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Epidemiological investigation of *peste des petits ruminants* virus infection in goat with therapeutic managementat at Bera upazila of Pabna in Bangladesh

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Abstract

Peste des petits ruminants (PPR), a fatal viral disease of goats causes high mortality and large economic losses, and is considered as one of the major constrains of goat farming worldwide.This study was undertaken to determine the prevalence, alteration of vital signs and effective therapeutics of PPR affected goats inBeraupzilla ofPabna district, Bangladeshduring the period of November 2014 to April 2015. A total number of 465 diseased goats were clinically examined of which 253 (54.41%) were found to be affected with PPR. The highest prevalence (72.27%) was found in Black Bengal goats whereas 35.04% and 27.78% prevalence were found in Jamunapari and Cross breed goats respectively. In case of Black Bengal goats51.78% affected goats were aged between 0-7months. In case ofJamunapari 51% affected goats aged between 8-14 months. Female goats were more susceptible (65%) as compared to males. About 60%Black Bengal goats had a body temperature range of 104-105.9 ℉. Over half of the study populations were in normal range of respiration rate.65%cross breed's heart rate was recorded in 91-110/minute range group that was higher in comparison to other breeds.The response totreatment following parenteral (I/M) administration of Sulphadimidine was higher (58%) than parenteral (I/M) OxytetracyclineHCl (50%) and Gentamycin Sulphate (46%) administration. All these findings revealed that, the prevalence of PPR depends on specific breed and age groupsand Sulphadimidine is the most effective drug choice in PPR treatment.

Key words: PPR, prevalence, vital signs, sulphadimidine, goat

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Introduction

The French acronym Peste des petits ruminants (PPR) is commonly used worldwide (Gargadennec*et al*., 1942). The virus is a member of the genus of *Morbillivirus*of the *Paramyxoviridae*family (Gibbs *et al*., 1979). Like other *Morbillivirus,* PPR is a negative single stranded, pleomorphic, enveloped and non-segmented RNA virus particle. Goats and sheep are considered as natural hosts of PPR, goats

being more susceptible (Taylor, 1984) than sheep (Radostits*et al*., 2000). In the south Asia, PPR was first recorded from India (Shaila*et al*., 1989), there the disease initially occurred in sheep and subsequently became more prevalent in goats (Kulkarni*et al*., 1996; Shaila*et al.,* 1996).The first outbreak of PPR in Bangladesh occurred in 1993 in Meherpur district, south western part of the country and continuing to occur since then (Sil *et al.,*1995 and Islam *et al*., 2001).In epidemic areas, morbidity rate has been estimated from 80% to 90% accompanied by mortality rate ranging from 50% to 80%, the disease has now become endemic and epidemic throughout the country (Debnath, 1995). It is assumed that, 75% of total districts in Bangladesh are affected with PPR in every year (Debnath, 1995). Rainy season is more susceptible for occurrence of this disease as compared with dry season (Samad, 1996). Traditionally in Bangladesh goat is considered as the poor man's cattle and PPR has been recognized to be highly contagious viral disease of small ruminants, particularly in goats (Islam *et al.,* 2001).For PPR to spread, close contact between infected and susceptible animals (Ozkul *et al.,* 2002) and inhalation of aerosols produced by sneezing and coughing of infected animals is needed(Saliki, 1998). Like other viral diseases, PPR has no specific treatment. However mortality rate may be decreased by using drugs that control the bacterial complications (Taylor, 1984). Also, combined drug therapy can save the animal in field condition (Richrd*et al*., 1996). The objectives of this study were to find out the prevalenceof PPR in different breeds and age categories of goats along withthe response to specific antibiotic treatment.

Materials and Methods

***Location of the study*:** The study was conducted at Beraupazila of Pabna District, Bangladesh during the period of November2014 to April 2015.

***Tools of diagnosis*:** Diagnosis of PPR was made by means of history and clinical signs like fever in the initial stage followed by pneumo-enteritis evidenced by matted mucus in the eye and nostrils, conjunctivitis, dyspnoea, diarrhea, anemia, erosion in oral mucosa and finally death. The degree of dehydration was estimated by conventional skin fold test.

