Article

Prevalence of common parasitic and infectious diseases of goat at Babugonj upazilla, Barisal, Bangladesh

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Abstract: This study was conducted to investigate the prevalence of common parasitic and infectious diseases of goat at Babugonj upazilla, Barisal, Bangladesh. The study was performed in Veterinary Clinic, ANSVM, PSTU and Upazilla Veterinary Hospital, Babugonj, Barisal during June, 2014 to May, 2015. The diseases were diagnosed on basis of clinical signs, owner's statement, general clinical examinations and laboratory diagnosis. A socio-economic survey of 200 destitute women and marginal/poor farmers of Barisal district was also done using a semi-structured questionnaire on their household. 70% of the respondents were females while 30% were males. 65% respondents were involved in agriculture, 13% in own business, 3% in shared business, 2% in govt. service and 17% in non-govt. service. 39% respondents had knowledge about signs of health of goat followed by management (74%), goat diseases (24%), veterinary drugs (20%), animal vaccine (14%) and biosecurity (13%). 53% animal houses were kacha followed by tin (41%) and pukka (2%). Goat received feed from own fodder areas (52%), purchase concentrate (5%) and both (43%). Respondents used tube-well (24%), river (18%), canal (26%) and ponds (32%) as the source of water for their goat. The prevalence of parasitic diseases was 41.33% followed by infectious diseases (39.34%) in goat. The prevalence of parasitic diseases was highest in rainy season 51.28% followed by autumn (41.61%), summer (40.37%) and winter (27.98%). The prevalence of infectious diseases was highest in winter 52.60% followed by autumn (37.55%), summer (37.47%) and rainy season (32.42%). Among viral diseases, prevalence of PPR was highest 8.52% followed by FMD (6.81%), goat pox (2.68%), contagious ecthyma (1.76%) and rabies (0.25%). The prevalence of peste des petits ruminants (PPR) was highest in winter (15.86%). The prevalence of pneumonia was highest 8.71% in whole year among the bacterial diseases. The prevalence of fungal disease (ringworm) was 1.44% in goat. The prevalence of trematodiasis was 12.60% followed by nematodiasis (11.27%), babesiosis (2.18%), tape worm infection (2.03%) and coccidiosis (1.19%). The prevalence of ecto-parasitic diseases was 12.06% .The prevalence of trematodiasis was highest in rainy season (18.01%). The prevalence of babesiosis was highest in summer (3.81%) and coccidiosis in winter (3.81%). The prevalence of ecto-parasitic diseases was lowest in winter (8.88%). The results of the present study will be helpful for scientists, extension service providers and veterinary practitioners for designing appropriate control measures for such diseases of goat.

Keywords: prevalence; parasitic diseases; infectious diseases; survey; goat

1. Introduction

Small ruminants especially goat is very important in rural economy and nutrition and has the potentially of using it as a tool for poverty reduction in Bangladesh. Goats, as far as known, were probably the first domesticated animals (Herre and Rohrs, 2001). Goats are one of the most important livestock species in Bangladesh, which is known as poor man's cow. Generally goats are raised by poor farmers and distressed

women with very little capital investment. Livestock diseases not only cause huge losses in the farmer's level but also can affect country's economy (Hussain, 1999). Bangladesh possesses 20.75 million goats at present (DLS, 2007). Goat significantly contributes to the national GDP through the production of 130000 MT of meat, 1312000 of MT milk and 391000 of MT Skin each year (FAO, 2003). Black bengal goats are highly preferred because of their high quality meat and skin in this country, as in other countries of the world. Farmers are interested in rearing goats due to their polite behavior, low food intake, highest fertility rate and multiple kids. The black bengal goat is a famous goat breed in the world. It is well known for high fertility, fecundity and excellent skin quality.

Goat is well recognized as a tool of poverty alleviation (Faruque *et al.*, 2010). Rural people rear more than 98% of total goats in Bangladesh. Goat meat is widely acceptable in our country and has a good market share, but its milk has only a very small market share and has been consumed more as a medicine than as food (Son, 1999). About 65% of the total populations in Bangladesh are poverty stricken and about 55% farmer having no or very little land for their homestead only (FAO, 1990). For rearing goats, a minimum investment of money is often required, even without specific arrangement of housing, grazing on barren and road-side grass land and least homemade supplied feed (rice gruel, boiled rice, skins of vegetables etc.). In addition, goats are fed on leaves of jackfruits, which is available in most of the rearing areas. The higher demands for meat and especially for skin in the local as well as foreign markets focused the goat enterprise extremely prominent to the vulnerable group of people and the existing socio-economic condition of the country (Hassan *et al.*, 2011). Medium and large farmers interested in commercial goat farming are managed either in intensive or semi intensive conditions. The system of goat rearing inherently incurs different diseases which intern reduces profitability of farming by treatment costs, reducing productivity and by mortality (Singh and Prasad, 2008).

