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RESEARCH ARTICLE

SURVEILLANCE STRATEGIES AND EPIDEMIOLOGICAL INSIGHTS INTO PPR IN SREEPUR, GAZIPUR

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ABSTRACT

The local economy and animal health are significantly impacted by PPR (Peste des Petits Ruminants). The study aims to determine the demographic analysis, risk factors, trends, and antibiotic prescription patterns of PPR in goats by using a passive surveillance system at Sreepur, Gazipur. After classifying the animals according to breed, age, sex, and vaccination history, the study based on 150 case records from Upazila Veterinary Hospital, Sreepur, Gazipur discovered a peak of 26% PPR cases in July. Mawna union has the highest percentage of PPR cases (26.67%). The age group most afflicted was 18 months (38%), followed by females (72%), and Black Bengal goats (73.07%). Pneumonitis (26%), enteritis (58.67%) Goats that have not received vaccinations are more vulnerable (76%) than those who have (24%). The result of this study reveals that the development of knowledgeable manpower, in-time surveillance, vaccination, and early warning of disease outbreaks are the keys to reducing mortality rateand producing safe food from animal origin. Further studies are needed to fill the laps and gaps as the study was limited to only a particular geo-ecological area of the country, therefore, this does not reflect the true real image of the PPR of goats in Bangladesh.

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INTRODUCTION

Peste des petits ruminants (PPR) is the most important OIE-listed disease of small-farmed ruminants in the developing world (Baron, Parida, & Oura, 2011; Parida *et al*., 2016). The etiological agent, PPR virus (PPRV) is a member of the family *Paramyxoviridae* and genus *Morbillivirus*. Following the eradication of rinderpest, the Food and Agriculture Organization (FAO) and the World Organization for Animal Health (OIE) have identified PPRV as the next target for eradication by the year 2030. In Bangladesh, goat rearing is a fundamental part of the farming system in rural areas which helps to make a 3.96%contribution to GDP (Alam *et al.,* 1998) as the population of goats is about33.51 million (DLS, 2002). Low-income workers, landless farmers, and distressed women who cannot rear cattle depend on rearing goats. Hence, the goat is called "The cow of poor people" in Bangladesh.

Goat rearing provides a significant level of supplying animal protein in the form of milk and meat (20%) and earning foreign exchange through the exportation of skin. But there are several diseases of goats especially PPR, which cause high mortality and great economic losses. PPR is one of the emerging diseases of goats in Bangladesh (Debnath, 1995; Islam *et al*., 2001).Sheep and Goats are the natural host of PPR virus whereas goats are more susceptible than sheep (Radostits *et al*., 2000). PPR is a highly contagious viral disease of small ruminants, especially in goats in Bangladesh (Islam *et al*., 2001). The disease clinically resembles bovinerinderpest and is characterized by high fever, necrotic stomatitis, catarrhal inflammation of the ocular and nasal mucosa, pneumonia, diarrhea and death (Fraser, 1986). In epidemic areas, the morbidity rate has been estimated from 80% to 90% accompanied by a mortality rate range from 50%to 80% (Debnath, 1995).It was first described in 1942 in Cote De Ivoire.

Also reported from the African continental, in the Arabian Peninsula, certain countries of the Middle East and South Asia (Taylor *et al*., 1990). In Bangladesh, the presence of rinderpest-like disease in goats was first detected by an FAO expert team during their visit to western districts of the country in 1993. Later, the causal agent of the disease was identified as the PPR virus by the World Reference Laboratory (Barrette *et al*., 1997). It is assumed that 75% of the districts in Bangladesh are affected by PPR in Bangladesh it is thought that the disease might have come from India (Debnath, 1995). The rainy season is more susceptible to the disease as compared with the dry season (Samad, 1996). Transmission occurs by close contact, inhalation of aerosol produced by sneezing and coughing of infected animals, direct contact with ocular, nasal, oral secretions, feces, and fomites such as bedding, water and feed troughs (Ozkul, 2002). PPR like other viral diseases has no specific treatment. However, for PPR, mortality may be decreased by using drugs that control bacterial complications (Taylor *et al*., 1984). Also, combined drug therapy can save the animal in field conditions (Richard and Adams, 1996). The aimed of this study is to identify the demographic character, risk factors, trend and antibiotic prescription pattern of PPR in goat by passive surveillance system at Sreepur, Gazipur.

