable	East	North	South	Overall	X ² Value	P-Value
Aware of the PPR vaccine						
PPR is a major threat for small ruminant production						
Agree	83.6	76.0	91.1	83.6	12.067	0.002
Disagree	16.4	24.0	8.9	16.4		
Aware of PPR vaccine						
Agree	34.2	61.6	47.3	47.7	21.982	0.000
Disagree	65.8	38.4	52.7	52.3		
Vaccination is the most effective means of PPR prevention						
Agree	11.0	34.2	16.4	20.5	26.515	0.000
Disagree	89.0	65.8	83.4	79.5		
Have vaccinated against PPR						
Yes	15.1	47.9	22.6	28.5	42.473	0.000
No	84.9	52.1	77.4	71.5		
Reasons for vaccinating animals PPR						
Poor knowledge	71.9	52.1	70.5	64.8	20.795	0.002
Lack of access	6.2	10.3	9.6	8.7		
Poor planning	3.4	4.8	6.8	5.0		
Lack of trust	19.9	13.0	31.5	21.5		
Infected carcasses are possible sources of infection						
Agree	32.9	41.8	41.1	38.6	3.025	0.220
Disagree	67.1	58.2	58.9	61.4		
PPR can be controlled and prevented						
Agree	87.7	93.8	84.9	88.8	6.112	0.047
Disagree	12.3	6.2	15.1	11.2		

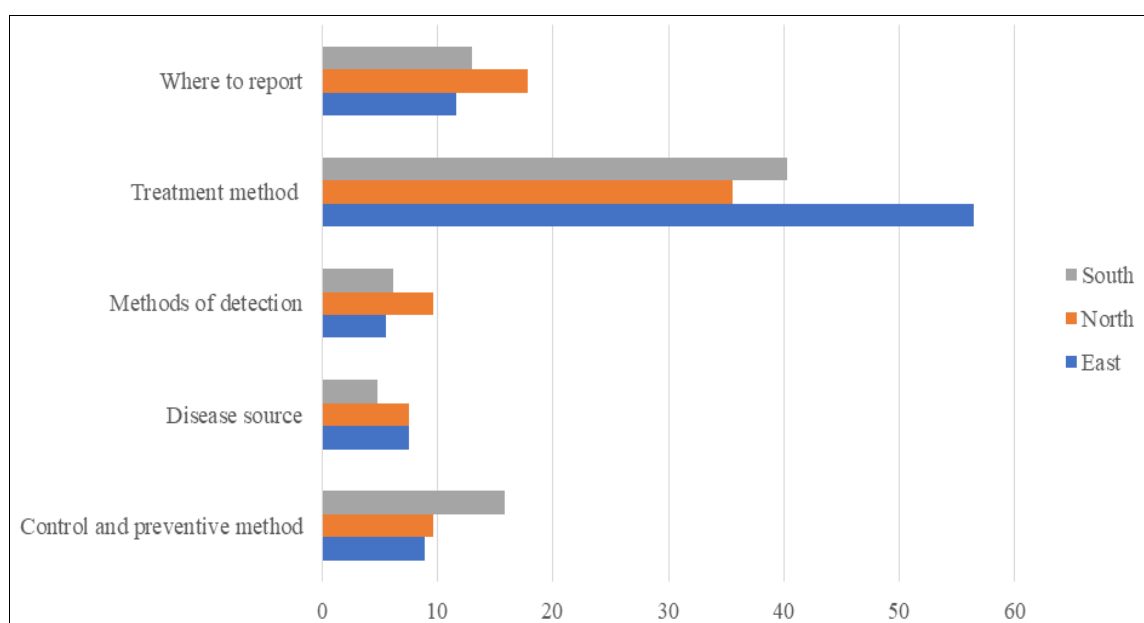


Fig 4: Basic information requested by farmers on PPR management

The current survey also delved into measures adopted in preventing the spread of PPR among susceptible livestock population. A number of methods were listed among which hygiene (62.1%) and preventing animal movement (47.3%)

were considered most effective in preventing the spread of the disease. Other measures, such as restricting animal sales (18.7%) and enforcing community by-laws (14.6%) were mentioned.

