



Research Article

Prevalence and associated risk factors of Peste des Petits Ruminants (PPR) in goats in Chittagong district, Bangladesh

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ARTICLE HISTORY

Received: 2014-08-18
Revised: 2014-09-12
Accepted: 2014-09-13

ABSTRACT

Peste des petits ruminants (PPR) is an acute febrile, extremely contagious and infectious disease of goats along with high morbidity as well as fatality rate. Present study was carried out to determine the prevalence and risk factors that directly associated with PPR in goats in Chittagong district, Bangladesh. A total of 5485 goats were registered at Shahedul Alam Quadery Teaching Veterinary Hospital (SAQTVH) in Chittagong Veterinary and Animal Sciences University (CVASU) during the period of two years (2012 & 2013). The complete prevalence associated with PPR in goats was seemed to be 8.99%. The higher prevalence revealed in the year of 2013 (10%) than the year of 2012 (7.99%). Risk factors age, sex, breed and seasonal influence were analyzed and higher prevalence was observed (11.72%) in young goats as compared to kids (6.19%) and adults (7.52%) with the significant p value (P=0.000). Disease prevalence was higher in male goats in comparison to female but it was not significant. The breed specific susceptibility associated with PPR was higher in the Black Bangle goats (10.11%) as compared with Jamunapari (7.44%) and others cross breeds goats (7.79%). Among of the seasonal variation, disease incidence was higher in the rainy season (11.30%) while it was less in winter (8.25%) and summer (6.40%) season with the significant p value (P=0.000). The research additionally pointed out the particular situation regarding PPR which is currently becoming endemic throughout the Bangladesh.

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ARTICLE CITATION: Parvez MA, Khatun R, Al-Noman MA (2014). Prevalence and associated risk factors of peste des petits ruminants in goats in Chittagong district, Bangladesh. Res. J. Vet. Pract. 2 (1S): 14 – 17.

INTRODUCTION

Goats participate in a vital position with lasting agricultural farming, employment generation as well as enhance the traditional economy of Bangladesh. Goats husbandry is one of the most important sources of incomes for rural families, marginal farmers, children, landless laborers and distress women who cannot afford to rear cattle, hence, goat is called "The cow of poor people" in Bangladesh. They provide mainly milk, meat, hides and skins as important export item. There are about 20.75 million goats in Bangladesh. This goats acquired second placement with regards to meat, milk along with skin manufacturing addressing information about 38.0%, 23.0% in addition to 28.0% respectively around the overall contribution involving livestock in Bangladesh (Devendra, 2007).

PPR is one of the major problems for the development of goats industry in Bangladesh. PPR is usually a severe disease condition frightening the actual income associated with very poor farmers (Diallo et al., 2007). A Peste des petits ruminants (PPR) is usually extremely contagious as well as infectious disease condition affecting goats the consequence of morbilli virus in addition to transmitted via primary or direct contact (Awa et al., 2000). This particular disease had a course of per acute, acute or may be chronic

with very high morbidity as well as fatality rate (Jones et al., 1997). Peste des petits ruminants (PPR) is a extremely severe febrile viral condition with regards to small ruminants, seen as mucopurulent nasal along with ocular discharges and also necrotising erosive stomatitis, enteritis along with pneumonia (Singh et al., 2004; Ismail et al., 1995). PPR has been recognized as extremely contagious viral disease linked with small ruminants, particularly in goats throughout the Bangladesh (Islam et al., 2001). The outbreaks of PPR brought about 74.13% of morbidity as well as 54.83% mortality within the Black Bengal goats throughout the Bangladesh (Islam et al., 2001; Das et al., 2007).

PPR was first discovered in Ivory Coast in 1942. PPR was once thought to be only an African problem, but the recent outbreaks in Middle East and Indian sub-continent causing alarming losses of animals especially goats. Episodes associated with PPR are usually common inside India, Nepal, Bangladesh, Pakistan, Bhutan and Afghanistan at this moment (Banik et al., 2008; Abubakar and Irfan, 2014). PPR is actually widely prevalent throughout the tropical and also sub-tropical countries, particularly in sub-Saharan Africa, Middle East and western and southern Asia (Dhar et al.,

2002). In Bangladesh, PPR is considered to be prevalent in goats since 1993 (Islam et al., 2001).

However, the pattern of PPR disease in goats, prevalence and underlying risk factors in Chittagong district of Bangladesh has not been analyzed before. These kinds of information might be valuable for realizing the economic importance as well as epidemiology of PPR in Chittagong district of Bangladesh. Therefore, the aims of this research were to determine the prevalence of PPR in goats and also to recognize associated risk factors in the goats population maintain within various management system. Such knowledge is essential in planning control strategies against PPR disease.