***Population and tools used for data collection*:** The study population was naturally PPR infected goats of various age, sex and breed that were brought to the hospital over the study period. A number of 465clinically sick goats were recorded during this study period; of those 253 cases were PPR affected goats (Table 1). Data were collected from farmers in previously formed closed ended (categorical) questionnaire that was designed according to Thrushfield (2005).

***Anamnesis*:** History of the cases were taken from the owner and carefully recorded in each case individually. Data were recorded from the owners for the breeds/age/sex of the animals; probable dates of clinical onset of the disease with probable signs.

Clinical inspection: Close inspection was done carefully for each case to observe the clinical signs. Dehydration rate was measured by skin fold test and temperature was recorded by using of clinical thermometer.

***Treatment*:** Symptomatic treatments were given and all PPR affected goats were divided into 3 groups irrespective of breed and age groupsand response to the treatment was recorded.

Group A was treated with Gentamycin Sulphate @ 5mg/kg body weight intramuscularly (I/M) daily for 5 days, Promethazin HCl @ 5mg/kg body weight I/M for 3 consecutive days and Oral Rehydrated Solution (ORS) @ 0.625gm/adult goat orally at every 6 hours interval for 5 days.

Group B was treated with Sulphadimidine-Na @ 166.5mg/kg body weight intramuscularly (I/M) at first day followed by half of the initial day for next 4 days, Promethazin HCl @ 5mg/kg body weight I/M daily for

3 days and Oral Rehydrated Solution (ORS) @ 0.625gm/adult goat orally at every 6hours interval for 5 days.

Group C was treated with Oxytetracycline @10mg/kg body weight I/M daily for 5 days, Promethazine HCl @ 5 mg/kg body weight I/M daily for 3 days and Oral Rehydrated Solution@ 0.625gm/adult goat orally at every 6 hours interval for 5 days. Efficacy of treatment and prognosis rate were recorded by regular monitoring of affected one.

Results and Discussion

In the present study, we found that the goat was suffering from high fever (106°-107°F), discharge (ocular and nasal), stomatitis and excessive salivation. The oculo-nasal discharges become mucopurulentfollowed by pneumonia accompanied by coughing and abdominal breathing. A watery blood stained diarrhea is common in the later stage of infection, which is followed by death. The above findings are very close to Samad, (2008). The viral disease has no treatment but sulpher drug and oral saline could be the treatment of choice to protect the secondary bacterial infection and to reduce the rate of dehydration (Rashid *et al*., 2008).In this study the highest prevalence was found in Black Bengal goats (72.27%). We also found 35.04% and 27.78% prevalence in Jamunapari and Cross breed goat respectively (Table 1).

Table 1. PPR prevalence in different breeds of goat

Breeds	No. of Samples	No. of non-affected	No. of Affected	Percentage of affected
Black Bengal	256	71	185	72.27%
Jamunapari	137	89	48	35.04%
Cross breed	72	52	20	27.78%
Total	465	212	253	54.41%

Our study were very close to Shaila*et al*., (1989) where Black Bengal goats were more susceptible (67.24 %) to PPR than Jamunapari breed (32.76%). Susceptibility of PPR disease in age group is presented in Figure 1. Data shows that, 0-7month's age group in Black Bengal, 8-14 months age group in Jamunapari wasmore susceptible. In case of Black Bengal, 51.78% affected goats were in between 0-7months range. But in Jamunapari it is 51% in between8-14 months age. In case of cross breed, it was 75% in 0-7 months, 15% in 8-14 months and 10% in 14 months above. Previous data shows that, more prevalence of PPRwas found in goat less than 1 year of age especially 4-12 months of age (Venkataramanan *et al*., 2005) and 7-12 months of age (Blood *et al*., 1995). The current study nearly agrees with them.

In Black Bengal, 57.14% animals were female affected with PPR.In Jamunapari, about 50% but in Cross breed 65% were femalewhich was higher than other breeds (Figure 2). It may be due to the fact that females were generallyimmunologicallysuppressed due to pregnancy or milking status (Chakrabarti, 2004) and found around 55% female goats affected with PPR (Samad, 2008). The present study showsa little bit higher value than previous observation.

In present study, maximum body temperature was found in black Bengal goat (60%) at 104-105.9ºF range group (Figure 3). This indicating that the body temperature was comparatively higher in Black Bengalthan Jamunapari (59%) and Cross breed (57.25%) in same group (Figure 3). A wide range of variation in fever was found in PPR according to severity. In severe condition high temperature was recorded. According to Radostits *et al* (2000),about 104-105ºFor over temperature was found in initial stage of PPR which is consistent with thepresent study. Maximum goats in this study had fever within this range.