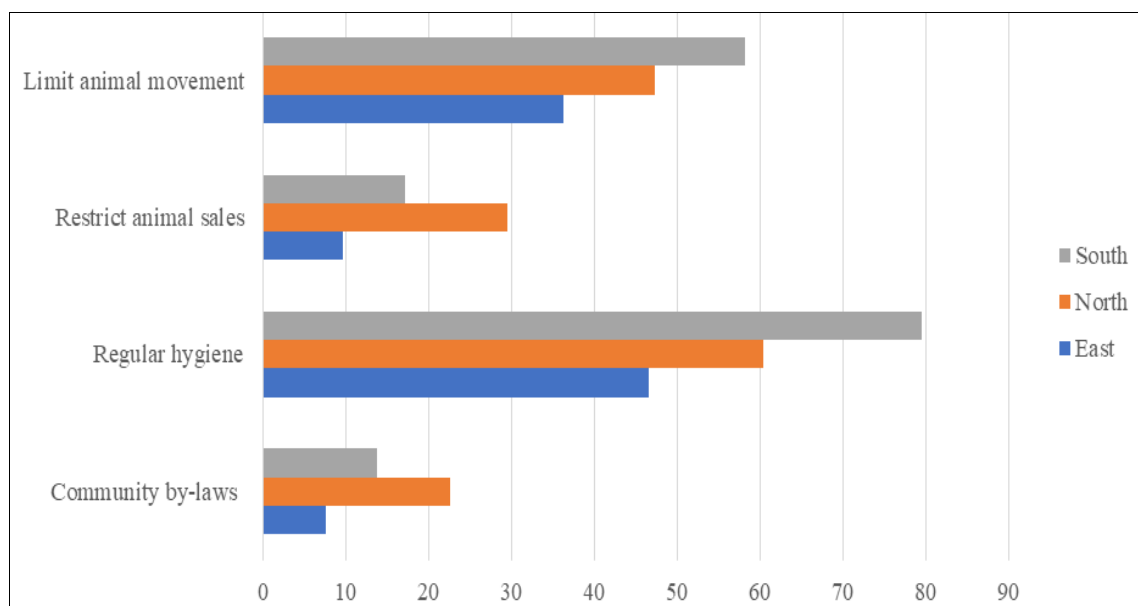


Fig 5: Measures to prevent the spread of disease during an outbreak

Discussion

Globally, Peste Des Petits Ruminants (PPR) poses a significant threat to the livestock industry, particularly in Africa and Asia, where small ruminants are vital assets for many smallholder farmers. The findings of this survey indicate that men and married couples are more actively engaged in small ruminant production, with the majority having limited formal education. For decades, small ruminants have played a crucial role in socio-cultural development, household functions, and economic improvement, particularly in resource-limited areas like Sierra Leone. This has led to the involvement of individuals from diverse backgrounds in small ruminant farming. In the study areas, cultural practices such as religious sacrifices and secret society initiation rituals have significantly influenced gender-based ownership patterns of livestock. These socio-cultural factors underscore the complex role of small ruminants in the livelihoods of rural communities, highlighting the need for culturally sensitive approaches in addressing PPR and other livestock-related challenges.

Diseases pose a significant barrier to sustainable livestock productivity, particularly in developing countries like Sierra Leone. They result in substantial losses through mortality, control and prevention costs, and reduced production potential of affected animals. This study investigated the major diseases threatening livestock production in the region. Our findings identified PPR and skin infections as the primary constraints for small ruminant rearing, while Newcastle disease and fowl pox were noted as significant challenges for poultry farmers, among others. Similar studies, such as ^[14], have also highlighted PPR as a major limitation for small ruminant production. In our study, 23.6% of farmers identified PPR as the most devastating disease. However, the incidence of other diseases varied by region. In the south, skin infections (7.9%) were the most severe, while similar rates were reported in the east (7.9%) but lower in the north (7.0%). The high prevalence of these diseases in the study areas is likely due to their endemic nature. These findings emphasize the need for targeted interventions and disease management strategies to mitigate the impact on livestock productivity in the region.

