

PREVALENCE OF ZONOTIC DISEASES OF SMALL RUMINANTS AT SAVAR UPAZILA OF DHAKA DISTRICT

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Abstract

The objective of this study was to assess the prevalence of zoonotic diseases of small ruminants (SR) at Savar upazila of Dhaka district. A questionnaire-based survey was conducted in small and middle-scale goat and sheep farms at Savar Upazila with a total number of 1981 SR (1438 goats and 543 sheep). We found a total of 468 diseased SR (281 goats and 187 sheep), of which 206 cases were zoonotic (41.37%) (124 / 60% goats; 82/40% sheep). Prevalence of bacterial zoonoses (Salmonellosis, Tetanus Dermatophilosis, Brucellosis, Listeriosis and Campylobacteriosis) was higher (23.78% in goat and 15.53% in sheep) followed by that of parasitic zoonoses (Hydatidosis, Fascioliasis, Amphistomiasis and Cryptosporidiosis) (17.48% in goat and 11.65% in sheep), viral zoonoses (Contagious Ecthyma, Foot and Mouth Disease and Rabies) (12.14% in goat and 7.77% in sheep), rickettsial zoonoses (Q Fever) (2.91% in goat and 1.94% in sheep). The age-wise, sex-wise and breed-wise prevalence of zoonotic diseases in goats and sheep were also determined. The study provided an epidemiological forecast showing the prevalence of zoonotic diseases of SR, which can be helpful for the clinician in the diagnosis of such infections. The present study revealed that the SR at Savar Upazila is susceptible and also infected with various zoonotic diseases. So, prevention and control of these zoonotic diseases are essential.

Keywords: Bacterial zoonoses, Parasitic zoonoses, Prevalence, Small ruminants

Introduction

Small ruminants (SR), particularly goats and sheep constitute the major portion of livestock in Bangladesh; about 80% of rural people are involved with livestock farming (Siddiki *et al.*, 2009). Goats and sheep are important livestock resources that give more production per unit of investment, have younger slaughter age, and have a well-established market (Prasad, 2007). They also contribute to earnings of a significant amount of foreign currency by exporting skins and other by-products (Kamaruddin,

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2003). Bangladesh has the third highest population of goats among the Asian countries which accounts for about 34.5 million heads representing 57% of total ruminant livestock (FAO, 2003) Maximum numbers of SR are raised under small holder old style management system in rural zones in Bangladesh.

The term “Zoonoses” is derived from the Greek word “Zoon”, which means animal, and “nosos”, which means illness. Zoonotic diseases are infectious diseases that spread naturally between species (sometimes by a vector) from animals to humans or from humans to animals. According to the World Health Organization (WHO), any disease or infection that is naturally transmissible from vertebrate animals to humans or from humans to animals is classified as zoonosis (WHO, 2020). Zoonotic diseases are common throughout the world and the public health threat of emerging, reemerging, and neglected zoonoses in the industrial world has been reported (Cutler *et al.*, 2010; Weese *et al.*, 2002) but it constitutes an important threat to human health in developing countries like Bangladesh. Among the human pathogens, about 61% are zoonotic in nature (Taylor *et al.*, 2001). Most of the zoonoses diagnosed SR are transmitted by close contact with humans and some others are airborne, vector-borne, and foodborne diseases. Most of these diseases affect animal health and decrease livestock production (Grace *et al.*, 2012). These diseases constitute a public health problem throughout the world, particularly in the tropics where their control is restricted by inadequate infrastructure and financial resources. A strong database on the prevalence of zoonotic diseases in any area might contribute to the provision of appropriate veterinary practice and effective zoonotic disease control programs and SR production systems considering the different geographical locations, it is an important issue to have a baseline database on zoonotic diseases prevalence of small ruminants.

