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PREVALENCE OF PESTE DES PETITS RUMINANTS (PPR) IN GOAT AND THEIR RESPONSE TO ANTIBIOTIC TREATMENT AT GANGACHARA UPAZILA OF RANGPUR DISTRICT

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ABSTRACT

A study was carried out at Upazila Veterinary Hospital, Gangachara, Rangpur, Bangladesh during 1st January to 30th April, 2018. A total number of 975 diseased goats were examined of which 412 (42.26%) Peste Des Petits Ruminants (PPR) cases were diagnosed based on history, clinical signs and physical examinations. High fever, nasal and ocular discharge, rapid and labored breathing, mouth lesion and diarrhoea were the common findings during clinical examination of PPR patients. Black Bengal goat was more susceptible (43.83%) than Jamunapari (29.63%). On the basis of sex, female goats were more susceptible (45.96%) than male goats (38.81%) to PPR disease. 7-12 months aged group of goats were more prone (48.45%) to PPR compare to other aged group (≤ 6 month of age, 13-18 month of age and ≥ 19 month of age). Non-vaccinated (50.27%) goats were more susceptible than vaccinated (17.30%) goats. Parental (I/M) combined antibiotic of Gentamicin, Sulphadimidine and Trimethoprim was more effective (72%) than Oxytetracycline (68%) and Sulphadimidine -NA (40%) along with symptomatic treatment.

1. Introduction

Livestock as a sub-sector of agriculture has a significant role in the national economy of Bangladesh. In Bangladesh, livestock sector generates employment opportunities, 20% of full-time and 50% for part-time population and contribution of livestock in gross domestic product is 1.60% (BBS, 2017). Goat is the second important livestock population in Bangladesh next to cattle (BBS, 2010). It's keeping is related to the rural poor and landless specially women (Chowdhury, 2002). For thousands of years they have been used for their milk, meat, hair and skin over much of the world. It is often regarded as poor man's cow. However, different types of infectious and non-infectious diseases act as barrier in raising the goat population in Bangladesh, especially peste des petits ruminants (PPR) causes higher morbidity and mortality and huge economic losses. Peste des petits ruminants (PPR) has

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been recognized as an exotic disease and a highly contagious viral disease of small ruminants, particularly in goats in Bangladesh (Islam *et al.*, 2001). It is also known as goat plague, an important disease in Africa (Roeder *et al.*, 1994) and Asia (Shaila *et al.*, 1996), where small ruminants form a considerable portion of livestock population. Generally, 100 percent morbidity and 80 to 90 percent mortality caused by peste des petits ruminants (PPR) have been reported in goats (Radostits *et al.*, 2000) and the outbreak caused 74.13% morbidity and 54.83% mortality in Black Bengal goats in this country (Das *et al.*, 2007). Thus, a combined effort with vaccination and zoo sanitary measure is required to control PPR. At present homologous PPR, vaccine has been practicing in Bangladesh against PPR to make up strong immunity. The duration of protective immunity was found at least for a period of 270 days post-vaccination. The maternal immunity derived from the vaccinated dose was sufficient to protect the kids for a period of 135-145 days during their early lives (Sil *et al.*, 1995). The present study was aimed to determine the prevalence of PPR disease in goat in related to breed, age, sex and immune status and to evaluate the response of animals to the commercially used antibiotics to control secondary bacterial infections in clinical cases of PPR in the study area.

2. Materials and methods

2.1 Population and tools used for data collection

The study was carried on natural host i.e. peste des petits ruminants infected goats that were brought to the hospital over the study period. Few cases were treated at the owner home on request with Upazila Livestock Officer. All the therapies prescribed by Upazila Livestock Officer were recorded carefully. A total number of 975 goats were registered during the study period and separated into several groups based on epidemiological parameter (age, sex, breed and vaccination status).

2.2 Diagnosis of PPR

Diagnosis of PPR cases in the affected goat were done by clinical history, clinical signs and physical examination of the animal during physical visit.

2.3 Anamnesis

History of the cases was taken by asking questions to owner. Each individual case was recorded. History on the vaccinated status were also recorded.