MATERIALS AND METHODS

The study was performed over a period of two years (January 2012 to December 2013) at Shahedul Alam Quadery Teaching Veterinary Hospital (SAQTVH) in Chittagong Veterinary and Animal Sciences University (CVASU), Chittagong district of Bangladesh. A total of 5485 goats were admitted during the period of 2 years with individual case registration number having address of owners, patient identification data, owners complain, anamnesis, clinical

examination, system affected, and different diagnostic test, diagnosis treatments, follow up, advice and prognosis recorded in this clinical investigation records. Diagnosis of each and every clinical case was based on clinical history taking from the owner, physical examination, clinical signs and symptoms. Goats affected with PPR revealed by sudden high rise of body temperature (104–107.5 F), oculo-nasal discharge, stomatitis, profuse diarrhea along with dehydration and feces adhere to hind quarter. Age was categorized as kids (<4 months), young (4–12 month) and adult (>12 month). The entire year was portioned directly into 3 seasons namely summer (March–June), rainy (July–October) and winter (November–February) according to the climatic condition associated with Bangladesh. Breeds of goats were based on their phenotypic characters as Black Bangle goats, Jamunapari goats and others crossbreed goats.

Statistical Analysis

Data were collected and sorted from previous clinical record to Microsoft Excel 2007® and exported to analytical software STATA 11.2® 2011. Applying 2X2 table along with determined measures of association by using Chi-square test and P values ($P \leq 0.05$) were regarded as significant.

Months	2012		2013		2012 and 2013	
	Goat(PPR)	Prevalence (%)	Goat(PPR)	Prevalence (%)	PPR/Goat	Prevalence (%)
January	218 (18)	8.25	214 (4)	1.87	22/432	5.09
February	202(18)	8.91	153 (21)	13.72	39/355	10.98
March	211 (10)	4.72	150(8)	5.33	18/361	4.99
April	239(17)	7.11	211(20)	9.48	37/450	8.22
May	188(9)	4.79	203(7)	3.45	16/391	4.09
June	189(17)	8.99	171(12)	7.02	29/360	8.05
July	224(17)	7.59	258(27)	10.46	44/482	9.12
August	267 (31)	11.61	293 (46)	15.70	77/560	13.75
September	272 (25)	9.19	352(41)	11.65	66/624	10.58
October	317(19)	5.99	291(51)	17.52	70/608	11.51
November	276(27)	9.78	216(25)	11.57	52/492	10.57
December	175(14)	8.0	195(9)	4.61	23/370	6.21
Total	2778(222)	7.99	2707(271)	10.0	493/5485	(8.99)

Table 1: Year and month wise prevalence of PPR in goats recorded at TVH during the period of 2 years (2012–2013)

Table 2: Age, sex, breed and season wise prevalence of PPR in goats recorded at TVH during the period of 2 years (2012–2013).

Parameters	Goats examined	Clinically affected (PPR)	Prevalence (%)	(P– Value)
Age category	Kids (<4 month)	1179	73	6.19
	Young (4–12 month)	2296	269	11.72
	Adult (>13month)	2009	151	7.52
sex	Male	2205	200	9.07
	Female	3280	293	8.93
Breed	Black Bangle goats	3015	305	10.11
	Jamunapari goats	1263	94	7.44
	Others cross breed	1207	94	7.79
Season	Winter season	1649	136	8.25
	Summer season	1562	100	6.40
	Rainy seson	2274	257	11.30
Total	5485	493	8.99	

(*–Significant $P \leq 0.05$)

RESULTS

The total of 5485 goat populations registered at Teaching Veterinary Hospital (TVH) in CVASU during the period of 2 years (2012–2013). Among them, 493 goats were found to be clinically affected with PPR. Thus the overall prevalence of PPR in goat population was observed to be 8.99%

(493/5485). The actual prevalence associated with PPR was increased in the year of 2013, (10.01%) than the year of 2012 (7.99%). In case of monthly observations, highest prevalence was recorded in the month of August (13.75% i.e., 77/560) followed by October (11.51%), February (10.98%), September (10.58%), November (10.57%), July (9.12%),

April (8.22%), June (8.05%), while lower prevalence recorded in the month of December (6.21%), January (5.09%), March (4.99%) and lowest prevalence recorded in the month of May (4.09%)(Table 1).

The age of goats were categorized as kids (<4 month), young (4–12 month) and adult (>13 month). Among of these age groups, the highest prevalence associated with PPR within goats was recorded in the young goats 11.72% in compare to kids 6.19% and adult goats 7.52%. The study revealed that the prevalence of PPR was higher in males 9.07% in comparison with female goats 8.93%. Breed was categorized as Black Bangle goats, Jamunapai goats and others cross breed goats bases on their phenotypic characters. Among of these breed groups, highest prevalence was recorded in Black Bangle goats 10.11% in compare to Jamunapai 7.44% and others cross breed goats 7.79%. Season was taken as summer, rainy and winter season. The highest PPR in goats were recorded in rainy season 11.30% followed by winter season 8.25% and summer season 6.40% (Table-2).