Savar is an upazila of Dhaka district in the division of Dhaka, Bangladesh. Savar is located at 23.8583 °N 90.2667 °E. It has 66,956 households and a total area of 280.13 km². The main economic sectors in Savar are agriculture (23.6%), industry (59.6%), and service (16.8%) (Wikipedia, 2019). The total number of goats in Savar Upazila is about 266,397 and sheep about 5,382 (Data source-Upazila Livestock Office and Veterinary Hospital, Savar, Dhaka). The present study was conducted to estimate the prevalence of zoonotic diseases in SR; the comparative prevalence of bacterial, parasitic, viral, fungal, and rickettsial zoonoses along with age-wise, sex-wise, and breed-wise distribution of zoonotic diseases affecting SR.

Materials and Methods

Study area and period

The study was conducted at Savar Upazila in Dhaka district by visiting small and middle-scale goat and sheep farms and also from Upazila Livestock Office and Veterinary Hospital during the period between 15 March 2021 and 21 August 2021.

Data collection

The data was collected and evaluated from a total number of 1981 SR (1438 goats and 543 sheep). A total of 150 questionnaires were prepared for the study.

Information was collected using a structured questionnaire by face to face interview of farmer and veterinary surgeon. The data was characterized according to the basic information about the farmer and farm such as the number of animals, age, sex, breed, body weight, vaccination, deworming, disease condition, rearing system, problems in rearing, and suggestions or comments.

Study design

The study was a cross-sectional study. During the study period, different ages, breeds, and sex of diseased SR were received at Upazila Livestock Office and Veterinary Hospital and also at different small and middle-scale goat and sheep farms in Savar Upazila. The zoonotic diseases were diagnosed on the basis of clinical history (e.g. deworming, vaccination, feeding etc.), clinical signs (e.g. nasal discharge, lacrimation, fever, salivation etc.) and post mortem lesions (e.g. necrosis, haemorrhage etc.).

Data analysis

Data that were collected had been stored in an MS Excel spreadsheet and descriptive statistics (percentage) were computed.

Results and Discussion

Overall prevalence of zoonotic diseases of SR

The study found a total number of 206 cases of zoonotic diseases at Savar Upazila where 124 cases were in goats and 82 cases were in sheep (Table 1). Here about 60% of cases in goats and about 40% of cases in sheep were zoonotic (Fig. 1). Among 124 zoonotic cases in goats; 49/23.78%), 36/17.48%), 25/12.14%), 8/3.88%, and 6/2.91% were recorded as bacterial zoonoses, parasitic zoonoses, viral zoonoses, fungal zoonoses, and rickettsial zoonoses, respectively, and another 82 zoonotic cases in sheep; 32/15.53%, 24/11.65%, 16/7.77%, 6/2.91%, and 4/1.94% were recorded as bacterial zoonoses, parasitic zoonoses, viral zoonoses, fungal zoonoses, and rickettsial zoonoses, respectively (Fig. 2).

Table 1. Total Number of Cases of Zoonotic Diseases of Small Ruminants at Savar Upazila

Species	Total No. of Diseased Animals	Total No. of Animals with Zoonoses
Goat	281	124
Sheep	187	82
Total Cases	468	206