The evaluation of knowledge, attitudes, and perceptions (KAP) among livestock owners and rearers is crucial for

polymakers in implementing effective containment and eradication measures for PPR. The burden and rapid spread of PPR in Sierra Leone have been reported in many regions and may be partly influenced by farmers' KAP and livestock trade practices. This study revealed that only 24.9% of respondents recognized PPR as a viral disease, with the lowest awareness (5.3%) recorded in the eastern region. The low knowledge level is likely linked to the respondents' low educational background, as 64.6% had no formal education. Reliable sources of information on animal diseases are critical for informed decision-making. Farmers identified other livestock rearers (53.9%) as their primary information source, with livestock traders, animal health workers, and media providing information in occasional basis. However, the trustworthiness of these sources may be compromised by the farmers' limited education.

The increasing incidence of PPR reported in the study areas from 2020 to 2021 underscores the ongoing threat to livestock productivity. In the south, cases rose sharply from 13.5% in 2020 to 37.7% in 2021, possibly due to seasonal herd migration from resource-limited areas to more favorable herding regions, introducing PPR to previously uninfected zones. Conversely, the east and north reported decreased PPR incidence, potentially reflecting the impact of preventive measures implemented based on prior knowledge on outbreaks. Farmers noted that PPR outbreaks could occur year-round but were most prevalent during specific seasons. The cold dry season saw higher outbreaks in the east, while the north reported increased cases during festive and wet seasons. In the south, outbreaks were most frequent during the exchange season. These findings align with studies by ^[14], which identified higher PPR prevalence in the cold dry and wet seasons. These insights highlight the need for region-specific interventions to address PPR outbreaks effectively.

The study evaluated farmers' knowledge of the biological factors influencing the severity of PPR among goats and sheep in the study areas. From the results, both species were considered by 34.0% of the population to have equal chances of exposure to the disease. A similar finding in Ethiopia by ^[16] has been reported. goats were perceived as more vulnerable to PPR than sheep, though both species were generally considered susceptible. Additionally, this study also aligns with findings made by ^[17], which also noted goats as more

susceptible to PPR than sheep. Among respondents who identified goats as the most vulnerable, the majority (66.4%) were from the southern region. Consistent with previous studies, such as [13], both male and female goats and sheep were considered equally likely to contract PPR. However, adult females were perceived to be more affected than males, potentially due to differences in breeding patterns and physiological functions, as noted by [18, 19]. The study also observed differences in farmers' knowledge regarding gender susceptibility to PPR infection across the evaluated regions. Though more than half of the respondents believed that both male and females are equally affected by the disease, a cross-section rejected this opinion and stated that male animals are more susceptible compared to 18.5% who considered female animals of being at higher risk. This is consistent with previous findings of [18]. The perception of age-related vulnerability decreased from the south (72.6%) to the north (63.0%) and east (24.0%). These differences may be attributed to flock dynamics, as herds in the study areas tend to have a higher proportion of females with long breeding histories compared to males. These findings highlight regional variations in farmers' knowledge of PPR vulnerability and emphasize the need for tailored educational programs to address these differences.

The knowledge assessment on PPR clinical signs revealed a significantly strong understanding among farmers, reflecting the repeated occurrence of the disease in the study areas. Notably, all farmers could identify at least one pathognomonic clinical sign of PPR. The most commonly recognized signs included sudden increased mortality, diarrhea, nasal and oral discharges, and poor body condition. Less frequently observed signs included difficulty breathing, abortion, and rough coat appearance. These findings align with descriptions reported in previous studies by [13, 20, 21]. This level of awareness among farmers underscores the importance of leveraging their observational experiences to strengthen disease detection and management strategies in affected regions.

The introduction and distribution of diseases in livestock-rearing areas significantly impact animal health, productivity, livelihoods, and economic stability. Contagious diseases like PPR can be introduced through various pathways, which this study aimed to explore. The findings reveal that 51.6% of farmers believe the introduction of new animals is the primary route for disease introduction in livestock-rearing communities. Other reported routes include domestic and wildlife interactions, live animal sales, and unsafe animal trade practices. However, 42.2% of farmers admitted having no knowledge of how diseases are introduced in their environments, underscoring the critical need for awareness campaigns and basic education on disease spread.