The maximum 65% cross breedshowed heart rate at 91-110/minute range group (Figure 4). In case of Black Bengal and Jamunapari, values recorded 50% and 58% respectively in same range groups (Figure 4). It indicates clearly that in case of cross breed,heart rate was higher in comparison to others. It may be due to the age of animals, severity of dehydration and

nutritional status. In young age, severe dehydration and anemic condition cause higher degree of heart rate. In case of respiration rate, highest percentage was found in all breeds at 30-50/minute range group.

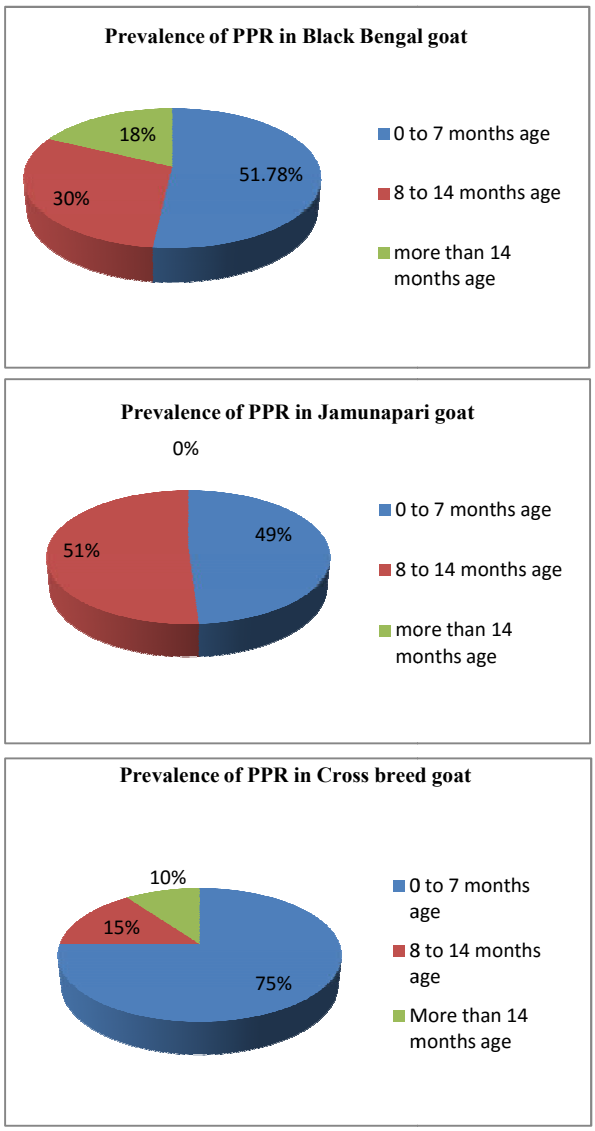

Figure 1. Prevalence of PPR Disease in relation to different age groups. 51.78% prevalence was found in 0-7 month's age group in Black Bengal whereas in Jamunapariit is 51% in 8-14 months age group. Cross breed goat was more susceptible (75%) in 0-7 month's age group.

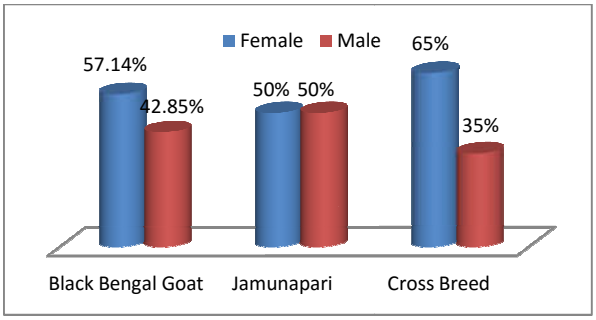

Figure 2. Prevalence of PPR in goat in relation to sex. Female goats about 65% in Cross breed and 57.14% in Black Bengal were affected with PPR and that were higher than male goats.