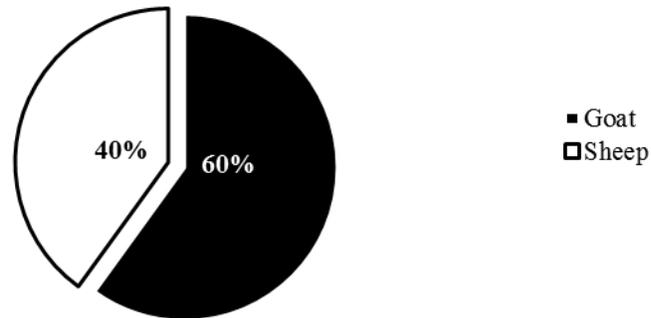


Fig. 1. Percentage of Zoonotic Diseases of Small Ruminants at Savar Upazila

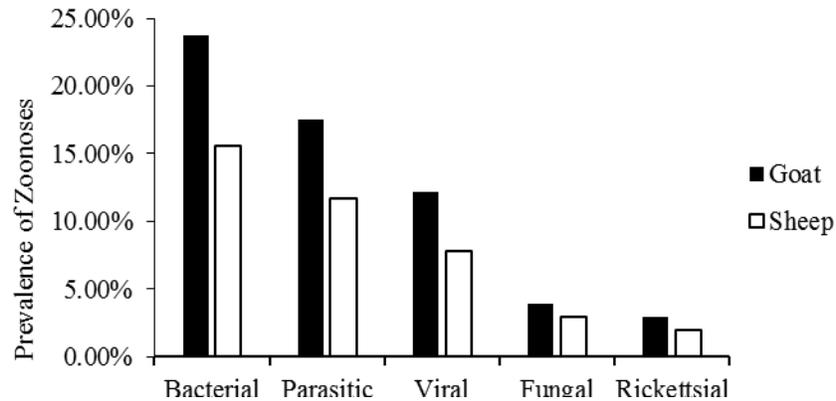


Fig. 2. Etiology of Zoonoses of Small Ruminants at Savar Upazila

Prevalence of bacterial zoonoses of SR

The bacterial zoonoses that were found in both goats and sheep were Salmonellosis, Tetanus Dermatophilosis, Brucellosis, Listeriosis, and Campylobacteriosis (Fig. 3). The prevalence of these bacterial zoonoses was higher in goats (23.78%) than in sheep (15.53%). The prevalence of Salmonellosis in goats was 10.19% and in sheep was 6.79%. Similarly, Tetanus 5.34% in goats and 3.88% in sheep; Dermatophilosis 2.91% in goats and 1.94% in sheep; Brucellosis 2.43% in goats and 1.46% in sheep; Listeriosis 1.94% in goat, 0.97% in sheep and Campylobacteriosis 0.97% in goat and 0.49% in sheep. Infection of Salmonellosis in animals is maintained by recycling slaughterhouse waste as animal feed, fecal-oral spread, and fecal contamination of hatching eggs (Borhanuddin *et al.*, 1986). The prevalence of Brucellosis was observed in small ruminants in the Tangail district (8.4%) followed by the small ruminants at Savar upazila (8.0%) (Gani *et al.*, 2016).

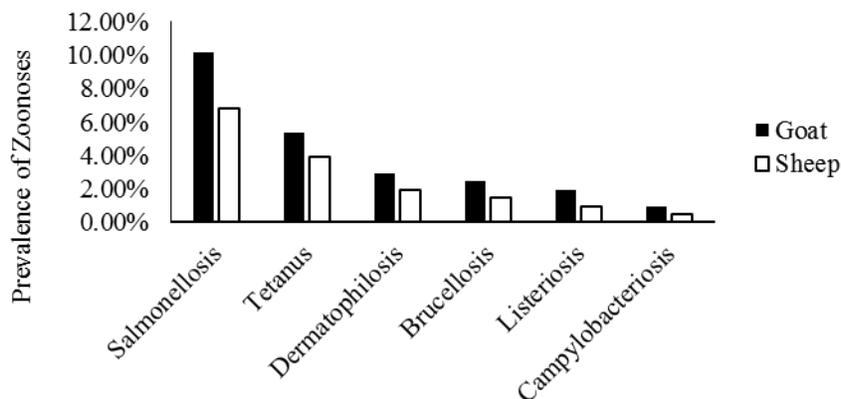


Fig. 3. Prevalence of Bacterial Zoonoses of Small Ruminants at Savar Upazila

Prevalence of parasitic zoonoses of SR

The parasitic zoonoses that were found in both goat and sheep were Hydatidosis, Fascioliasis, Amphistomiasis, and Cryptosporidiosis (Fig. 4). The prevalence of parasitic zoonoses were higher in goat (17.48%) than in sheep (11.65%). The prevalence of Hydatidosis in goats was 7.76% and in sheep was 5.34%. Similarly, Fascioliasis 5.83% in goats and 3.40% in sheep; Amphistomiasis 2.43% in goats and 1.94% in sheep and Cryptosporidiosis 1.46% in goats and 0.97% in sheep. Similar findings were also found by Kabir et al., (2009). Hydatidosis is an important parasitic zoonosis and the disease has been recorded in almost all parts of the world during the execution of veterinary inspection in slaughterhouses (El-Badawi et al., 1980, Chermette, 1983, Petkov et al., 1987, Ashraf et al., 1987; Anwar et al., 1993). The highest case fatality of Fascioliasis (33) per ten thousand animals was recorded in goats by Rahman et al. (2017).