2.4 Clinical examination

Close inspection was performed properly in order to observe the presenting signs such as a sharp rise of temperature 104°F-106°F, oculonasal discharge, diarrhoea, respiratory distress and weakness of animal. Temperature was recorded per rectum with the thermometer in each case. Respiratory distress was identified with the help of stethoscope and observed the lung and tracheal sound and recorded. In diarrhoeal case, dehydration was measured by skin fold test.

Prevalence was calculated using the formula-

$$\text{Prevalence rate} = \frac{\text{Number of cases of disease}}{\text{Population at risk}} \times 100$$

2.5 Grouping of animals for antibiotic therapy and monitoring

To evaluate the response of commercial antibiotic therapy in PPR, total 75 PPR affected goats were selected and categorized into three equal group (n=25). All the three groups were treated with antibiotic, antihistaminic drug and electrolyte solution. Along with the antibiotic, antihistaminic drug and electrolyte solution were provided with same composition and same dose in each group of goat.

After the application of antibiotic response to treatment were observed from 1st day to 7th day of treatment and recorded. For monitoring the antibiotic treated results, the owner of the patient was contact over mobile phone and also home visit with the help of Upazila Livestock Officer.

Table 1. Grouping of goats and administration of different antibiotics with their dose and route of administration

Therapeutic treatment	Group A (n=25)	Group B (n=25)	Group C (n=25)
Antibiotic	Combined antibiotic Gentasone plus® (Each ml contain Gentamicin BP 30mg, Sulphadimidine BP 125mg, Trimethoprim BP 25mg) Dose: 1ml per 10kg body wt. Route: I/M	Renamycin100® (Each ml contain Oxytetracycline BP 100mg) Dose: 1ml per 10kg body wt. Route: I/M	Salidone® (Each ml contain Sulphadimidine Sodium 333mg) Dose: 3ml per 5 kg body wt. in the first dose and ½ of the initial dose in subsequent days Route: I/M
Antihistaminic drug	Histavet ^(R) (Each ml contain Pheniramine maleate BP 22.7mg) Dose: 1ml per 10kg body wt. Route: I/M		
Electrolyte	Glucolyte ^(R) (Each 25 gm contain Sodi bi carb-BP 12.50gm, NaCl-BP 6.66gm, KCl- BP 1.25gm, Vita -A-BP 50,000IU, Glucose - BP 4.5gm) Dose: 25gm/20Litre water Route: orally		

2.6 Statistical analysis

Data were analyzed by Chi-square test and the descriptive analysis was also done using IBM SPSS (Version 20).

3. Results and Discussions

3.1 Prevalence of diseases in goat

The prevalence study of PPR in goat and their response to the antibiotic therapy were done in Gangachara Upazila of Rangpur District of Bangladesh. For this purpose all the registered goats were observed carefully for the clinical signs of PPR. A total number of 975 diseased goats were registered during the study period. The prevalence of PPR was highest (42.26%) among the all affected goats and the other cases were parasitic infestation (25.64%), non- specific diarrhoea (15.38%), pneumonia (9.23%) and other diseases (7.49%).

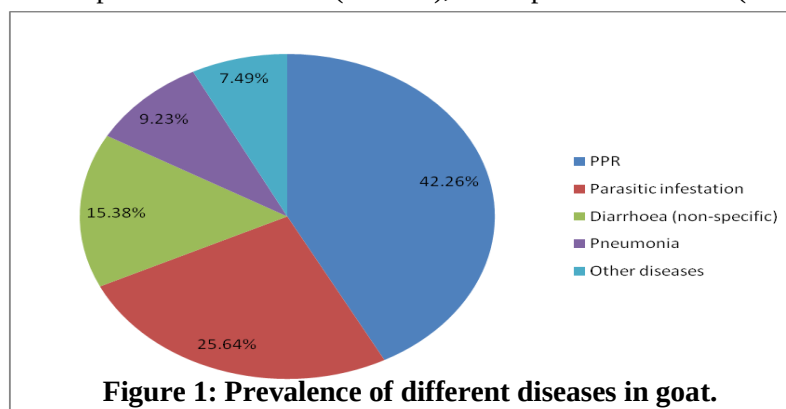


Figure 1: Prevalence of different diseases in goat.