Farmers often bring animals from other locations without verifying their health status, heightening the risk of introducing new diseases. Despite these gaps, farmers demonstrated a reasonable understanding of PPR transmission through practices like mixing flocks and common grazing. They also recognized that free-range grazing, direct contact with body fluids or discharges, shared water sources, and handling infected carcasses could spread PPR. Similar transmission routes have been documented in studies by [22, 23]. This knowledge likely stems from personal observation and shared experiences among small ruminant keepers. These findings emphasize the need for targeted education and preventive measures to reduce the risk of disease introduction and transmission in livestock-rearing communities.

Farmers in resource-constrained areas often rely on indigenous remedies to manage livestock diseases. This survey revealed that self-treatment is the predominant response to outbreaks, with 84.2% of farmers in the south engaging in this practice. Many farmers reported using local remedies (28.1%), often involving outdated or potentially harmful methods, as their primary treatment approach. Veterinary medicine was the least utilized method (11.9%), highlighting limited access to or awareness of veterinary services. Some farmers also treated animals with human medicine (28.1%) or combined multiple treatments (20.3%). In some instances, farmers sold suspected sick animals to avoid losses, migrated their herds to perceived safer areas, or slaughtered animals for home consumption. These practices could exacerbate disease transmission and pose significant public health risks. Carcass disposal practices were inconsistent, with nearly half of the farmers (49%) discarding carcasses, while others used them for meat, giveaways, or sales. Isolation of sick animals and quarantine of new stock were poorly practiced, contributing to the continued spread of endemic and creating the environment for emerging diseases. These behaviors undermine livestock health and productivity, emphasizing the urgent need for improved veterinary services, farmer education, and community-based disease control initiatives. Different strategies employed by farmers to combat PPR outbreaks is in agreement with findings made by [13], who reported restriction to movement and preventing contact between animals as measures to prevent spread of the disease.

Understanding livestock farmers' perceptions of economically significant diseases is essential for preventing their spread and reducing the burden they impose on farmers and national economies. This is particularly vital in communities with limited education and restricted access to information. In this survey, fewer than 50% of farmers were aware of the PPR vaccine, and nearly 80% believed vaccination was not the most effective method of prevention. Among those familiar with PPR vaccine, only 28.5% had vaccinated their animals at the time of the study. These findings were lower than those reported by [24], where over half of the farmers vaccinated their animals but similar to [13]. Regional disparities were evident, with the highest vaccination rates (47.9%) in the north and the lowest (15.1%) in the east. Farmers cited poor knowledge (64.8%) and lack of trust (24.5%) often due to negative past experiences as key reasons for not vaccinating their animals. These perceptions were more pronounced in the eastern and southern regions compared to the north. Other limitations included a lack of access to vaccines and poor vaccination planning, with some farmers reporting scheduling conflicts with agricultural activities. A notable issue was mortality after vaccination, attributed to vaccinating animals already infected with the virus, potentially due to vaccinators' inability to differentiate PPR from other diseases or asymptomatic infections. Additionally, improper carcass disposal during outbreaks contributed to misconceptions, with some farmers dismissing the notion that infected carcasses are a primary source of PPR transmission. Despite these challenges, farmers expressed optimism about controlling and eradicating PPR, aligning with the global agenda set by [3] for PPR eradication. Addressing knowledge gaps, improving vaccine access, and building trust through education and better planning are critical steps toward achieving this goal. Efforts to eradicate PPR globally continue due to its devastating economic impact and threat to food security. However, insufficient information remains a significant

barrier to timely and effective interventions. This survey highlights a persistent knowledge gap among farmers regarding the disease's epidemiology. Notably, 44.5% of respondents expressed a need for information on treatment, control, prevention, sources of infection, and distinguishing PPR from other diseases. Furthermore, a portion of respondents reported having no reliable avenue for reporting suspected cases of PPR. These findings underscore the critical need for enhanced veterinary and livestock extension services. Integrating local herders into community-based disease control and prevention activities is essential to address these gaps effectively. Strengthening such collaborative efforts can improve awareness, reporting mechanisms, and overall disease management, contributing significantly to the global goal of eradicating PPR.