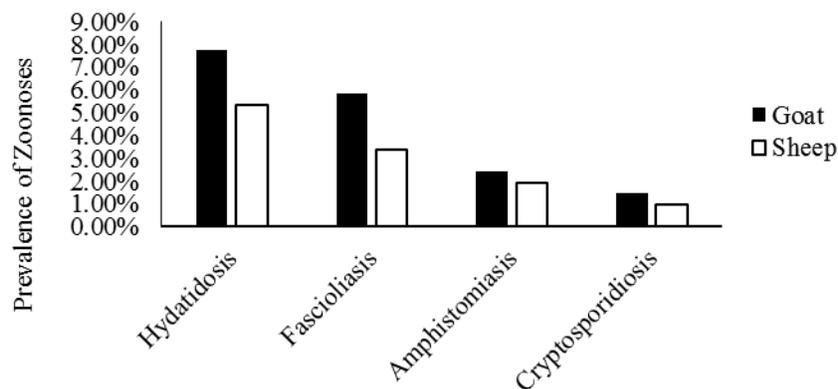


Fig. 4. Prevalence of parasitic zoonoses of small ruminants at savar upazila

Prevalence of viral zoonoses of SR

The viral zoonoses that were found in both goats and sheep were Contagious Ecthyma, Foot, and Mouth Disease (FMD), and Rabies (Fig. 5). The prevalence of these viral zoonoses was higher in goats (12.14%) than in sheep (7.77%). The prevalence of Contagious Ecthyma in goats was 9.22% and in sheep was 6.13%. Similarly, FMD is 1.94% in goats and 0.97% in sheep, and Rabies is 0.98% in goats and 0.94% in sheep. Contagious ecthyma is a zoonotic disease that primarily affects sheep and goats worldwide. Although the clinical occurrence of this disease in goats has been reported in Bangladesh (Samad, 2000a), its transmission from animals to humans has not yet been documented locally. Foot-and-mouth disease is an endemic disease mainly affecting ruminants in Bangladesh and severe outbreaks are mostly recorded in cattle (Islam and Samad, 1998). Almost all human deaths caused by Rabies originated in Asia and Africa (Samad, 2008). Epidemiological studies of Rabies in Bangladesh are very limited (Ali *et al.*, 1982; Biswas *et al.*, 1996) to formulate an effective control program.

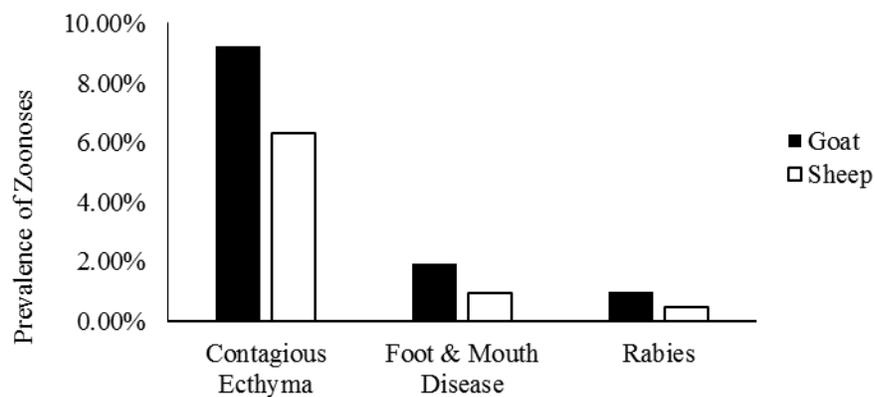


Fig. 5. Prevalence of viral zoonoses of small ruminants at savar upazila

Prevalence of fungal and rickettsial zoonoses of SR

Prevalence of dermatomycosis was found its prevalence was higher in goats (3.88%) than in sheep (2.91%) (Fig. 6), which conforms to the findings of Gupta *et al.*, (1970). Similarly, the prevalence of Q fever was higher in goats (2.91%) than in sheep (1.94%) (Fig. 6). The seroprevalence of Q fever varied according to sex, pregnancy status, and study areas but none was significant statistically (Rahman *et al.*, 2016).