(9.23%) and others (7.49%) (Figure 1). Similar prevalence of PPR (51%) was reported by Rahman *et al.* (2011) in Mymensingh district of Bangladesh. Conversely, the finding of this study was lower than the prevalence of 90% reported in Al-Asha oasis in eastern Saudi Arabia in 1988. The high prevalence of PPR might be due to geographical location, improper vaccination, type of housing and climate.

3.2 Breed wise prevalence of PPR in goats

The prevalence study of PPR was done in two important breeds, which are reared commonly in Bangladesh. In the present study the results reveal that the prevalence of PPR disease was higher in Black Bengal goat (43.83%) than in Jamunapari goat (29.63%) which is statistically significant ($p < 0.01$) (Table 2). The results of the present study were in a line with the findings of Samad (2001), who also observed that Black Bengal breed (67.24%) were more susceptible to PPR than Jamunapari breed (32.76%). Similar results were also published by Naznin *et al.* (2014). They concluded that the breed wise prevalence of PPR was 52% in Black Bengal, 49% in Jamunapari and 43% in Cross breed goats. It is difficult to draw any conclusions for changes of prevalence because of the differences in sampling procedures in the different studies that affect their representativeness. This variation in breed wise prevalence of PPR might be due to location and population of breed as well as due to irregular vaccination.

Table 2. Breed wise prevalence of PPR in goats

Breed	No. of goat examined	No. of PPR cases	prevalence (%)	χ^2	Level of significance (p-value)
Black Bengal	867	380	43.83	7.94	0.005**
Jamunapari	108	32	29.63		

3.3 Sex wise prevalence of PPR in goats

The sex wise prevalence of PPR is presented in Table 3. Statistically the variation in sex was significant ($p < 0.05$). The findings of the present investigation indicate that the both male and female goats were affected by PPR. Among the 412 PPR affected goats, 196 goats were male (38.81%) and 216 goats were female (45.96%). The occurrence of PPR in female was higher than male goats which are supported by the study of Abdalla *et al.* (2012). They estimated the prevalence was 54.2% in male and 64.2% in female goats. It shows that sex-wise prevalence was significantly different and this finding contradictory with Osman (2005) findings that the sex of the animals had no effect on the development of PPRV antibodies. The variation between male and female was might be due to genetic factors.

Table 3. Sex wise prevalence of PPR in goats

Sex	No. of goat examined	No. of PPR cases	Prevalence (%)	χ^2	Level of significance (p-value)
Male	505	196	38.81	5.094	0.024*
Female	470	216	45.96		

3.4 Age wise prevalence of PPR in goats

The age wise prevalence of PPR is presented in Table 4. In statistical analysis all the variation in age were significant ($p < 0.05$). The present study showed that the prevalence of PPR was maximum (48.45%) at age category 7-12 months, in compare with 40.55%, 40.23%, 35.81% at age category ≤ 6

months, 13-18 months and ≥ 19 months, respectively. It agrees with the findings of Blood *et al.* (1995) where prevalence was maximum within 7-12 months of age. Apparently, the disease differs significantly between age groups and this study shows that the young goats which were 7 to 12 months of age were more susceptible to PPR and the prevalence in them was 48.45%, which was somewhat lower than the previous study where 60.87% prevalence was found between 6 to 12 months of age (Gupta *et al.*, 2007). Singh *et al.* (2004) also assessed that the disease is more prevalent in the goats less than one year of age. The increased susceptibility of young goats to PPR disease might be due to malnutrition, poor immunity and poor management system.