MATERIALS AND METHODS

Data collection: The Data was collected from the Upazila Veterinary Hospital, Sreepur, Gazipur from April to September 2021.The Upazila Livestock Officer, veterinary surgeon, and compounder received the patient collected information from the owner, and gave treatment at Upazila Veterinary Hospital, Sreepur, Gazipur. Data was collected from the patient register book that was written by the upazila Livestock Officer, veterinary surgeon, and compounder. Then the collected data were sorted into different variables like date, species, breed, age, sex, signs and symptoms, and treatment. The data were analyzed, summarized, and interpreted using table, bar diagram, pie chart, and line graph.

Case definition for PPR: The study was conducted on natural PPR-infected goats of various age, sex, and breed that were brought to the hospital for treatment over the study period. After taking a history of the infected goat from the owner, clinical examinations were done carefully and findings were recorded carefully in each case individually. Stomatitis, enteritis, and pneumonitis are the main syndromes for PPR. PPR will be suspected in goats at any age and sex if one or more clinical signs are found like high temperature of 104°F–106°F, occulonasal discharge, diarrhea, sores in the mouth, and respiratory distress. (Sahoo *et al*., 2020).To observe the treatment efficacy the goats were treated with some antibiotics like oxytetracycline, sulphadimidin, gentamicin, and ampicillin to prevent secondary bacterial infection.

RESULTS

The study was conducted among the naturally infected PPR goats of various ages and sexes that were brought to the hospital for treatment from different unions of Sreepur, Gazipur. The owners bring their animals to veterinary hospitals on foot as they usually cannot bear the expense of renting a vehicle.

Table 1. Age distribution of PPR in goat from April to September 2021 at Upazila Veterinary Hospital, Sreepur (N=150)

Age (Month)	PPR case no (%)
0-6	10 (6.67)
7-12	38(25.33)
13-18	57 (38)
19-24	28 (18.67)
25-30	5 (3.33)
31-36	6 (4)
37-42	2 (1.33)
43-48	4 (2.67)
Total:	150 (100)

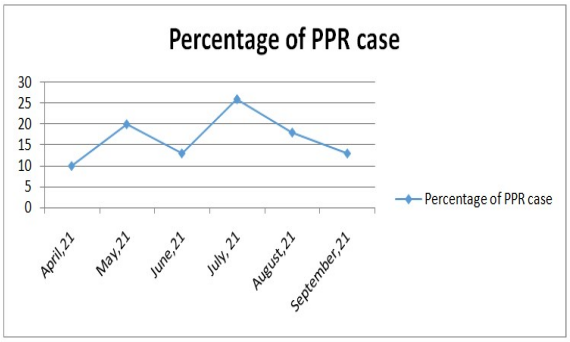

Fig 1. Line graph showing monthly distribution of PPR in goat form April to September, 2021 at Upazila Veterinary Hospital, Sreepur (N=150)

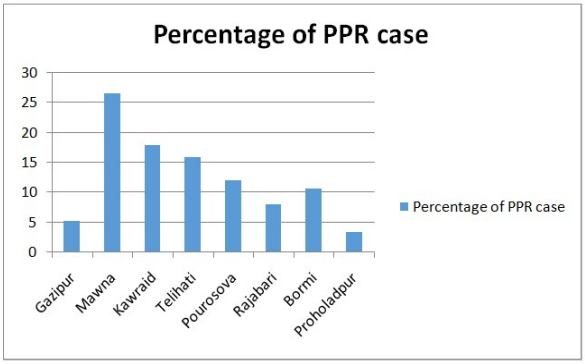

Fig 2. Bar diagram showing area wise distribution of PPR in goat form April to September, 2021at Upazila Veterinary Hospital, Sreepur (N=150)