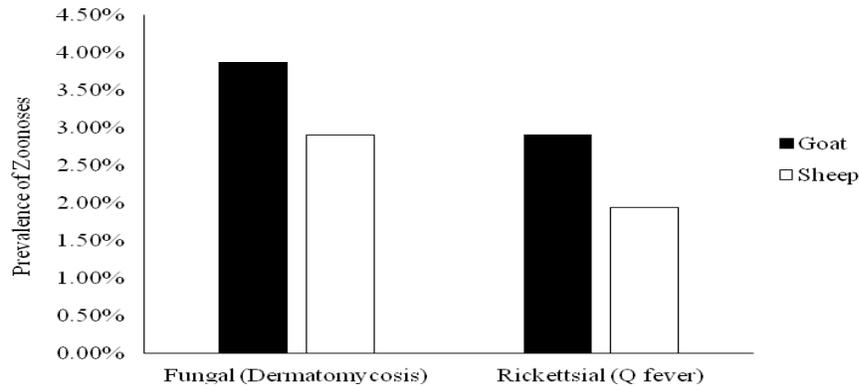


Fig. 6. Prevalence of fungal & Rickettsial Zoonoses of Small Ruminants at Savar Upazila

Age-wise prevalence of zoonotic diseases of SR

In age-wise prevalence, this study found the highest prevalence of zoonotic diseases in young animals (12 to 24 months) both goats (42.74%) and sheep (45.12%) than older animals (more than 24 months) in goats (32.26%) and sheep (29.27%) and growing animals (6 to 12 months) in goats (25%) and sheep (25.61%) (Fig. 7). The reason in the prevalence of infection of zoonotic diseases in different age groups in sheep and goat is difficult to explain but it might be due to an immunological phenomenon (Okafor *et al.*, 1988). Besides, higher prevalence in older groups may be due to more exposure to the source of infection (Mohiuddin *et al.*, 1982).

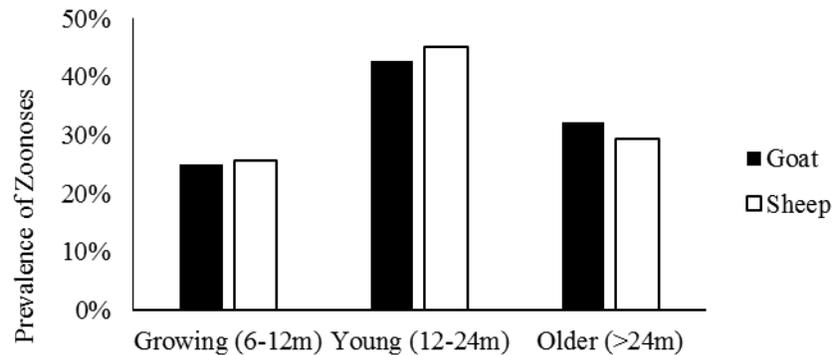


Fig. 7. Age-wise Prevalence of Zoonoses of Small Ruminants at Savar Upazila

Sex-wise prevalence of zoonotic diseases of SR

In sex-wise prevalence, this study revealed that a higher prevalence was observed in females (55.65%) than in males (44.35%) in goats. Similarly in sheep, the higher prevalence was observed in females (54.88%) than in males (45.12%) (Fig. 8). The

higher percentage of infection of zoonotic diseases in the female may be due to alteration in the physiological condition of the animals during pregnancy and lactation (production activity) and also the lack of feed supplement for production, which may lead to the lowering of body resistance of the female (Uddin *et al.*, 2006).