Conclusion

In conclusion, this study highlights critical gaps in knowledge, attitudes, and practices (KAP) regarding PPR among small ruminant farmers in Sierra Leone, emphasizing the need for targeted interventions. The findings underscore the importance of educational initiatives and collaborative efforts to address misconceptions, improve awareness, and promote effective disease management practices, such as vaccination and proper animal husbandry. Bridging these gaps is vital for enhancing productivity, safeguarding livelihoods, and supporting sustainable development in the livestock sector.

Conflict of Interest

Not available

Financial Support

Not available

6. Reference

- Maes P, Amarashinghe GK, Ayllón MA, Basler CF, Bavari S, Blasdel KR, *et al.* Taxonomy of the order Nononegavirales: Second update 2018. *Arch Virol.* 2019;164(4):1233-1244. <https://doi.org/10.1007/s00705-018-04126-4>.
- WOAH. Peste des petits ruminants (infection with small ruminant morbillivirus). WOAHP Terrestrial Manual, 2022. Available from: https://www.woah.org/fileadmin/Home/fr/Health_standards/tahm/3.08.09_PPR.pdf.
- FAO and OIE. International conference for the control and eradication of peste des petits ruminants (PPR), 2015. Abidjan, Côte D'Ivoire. Available from: <https://www.fao.org/3/i4460e/i4460e.pdf>.
- Kabire A, Kalhoro DH, Abro SH, Kalhoro MS, Yousafzai HA, Shams S, *et al.* Peste des petits ruminants: A review. *Pure Appl Biol.* 2019;8(2):1214-1222. <http://dx.doi.org/10.19045/bspab.2019.80063>.
- Mbetele DP, Komba E, Seth MD, Misinzo G, Kock R, Jones BA. Review of peste des petits ruminants occurrence and spread in Tanzania. *Animals.* 2021;11:1698. <https://doi.org/10.3390/ani11061698>.
- Otte MJ, Chilonda P. Cattle and small ruminant production systems in sub-Saharan Africa: A systematic review, 2002. Available from: <https://www.fao.org/3/y4176e/y4176e.pdf>.
- Panel MM. Meat, milk and more: Policy innovations to shepherd inclusive and sustainable livestock systems in Africa. International Food Policy Research Institute, 2020. <https://doi.org/10.2499/9780896293861>.
- Agyemang K, Moigua M, Barrie M. Sierra Leone national livestock sample survey, 2016; draft report, Food and Agriculture Organization: Freetown, Sierra Leone, 2017, p. 310.
- Munir M, Zohari S, Suluku R, Sankoh FAR, Berg M, Barrie ML, *et al.* Genetic characterization of peste des petits ruminants virus, Sierra Leone. *Emerg Infect Dis.* 2012;18(1):193-195. DOI: 10.3201/eid1801.111304. PMID: 22260878; PMCID: PMC3310125.
- SSL. Sierra Leone Mid-term population and housing census. Statistics Sierra Leone, 2021. Available from: www.statistics.sl.
- FAO. Sierra Leone / Agricultural livelihoods and food security in the context of COVID-19: Monitoring report-May 2021. Rome. <https://doi.org/10.4060/cb4396en>.
- Khan SS, Hossain H, Talukder S, Uddin MS, Uddin MA, Siddiqui MSI. A survey on the knowledge, attitudes, behaviors and practices of goat farmers about peste des petits ruminants disease in goats Haor and bordered areas in Sylhet district of Bangladesh. *Vet Med Sci.* 2024;10:e1542. <https://doi.org/10.1002/vms3.1543>.
- Shuaib YA, Fadil ELAAM, Rahman AME, Negussie H, Abdalla MA, Zessin KH. Knowledge and perceptions of sheep owners and herders on peste des petits ruminants in North Kordofan and Kassala States, Sudan. *Sch J Agric Vet Sci.* 2016;3(2):126-139. DOI: 10.36347/sjavs.2016.v03i02.011.
- Mustapha EI, Kargbo K, Bandabla T, Kassoh ES, Yillah DS. The epidemiology of peste des petits ruminants in Sierra Leone. *Int J Environ Agric Biotechnol.* 2022;7(6). DOI: 10.22161/ijeab. <https://ijeab.com/>.
- Balamurugan V, Kumar VK, Dheeraj R, Kurli R, Suresh KP, Govindaraj G, *et al.* Temporal and spatial epidemiological analysis of peste des petits ruminants outbreaks from the past 25 years in sheep and goats and its control in India. *Viruses.* 2021;13(30):480. DOI: 10.3390/v13030480. PMID: 33804146, PMCID: PMC8001942.
- Wendimu TG, Dinbiso TD, Lobago DS, Marami LM. Seroprevalence and associated risk factors of peste des petits ruminants in sheep and goats in three districts of the Central Oromia Region, Ethiopia. *Front Vet Sci.* 2024;11:1402342. DOI: 10.3389/fvets.2024.1402342.
- Kumar N, Maherchandani S, Kashyap SK, Sharma S, Chaubey KK, Ly H. Peste des petits ruminants virus infections of small ruminants: A comprehensive review. *Viruses.* 2014;6(6):2287-327. DOI: 10.3390/v6062287. PMID: 24915458; PMCID: PMC4074929.
- Dubie T, Dagneu B, Gelo E, Negash W, Hussein F, Woldehana M. Seroprevalence and associated risk factors of peste des petits ruminants among ovine and caprine in selected districts of Afar region, Ethiopia. *BMC Vet Res.* 2022;18:429. DOI: 10.1186/s12917-022-03528-6.
- Megersa B, Bifa D, Belima T, Debela E, Regassa A, Abunna A. Serological investigation of peste des petits ruminants (PPR) in small ruminants managed under pastoral and agro-pastoral systems in Ethiopia. *Small Ruminant Res.* 2011;97:134-8.
- Bamouh Z, Fakri F, Jazouli M, Safini N, Tadlaoui KO, Elharrak M. Peste des petits ruminants pathogenesis on experimental infected goats by the Moroccan 2015 isolate. *BMC Vet Res.* 2019;15:452. DOI: 10.1186/s12917-019-2164-6.