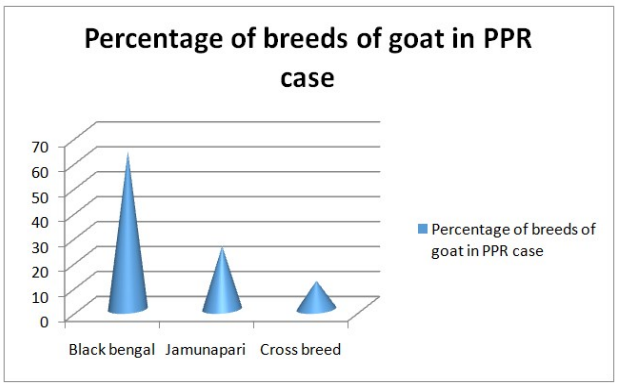

Fig 3. Bar diagram showing breed wise distribution of PPR in goat form April to September, 2021 at Upazila Veterinary Hospital, Sreepur (N=150)

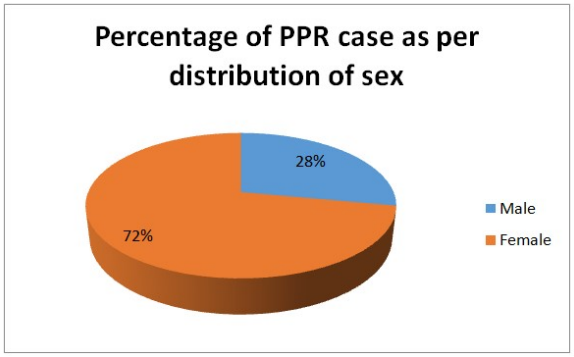

Fig. 4. Pie chart showing sex distribution of PPR in goat form April to September, 2021 at Upazila Veterinary Hospital, Sreepur (N=150)

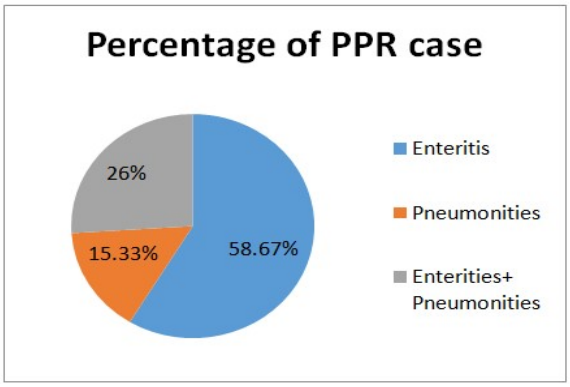

Fig 5. Pie chart showing Symptoms distribution of PPR in goat form April to September, 2021 atupazila veterinary hospital, Sreepur (N=130)

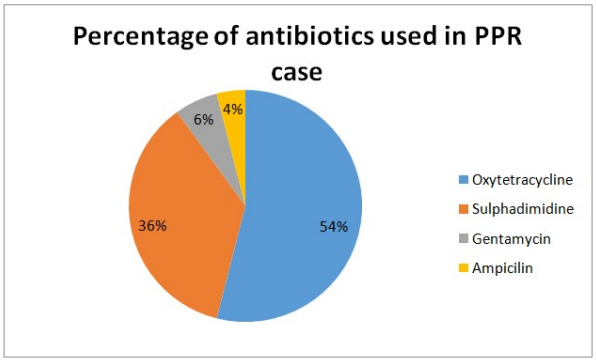

Fig 6. Pie chart showing distribution of Antibiotics treatment of PPR in goat form April to September, 2021 Atupazilla Veterinary Hospital, Sreepur (N=150)

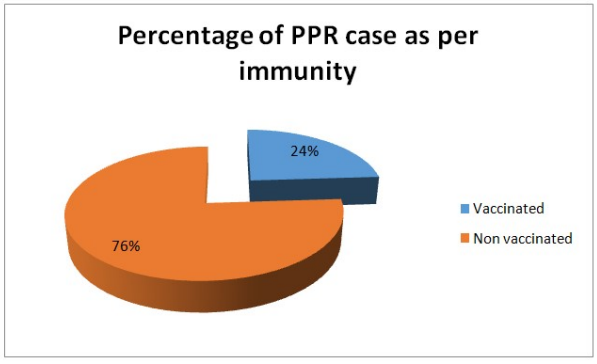

Fig 7. Pie chart showing percentage of PPR case as per immunity in goat form April to September, 2021 Atupazila Veterinary Hospital, Sreepur (N=150)