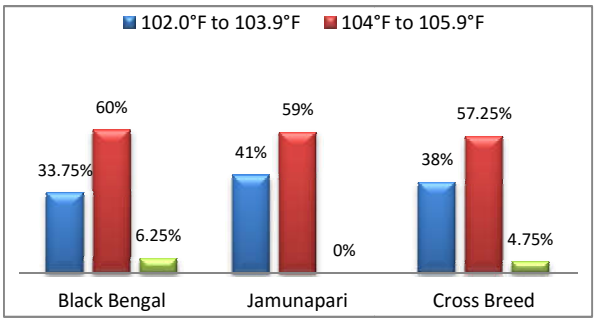

Figure 3. Temperature recorded in PPR affected Black Bengal, Jamunapari and Cross breed goats. Percentages of body temperature were higher in Black Bengal (60%)than Jamunapari (59%) and Cross breed (57.25%) in 104°F-105.9°F group.

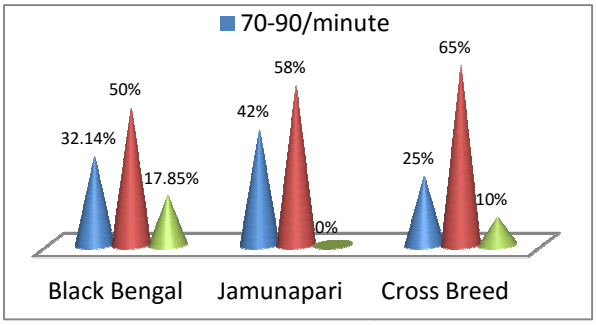

Figure 4. Heart rate recorded in PPR affected Black Bengal, Jamunapari and Cross breed goats. The highest65% Cross breedshowed heart rate at 91-110/minute range group. In Jamunapari and Black Bengal, itwas 58% and 50% respectively in same group.

In Black Bengal and Jamunapari, it was 35.72%, 34.62% respectively but in case of cross breed it was 40% in 51-70/min rangegroup (Table 2). That means more than half of the study population was in normal range of respiration rate. Mainly respiration rate increases in PPR in chronic pneumonic condition. The respiration rate found higher in case of PPR (Radostits*et al*., 2000). The present study partially agrees with the observation.

In all breeds,maximum number of goats was showing slight degree of dehydration. The values were 51.78%, 50% and 60% in Black Bengal, Jamunapari and cross breed respectively (Table 2). It indicates that maximum patients were brought to hospital just 1 or 2 days after showing clinical signs. It was also observed that the number ofgoats suffering fromsevere degree of dehydration was higher than the moderate degree of dehydration (Table 2).

Table 2. Respiration rate and degree of dehydration recorded in PPR affected goats

Breed	Respiration rate			Degree of Dehydration		
	30-50/ minute	51-70/ minute	71-90/ minute	Slight	Moderate	Severe
Black Bengal	51.78%	35.72%	12.5%	51.78%	14.28%	33.94%
Jamunapari	50%	34.62%	15.38%	50%	50%	0%
Cross	35%	40%	25%	60%	10%	30%

Radostits *et al* (2000) reported thatthe degree of dehydration is not remarkably increased just after the onset of clinical signs. The study also supports this statement because the maximum study patientswere hospitalized just after showing the clinical signs.

In table 3 results showed that, the percentage of response to treatment following intramuscular Sulphadimidine administration was higher (58%) than intramuscular Oxytetracycline HCl (50%) and Gentamycin Sulphate (46%) administration which is consistent with the study of Gupta *et al*., (2007). It was found that combined therapy with antihistamine and antibiotic in addition tooral fluid administration is so much effective to minimize mortality.

Table 3. Response to treatment in relation to different drugs therapy

Drug name (Generic)	Response to treatment		Total no. of case	Response to treatment (%)
	Positive	Negative		
Gentamycin Sulphate+ Promethazine + ORS	23	27	50	46%
Oxytetracycline+ Promethazine HCl + ORS	25	25	50	50%
Sulphadimidine-Na + Promethazine HCl + ORS	29	21	50	58%

Conclusion

From this study, it is observed that Black Bengal goats are more susceptible to PPR than Jamunapariand Cross breed goats. Young goats about 7-12 months of age are more prone to PPR than adult. Female goats are more susceptible than that of male. Treatment responsiveness following intramuscular administration of Sulphadimidine is higher than Oxytetracycline HCl and Gentamycin Sulphate administration.

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