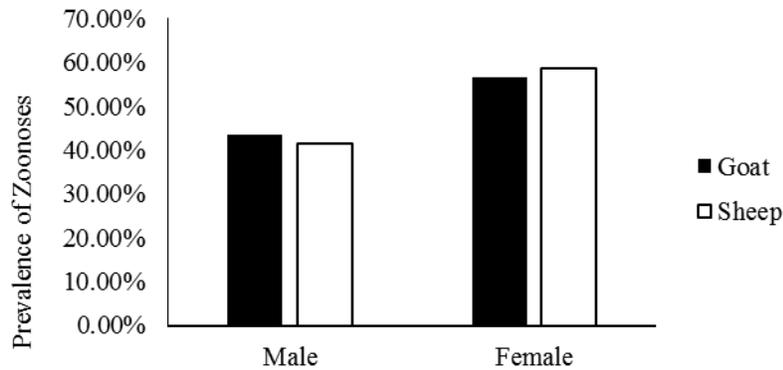


Fig. 8. Sex-wise prevalence of zoonoses of small ruminants at savar upazila

Breed-wise prevalence of zoonotic diseases of SR

In breed-wise prevalence, this study revealed that the highest prevalence in goats was observed in the Black Bengal (45.16%) than in Jamunapari (33.87%) and Cross (20.97%) (Fig. 9). On the other hand, the highest number of prevalence in sheep was observed in the Indigenous (64.63%) than the Garole (35.37%) (Fig. 10). Chakrabarty *et al.* (2016) found more zoonotic disease prevalence in Black Bengal goat breed.

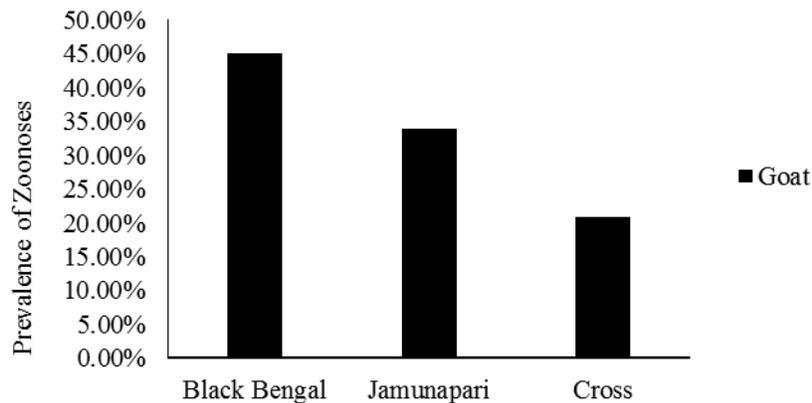


Fig. 9. Breed-wise prevalence of zoonoses of goat at savar upazila

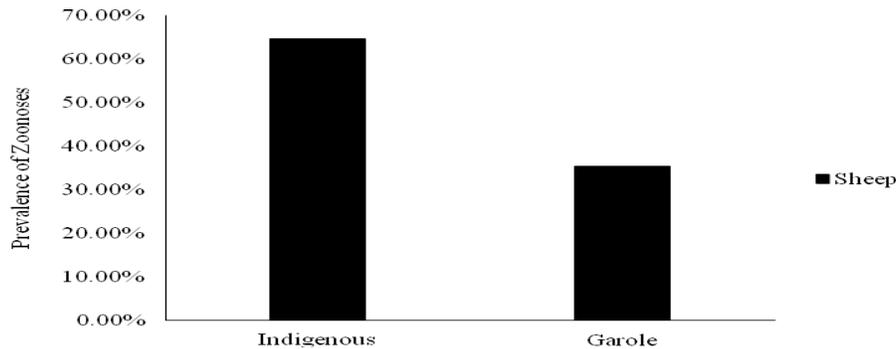


Fig. 10. Breed-wise prevalence of zoonoses of sheep at savar upazila

Conclusion

This study revealed the overall prevalence of zoonoses of SR at Savar Upazila in Dhaka district which might be given a transparent perception about their distribution to the forthcoming researchers or veterinarians to carry on further investigations for finding the problems and solutions.

Conflicts of Interest

The authors declare no conflicts of interest regarding publication of this paper.

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