Table 4. Age wise prevalence of PPR in goat

Age groups (Months)	No. of goat examined	No. of PPR cases	Prevalence (%)	χ^2	Level of significance (p-value)
≤ 6	217	88	40.55	10.036	0.018*
7-12	355	172	48.45		
13-18	174	70	40.23		
≥ 19	229	82	35.81		

3.5 Immune status wise prevalence of PPR in goats

The relation to immune status with the prevalence of PPR is presented in Table 5. Statistically the variation in relation to immune status was highly significant ($p < 0.001$). Both vaccinated and non-vaccinated goats were affected by PPR. Among 412 PPR affected goats, 41 goats were from vaccinated and 371 goats were from non-vaccinated. Results show that the prevalence of PPR was higher in non-vaccinated (50.27%) goat as compared with vaccinated (17.30%) goats. This result was supported by the earlier report made by Gibbs *et al.* (1979) who also found higher prevalence (68.38%) of PPR in the non-vaccinated goat population. Similar observation was also pointed out by Islam *et al.* (2013) who noted the prevalence 66.40% in non-vaccinated goats where 19.56% in vaccinated goats. Prevalence of PPR was varied significantly based on the immunological status of the animals. However, vaccination against the disease leads to decrease in the prevalence, but may not absolute guarantee for freedom from the disease. Immunized goats with PPR vaccine also showed the signs of PPR and this might be due to vaccination failure.

Table 5. Immune status wise prevalence of PPR in goats

Immune status	No. of goat examined	No. of PPR cases	Prevalence (%)	χ^2	Level of significance (p-value)
Vaccinated	237	41	17.30	79.924	0.000***
Non vaccinated	738	371	50.27		

3.6 Response to treatment in relation to different antibiotics

The response of commercially used antibiotic treatment in PPR cases are presented in Table 6. In statistical analysis all the variation in response of treatment in relation to different commercially used antibiotic was statistically significant ($p < 0.05$). The percentage response of treatment towards parental (I/M) combined antibiotic Gentasone plus^(R) in Group A was more effective (72%) than parental (I/M) in Group B Renamycin100^(R) (68%) and Salidone^(R) (40%) in Group C along with symptomatic treatment. The highest positive response was found in group A than group B and C. Considering mortality rate of PPR in goat the results showed highest mortality in group C (60%) than group B

(32%) and group A (28%). Naznin *et al.* (2014) also found the percentage of response to treatment towards parenteral (I/M) Oxytetracycline was higher (58%) than parenteral (I/V) use of Sulfonamide (28%). Similarly, Islam *et al.* (2013) reported that Oxytetracycline was more effective (64%) than Sulphadimidine (44%) along with symptomatic treatment. Previous result of study with Sulphur drug and Oxytetracycline therapy on PPR cases was effective but it was more effective when we treated the diseased goat with combined antibiotic, Gentasone plus^(R). It was due to synergistic action of antibiotics that exert more effective action against the secondary bacterial infection. Samad (2008) reported that in unprotected animals the morbidity can be up to 100% and mortality may be up to 20 to 90% and in severe outbreaks 100% case fatality particularly in goats. This finding was similar with the result of the present study. The lowest mortality in group A was found might be due to better response of Gentasone plus^(R) and also for synergistic action of antibiotics.

Table 6. Response to treatment in relation to different antibiotics

Group	Positive response (number)	Positive response (%)	Number of death	Mortality rate (%)	χ^2	Level of significance (p-value)
Group A (n=25)	18	72	7	28	6.33	0.042*
Group B (n=25)	17	68	8	32		
Group C (n=25)	10	40	15	60		

4. Conclusions

Goats are reared by farmers mostly as a subsidiary occupation or by poor people in Bangladesh and play an important role in women empowerment. PPR is a significant impediments to the economical rearing of small ruminants. PPR is an economically important diseases with high mortality and lower recovery rate. The prevalence of PPR in Gangachara Upazila of Rangpur district were high among the other infectious and non-infectious diseases of goat. Among the two important breeds of Bangladesh, Black Bengal goats were more susceptible than the Jamunapari goats to PPR disease. Considering the sex, female goats were more susceptible than male goats and 7-12 months aged group of goats were more prone to PPR compare to other aged groups. Diseases occurrences also occurred in vaccinated flock of goat. Parental (I/M) combined antibiotic of Gentamicin, Sulphadimidine and Trimethoprim was more effective than Oxytetracycline and Sulphadimidine-NA along with symptomatic treatment. PPR causes higher mortality and heavy economic losses in every year which may be reduced substantially by proper vaccination and other management approaches. To prevent this devastating disease, effective vaccination programme should be continued in all the year round and the government should take proper steps at the necessary moment.

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