21. Hailegebreal G. Seroprevalence of peste des petits ruminants in selected districts of Siltie and Gurage zones, south region, Ethiopia. *J Anim Vet Adv.* 2019;18(2):30-4. DOI: 10.36478/java.2019.30.34.
22. Fathelrohman EM, Reeves A, Mohamed MS, Ali YME, Awad ELAI, Bensalah OK, *et al.* Epidemiology and cost of peste des petits ruminants (PPR) eradication in small ruminants in the United Arab Emirates-Disease spread and control strategies simulations. *Animals.* 2021;11:2649. DOI: 10.3390/ani11092449.
23. Idoga ES, Armson B, Alafiatavo R, Ogwuche A, Mijten E, Ekiri AB, *et al.* A review of the current status of peste des petits ruminants epidemiology in small ruminants in Tanzania. *Front Vet Sci.* 2020;7:592662. DOI: 10.3389/fvets.2020.592662.
24. Mbyuzi AO, Komba EVG, Cotter CR, Magwisha HB, Kimera SI, Kambarage DM. Descriptive survey of peste des petits ruminants and contagious pleuropneumonia outbreaks in traditional goat flocks in Southern Tanzania: producers' concerns, knowledge and attitudes. *Livest Res Rural Dev.* 2015;27(71). Available from: <http://www.lrrd.org/lrrd27/mbyu27071.html>.

How to Cite This Article

Kallon S, Sesay AR, Conteh AM, Sesay ME. Knowledge, attitudes, and perceptions assessment of goat and sheep farmers against Peste des Petits Ruminant Disease, Sierra Leone. *International Journal of Veterinary Sciences and Animal Husbandry.* 2025;10(3):100-110.

Creative Commons (CC) License

This is an open-access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.