DISCUSSION

The reported prevalence of PPR in goats at present study was 8.99%. In contrary with the results higher prevalence reported by Islam et al., (2012), Sarker and Islam (2011), Rahman et al., (2011), Al-Dubaib (2009), Swai et al., (2009), Ozkul et al., (2002) and Singh et al., (2004) who reported 50.27% in Patuakhali (Bangladesh), 20.57% in Rajshahi (Bangladesh), 55% in Black Bangle goat (BAU), 55.1% seroprevalence in Saudi Arabia, 49.5% seroprevalence in Tanzania, 15.36 % seroprevalence in Pakistan, 20% in Turkey and 32.4% in India (Abubakar et al., 2011). This variation might be due to different geographical location, research period, and different management practices.

The prevalence regarding PPR among kid, young and adult goats were found to be 6.19% 11.72% and 7.52% respectively with the significant p value (P=0.000). Thus the reported prevalence of PPR was higher in young goats over the adults and kids agreed with the results of Islam et al., (2012), Sarker and Islam (2011), Rahman et al., (2011) and Singh et al., (2004) who described that the disease is commonly presence in the young goats under twelve month of age. In contrast with the results of present study Singh et al., (2004), Abubakar et al., (2009) who reported that prevalence of PPR was higher at the age of old goats (>12 month). The kids are less susceptible to the disease of PPR might be due to they have maternal derived antibody persist their body before the age of weaning period.

The final results of the existing research revealed that the higher prevalence of PPR was recorded in male goats 9.07% in compare to female goats 8.93% but p value was not significant (P=0.862). Higher prevalence of PPR is also reported in male goats by Sarker and Islam (2011) and Rahman et al., (2011).

The breeds of the goats divided as Black Bangle, Jamunapai and others cross breed goats. This research also revealed that, the highest prevalence of PPR was recorded in Black Bangle goats 10.11% in compare to Jamunapai goats 7.44% and other cross breed goats with significant p value (P=0.005). So that the Black Bangle goats were much more prone to PPR in compare to Jamunapai along with other cross breed goats similarity with the findings of Islam et al., (2012), Sarker and Islam (2011) and Mondal et al., (1995)

who observed that Black Bangle goats were more susceptible to the PPR in compare to other breed.

Prevalence of PPR in goats due to seasonal variation revealed that highest prevalence had been seen in rainy season 11.30% in comparison to summer 6.40% as well as winter season 8.25% with significant p value (p=0.000). Hence the present study showed that the prevalence of PPR had been increased in rainy season when compared with summer and also winter season disagree with the results of Sarker and Islam (2011) who observed higher prevalence in winter season. This variation might be due to different geographical region and study period.

The highest prevalence of PPR at present study was observed in the month of August 13.75% and October 11.51% in contrast with the findings of Sarker and Islam (2011); Abubakar et al., (2009) who recoded highest prevalence in the month of December (31.68%) and January (30.34%); 32.57% in March and 19.43% in April respectively. Results revealed that the lowest occurrence was in May (4.09%) in contrary with this result Abubakar et al., (2009) and Sarker & Islam (2011) who reported lowest prevalence in the month of June, i.e., 1.71% and 9.52%, respectively.

CONCLUSION

The result of present study provided valuable information on the prevalence and associated risk factors directly linked with the PPR throughout the goat population which must be kept in mind while taking the necessary preventive measure against the disease like vaccination and management techniques for the prevention and control of the PPR disease at national as well as international policy level.

ACKNOWLEDGEMENTS

The authors are thankful to the Department of Medicine and Surgery and Shahedul Alam Quadery teaching veterinary hospital, Chittagong Veterinary and Animal Sciences University, Khulshi-4225, Chittagong, Bangladesh for their kind co-operation during the research period.

CONFLICT OF INTEREST

No conflict of interest.