The surveillance of PPR was a maximum of 38% at the age category 13-18 months, in comparison with the other age categories (Table 1). From the surveillance data, we found that a high frequency of PPR in goats occurred during the summer season mainly in July about 26% (Fig 1), which is in agreement with previous studies in India, Pakistan, and Bangladesh (Khan 2010). During summer, the goats are more frequently allowed to graze in communal grazing fields which might increase the chance of virus transmission from diseased goats to healthy ones. The surveillance of PPR aboutarea-wise distribution is illustrated in bar diagram (Fig 2). According to the findings, local Black Bengal goats seem more prone to PPR than cross-breed and Jamunapari goats (Fig 3).The surveillance of PPR concerning sex distribution of goats is summarized in (Fig 4). As per diagnosis, 58.67% of cases of PPR had shown enteritis symptoms and 26% had shown both enteritis and pneumonitis symptoms (Fig 5). The relative effects of antibiotics in the treatment of PPR are presented in the pie chart. Parental (I/M) Oxytetracycline was more effective (54%) than parental (I/M) Sulphadimidine (36%) along with symptomatic treatment (Islam *et al*., 2012) (Fig 6). The surveillance of PPR concerning immune status is illustrated in the pie chart (Fig 7). Non-vaccinated goats were more susceptible (76%) to PPR infection than vaccinated goats (24%).This result supports the earlier report of (Islam *et al*., 2012)where a higher prevalence of PPR was found in the unvaccinated goat population.

DISCUSSION

Research revealed that more prevalence of PPR is found in goats less than 1 year of age especially 4-12 months of age (Chavan *et al*., 2009) and 7-12 months of age (Islam *et al*., 2012) the current study maximum of 38% found in 18 months of age that nearly agrees with them. Besides, More than 26.67% of cases are found in Mawna, Sreepur which is consistent with the previously reported rates from India (30%) and Pakistan (30%) (Khan 2010), confirming the severity of PPR in goats in this region. The data indicate that the local goats (Black Bengal) appear more susceptible to PPR than Jamunapari (Rahman *et al*., 2018;Madin, 2011) and the cross-breed goats (Sarker and Islam, 2011), in agreement with the previous findings of (Rahman *et al*., 2018) but in contrast with a recent study (Sarker and Islam, 2011). Food and Agricultural Organization and International Atomic Energy Agency reported that the Black Bengal goats had innate resistance against common diseases and were well adapted to the local environment. The results revealed that the prevalence of PPR is higher in females (72%) (Mahajan *et al*., 2012) than in males (28%) ($p>0.05$) and it is supported by Banik *et al*., 2008); Samad M.A, 2008. It may be because females are generally immunologically suppressed due to pregnancy or milking status (Rahman *et al*., 2016). As per diagnosis, More than half of cases of PPR had shown enteritis symptoms and a quarter had shown both enteritis and pneumonitis symptoms. Death in the PPR-infected animals (Chowdhury *et al*. 2014).The relative benefits of antibiotics in the treatment of PPR are illustrated in the pie chart. When combined with symptomatic treatment, parental (I/M) oxytetracycline proved to be more efficacious than parental (I/M) sulphadimidine which support the research of Islam *et al*., 2012. Furthermore, unvaccinated goats were more prone to PPR infection than vaccinated goats, according to the PPR monitoring about immunological state, as shown by the pie

chart. This outcome validates the earlier study by Islam *et al*. (2012), which discovered that the population of goats without vaccination had a greater prevalence of PPR. In addition, financial hurdles persist in a country like Bangladesh, imposing many difficulties in the surveillance and early reporting of diseases outbreaks; therefore, these diseases are, stubbornly prevalent. The study was carried out in veterinary hospitals only, which might exclude household sick animals. The study was done only a particular geo-ecological area of the country, therefore, this does not reflect the true real image of the PPR of goat in Bangladesh as well as Sreepur, Gazipur.

CONCLUSION

Peste des petits ruminants (PPR) is one of the most economically important transboundary endemic diseases of goats There is huge shortage of effective vaccines against all of the infectious diseases of livestock and poultry in Bangladesh. The government and non-government research organizations have to enrich their surveillance system and have to report all the diseases to prevent future havoc. Timely collection and analysis of the data of passive and active surveillance systems may enable us to detect most of the infections, emerging, zoonotic and endemic diseases at early onset and provide warning and precautions accordingly.

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