

The epidemiology of bacterial pneumonia in Black Bengal goats in Bangladesh

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Abstract

Goat pneumonia is commonly caused by infectious agents. The present study was conducted at Mymensingh Sadar (District headquarters) and Ullahpara Upazillas (Sub-district). In each area goats with a history of pneumonia were identified. Age, sex, season, health status and hygienic practices of the affected flocks were recorded. Lungs and nasal swabs were collected from 250 Black Bengal goats for bacteriological examination. The prevalence of pneumonia was higher in young goats (1-12 months old) than in adults (>12 to 36 months old) (33% and 11.3%, respectively) ($P<0.05$). The prevalence in female goats was higher than in male goats (23.0% and 12.0%, respectively). In winter prevalence was higher (27.1%) than in summer (11.0%) ($P<0.05$). (*Bangl. vet.* 2014. Vol. 31, No. 2, 70 – 73)

Introduction

Pneumonia in goat is characterized by fever (40 – 41°C), anorexia, painful coughing, dyspnoea, mucopurulent nasal discharge and depression. It is one of the most common respiratory illnesses in goats throughout the world (Ackermann and Brogden, 2000). Although, pneumonia occurs more frequently in kids, it also affects adults. *Pasteurella multocida* and *Pasteurella haemolytica* are associated with outbreaks of acute pneumonia and death of goats of all ages (Falade, 2002). These bacteria are commonly found in the upper respiratory tract of healthy goats. Poor management, transportation stress, overcrowding, sudden changes of temperature and humidity, poor housing; viral infection (e.g. parainfluenza-3 virus), lung parasites (*Dictyocaulus*) and stress predispose goats to pneumonia. Pneumonia can lead to widespread financial loss because of death, reduced live weight, delayed marketing, treatment cost and unthriftiness (Davies *et al.*, 1997; Daniel *et al.*, 2006). Pneumonia of goats is reported in Bangladesh (Momin *et al.*, 2011). *P. multocida* and *Staphylococcus aureus* have been associated with pneumonia in Black Bengal goats (Momin *et al.*, 2011). In order to control pneumonia in goats, risk factors should be determined.

Materials and Methods

Study areas

This study was conducted at Mymensingh Sadar (District headquarters) and Ullahpara Upazilla (Sub-district), Sirajgonj in Bangladesh from May 2009 to April 2010.

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Goats

Goats (n = 250) manifesting the characteristic clinical signs of respiratory distress such as: high fever (40 - 41°C), anorexia, dyspnoea, coughing and depression were selected. In Mymensingh Sadar, the study area included the Veterinary Teaching Hospital, Bangladesh Agricultural University (BAU), BAU goat farm, Bulbul private goat farm and Kamal-Ranjit (KR) shopping centre. In Ullahpara of Sirajganj district, the study was conducted at Howrah village.

Collection of samples

Nasal swabs were collected from clinically sick goats (n = 247) using sterile cotton bud. Lung swabs from three dead goats were collected from the inner core of the lung using sterile cotton buds during necropsy. Swab samples were placed immediately into the Falcon tubes containing 10 mL nutrient broth. All swab samples were transported to the laboratory using ice box and kept at 4°C until use. Age, sex, health status and husbandry practice were recorded (Table 1) by the animals' attendants using a pretested questionnaire.

Table 1. History of goats used in the study

Variables	Category level	Number of observation
Age	1 - 12 months	100
	>12 - 36 months	150
Sex	Male	67
	Female	183
Seasons	Winter (November to February)	140
	Summer (March to May)	110
Health status	Poor	190
	Good	60
Condition of rearing	Unsatisfactory	175
	Satisfactory	75

Bacteriological study

Nasal and lung swab samples were inoculated onto nutrient agar and blood agar, Eosin Methylene Blue (EMB) agar and MacConkey agar media and incubated at 37°C for 24 hours. The colonies on primary culture were repeatedly sub-cultured by streak plate method until pure cultures with homogenous colonies were obtained (Cheesbrough, 1985). Identification of bacteria was performed by colony morphology, Gram's stain and biochemical tests (Cheesbrough, 1985).

Statistical analysis

Statistical analysis was performed using 'Statistical package for the social sciences' (SPSS), version 17.0 (UK). The association between each risk factor and the outcome

variable was assessed using the Chi-square (X^2) test. For all analysis a p value of ≤ 0.05 was considered to be statistically significant.

Results and Discussion

The results are shown in Table 2. Prevalence of pneumonia is based on the bacteriological findings. When *Pasteurella multocida* and *Staphylococcus aureus* were isolated from nasal swabs or lung tissue, this was considered as evidence of pneumonia (Momin *et al.*, 2011; Oros *et al.*, 1997). Nutrition, immune status, climate and housing might influence the occurrence of goat pneumonia caused by bacterial pathogens (Pinheiro *et al.*, 2000; Kumar *et al.*, 2004).

Table 2. Prevalence of pneumonia in Black Bengal goats on the basis of clinical signs

Epidemiological parameters	Level	No. of animal examined	No. of animals affected and prevalence (%)
Age	1 – 12 months	100	33 (33.0)
	12 – 36 months	150	17 (11.3)
Sex	Male	67	8 (11.9)
	Female	183	42 (23.0)
Season	Winter	140	38 (27.1)
	Summer	110	12 (10.9)
Health Status	Poor	190	43 (22.6)
	Good	60	7 (11.7)
Condition of rearing	Unsatisfactory	175	39 (24.4)
	Satisfactory	75	11 (12.2)

In this study the overall prevalence of pneumonia was 20% (50 of 250). A study conducted in Nigeria recorded only 0.1% prevalence of pneumonia in goats (Adamu and Ameh, 2007). This study recorded higher prevalence of pneumonia in goats of 1-12 months of age (33%) as compared to goats of >12 to 36 months of age (11.3%): the difference is statistically significant ($P<0.05$). Kumar *et al.* (2004) recorded a higher incidence of pneumonia in 3 – 6 month-old goats (25.5%) as compared to >12 months age goats (3.3%) in India. Young animals are more prone to develop pneumonia caused by bacterial agents; however, adult animals are also susceptible, particularly when immuno-compromised (Rimoldi and Moeller, 2013).

Prevalence was higher in female goats (23.0%) than male (11.9%). In the winter prevalence was higher than in summer (27.1% and 10.9%, respectively) the difference is statistically significant ($P<0.05$). Temperature fluctuation in the winter and summer appeared to be the major determinant of pneumonia in goats (Kumar *et al.*, 2004). A study conducted in India on Barbari goats recorded higher prevalence of pneumonia in the winter (39.4%) than in summer (33.8%) (Kumar *et al.*, 2004).

Goats in poor health showed higher pneumonia prevalence than goats in good health (22.6% and 11.7%, respectively). Goats reared under unsatisfactory hygienic conditions exhibited higher prevalence of pneumonia than goats reared under satisfactory hygienic conditions (24.4% and 12.2%, respectively). Poor husbandry is a predisposing factor to pneumonia in goats (Tariq, 1980).

Results of this study suggest that bacterial pneumonia is endemic in the study areas and underscore the need for prevention and control measures.

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