REFERENCES

- Abubakar M, Jamal SM, Arshed MJ, Hussain M, Ali Q (2009). Peste des petits ruminants virus (PPRV) infection: its association with species, seasonal variations and geography. *Trop. Anim. Health Prod.* 41: 1197 – 1202.
- Abubakar M, Khan HA, Arshed MJ, Hussain M, Ali Q (2011). Peste des Petits Ruminants (PPR): disease appraisal with global and Pakistan perspective. *Small Rum. Res.* 96: 1 – 10.
- Abubakar M, Irfan M (2014). An overview of treatment options to combat Peste des Petits Ruminants (PPR). *Res. J. Vet. Pract.* 2 (1S): 4 – 7.
- Al-Dubaib MA (2009). Peste des petits ruminants morbillivirus infection in lambs and young goats at Qassim region, Saudi Arabia. *Trop. Anim. Health Prod.* 41: 217 – 220.
- Awa DN, Njoya A, Ngo-Tama AC (2000). Economics of prophylaxis against peste des petits ruminants and gastrointestinal helminthosis in small ruminants in north Cameroon. *Trop. Anim. Health Prod.* 32: 391 – 403.
- Banik SC, Podder SC, Samad MA, Islam MT (2008). Sero-prevalence and immunization in sheep and goats against Peste des petits ruminants in Bangladesh. *Bangl. J. Vet. Med.* 6 (2): 185 – 190.
- Das KK, Shil NK, IslamMR (2007). Sero-epidemiological investigation on Peste des Petits Ruminants in black Bengal goats. *Bangladesh J. Microbiol.* 24:143 – 145.
- Devendra C (2007). Perspectives on animal production systems in Asia. *Livest. Sci.* 106: 1-18.

- Dhar P, Sreenivasa BP, Barrett T, Correy M, Singh RP, Bandyopadhyay SK (2002). Recent epidemiology of peste des petits ruminants virus (PPRV). *Vet. Microbiol.* 88: 153 – 159.
- Diallo A, Minet C, Goff CLE, Berhe G, Albina E, Libeau G, Barrett T (2007). The threat of peste des petits ruminants: progress in vaccine development for disease control. *Vaccine.* 25 (30): 5591 – 5597.
- Islam MR (2011). Peste des petits ruminants virus infection of goats in Bangladesh: Pathological investigation, molecular detection and isolation of the virus. *Bangl. Vet.* 28(1): 1 – 7.
- Islam MR, Shamsuddin M, Das PM, Dewan ML (2001). An outbreak of Peste des Petits Ruminants (PPR) in Black Bengal goats in Mymensingh, Bangladesh. *Bangl. Vet.* 18(1): 14 – 19.
- Islam MS, Khan MSI, Kader HA, Begum MR, Asgar MA (2012). Prevalence of PPR of goat and their response to antibiotic treatment at Mirzaganj Upazila of Patuakhali District. *J. Environ. Sci. and Natural Resources.* 5(2): 81 – 184.
- Ismail TM, Yamanaka MK, Saliki JT, Kholy AEL, Mebus C, Yilma T. (1995). Cloning and expression of the nucleoprotein of peste des petits ruminants virus in baculovirus for use in serological diagnosis. *Virology.* 208 (2): 776–778.
- Jones TC, Hunt RD, King NW (1997). Diseases caused by viruses. In: *Veterinary Pathology*, 6th edition. William and Wilkins, a Waverly Company. Philadelphia, USA. PP 197.
- Mondal AK, AP Chottopadhyay, SD Sarkar, GR Saha and MK Bhowmik, (1995). Report on epizootological and clinico-pathological observation on peste des petits ruminants (PPR) in West Bengal. *Ind J of Anim Health Bull.* 64: 261.
- Ozkul A, Akca Y, Alkan F, Barrett T, Karaoglu T, Dagalp SB, Anderson J, Yesilbag K, Cokcaliskan C, Gensay A, Burgu I (2002). Prevalence, distribution, and host range of Peste des petits ruminants virus, Turkey. *Emerg. Infect. Dis.* 8: 708 – 712.
- Rahman AU, Ashfaq M, Rahman SU, Akhtar M, Ullah S (2004). Peste des petits ruminants antigen in mesenteric lymph nodes of goats slaughtered at D I Khan. *Pak. Vet. J.* 2: 159 – 160.
- Rahman MA, Shadmin I, Noor M, Parvin R, Chowdhury EH, Islam MR (2011). Peste des petits ruminants virus infection of goats in Bangladesh: Pathological investigation, molecular detection and isolation of the virus. *The Bangladesh Veterinarian.* 28(1): 1 – 7.
- Sarker S, Islam MH (2011). Prevalence and Risk Factor Assessment of Peste des petits ruminants in Goats in Rajshahi, Bangladesh. *Vet. World.* 4(12): 546 – 549.
- Singh RP, Saravanan P, Sreenivasa B, Singh RK, Bandyopadhyay SK (2004). Prevalence and distribution of Peste des petits ruminants virus infection in small ruminants in India. *Rev. Sci. and Tech.* 23 (3): 807 – 819.
- Swai ES, Kapaga A, Kivaria F, Tinuga D, Joshua G, Sanka P (2009). Prevalence and distribution of Peste des petits ruminants virus antibodies in various districts of Tanzania. *Vet. Res. Commun.* 33: 927 – 936.