Viral diseases like peste des petits ruminants (PPR), goat pox, contagious ecthyma, foot and mouth disease (FMD) and rabies, and bacterial diseases such as pneumonia, tetanus, enterotoxaemia, foot rot, mastitis, black quarter and colibacillosis, and fungal diseases like ring worm infection were common causes for goat mortality in rural areas. Parasitism is an important limiting factor that responsible for deteriorating the health and productivity of livestock. The agro-ecological and geo-climatic conditions of Bangladesh are highly favorable for the growth and multiplication of parasites. As a result about 50% apparently healthy population has been demonstrated to be affected with different species of parasites (Garrels, 1975). The greatest losses associated with parasite infections are sub-clinical, and economic assessments have showed that financial costs of internal parasitism are enormous (McLeod, 1995). Parasitic diseases like trematodiasis, nematodiasis, tape worm infection, babesiosis, coccidiosis, tick and mite infection causes less mortality but cause severe depression in the growth and reproductive rate of the goat. Lack of proper care and overall faulty husbandry practices are also responsible for higher goat mortality in the prevailing production system (Ndegwa *et al.*, 2001). Castration is one of the management activities practiced in different parts of the country. Uncastrated and sexually mature goats are difficult to sell or they may have low market price because of their strong male taint. Castrations also affect growth and carcass composition (Kebede *et al*., 2008).

It is an easy and profitable system of goat rearing to alleviate poverty, unemployment and generate income for the rural people. Considering the above situations, the present study has improve the primary knowledge about animal heath, diseases and management of goat rearing farmers for effective and economic goat farming. Therefore, the study was designed to investigate the prevalence of important parasitic and infectious diseases of goats in different season at Babugonj upazilla, Barisal.

2. Materials and Methods

2.1. Socio-economic survey
A local level socio-economic survey of destitute women and marginal/poor farmers who rear goat were selected Babugonj upazilla of Barisal district of Bangladesh. 50 different type's data (information) were collected using a semi-structured questionnaire on their household from each 200 women and farmers.

2.2. Study area and time
The study was carried out in Veterinary Clinic, Faculty of Animal Science and Veterinary Medicine (FANSVM), Patuakhali Science and Technology University (PSTU) and Upazilla Veterinary Hospital (UVH), Babugonj, Barisal during the period of June, 2014 to May, 2015.

2.3. Sample size
During this study period a total of 6799 goats were examined at whole year (June, 2014 to May, 2015) from which the prevalence of important parasitic and infectious diseases were diagnosed. Among them, the number of goat in rainy seasons (June-August), autumn (September-November), winter (December-February) and summer (March-May) were 2221, 1454, 1576 and 1548, respectively.

2.4. Diagnosis of diseases
The diseases were diagnosed on basis of clinical signs, owner's statement, general clinical examinations and laboratory diagnosis.

2.4.1. Owner's statement
Information of goats was recorded according to age, sex, breed, months and seasons were also recorded by carefully asking questions to the owner or farmers.

2.4.2. Clinical signs
Goat diseases were diagnosed on basis of clinical signs as described by Samad (2001).

2.4.3. General clinical examination
Examination of different parts and systems of the body of sick animals were performed by using the procedure of palpation, percussion, auscultation, needle puncture and walking of animals.

2.4.4. Laboratory diagnosis
Parasites were identified according to the keys given by Rahman *et al*. (1996) and Soulsby (1986). Blood smears were prepared and examined under microscope after Giemsa's staining according to the methods described elsewhere to confirm hemoprotozoan infestation (Hendrix and Robinson, 2006).

3. Results and Discussion
3.1. Socio-economic characteristics of destitute women and poor farmers rearing goat
The socio-economic characteristics of the respondents were shown in Table 1. From the data generated from the field survey, and the frequency distribution of the respondents (200) according to sex, marital status, educational qualification and occupation. 70% of the respondents were females while 30% were males. This implies that women constitute a greater percentage of those involved in goat rearing in the study area. Similar observation was also found by Rokonuzzaman and Islam (2009). It was revealed that the majority (71%) of the respondents were married. 16%, 9% and 4% of the respondents were unmarried, divorced and widowed, respectively. Goat farming was less laborious than other root and tuber crops and did not require a lot of physical strength. 27% of the farmers had no formal education (illiterate), while only 35% attended primary school followed by able to sign (17%), secondary (14%), higher secondary (5%) and graduate (2%). Out of the 200 respondents 65% were involved in agriculture (farmer), 13% in own business, 3% in shared business, 2% in govt. service and 17% in non-govt. service. The present finding was in agreement with the works of Rokonuzzaman and Islam (2009) and Nandi *et al*. (2011).

3.2. Factors associated with destitute women and poor farmers rearing goat
Table 2 shows the factors associated with destitute women and poor farmers rearing goat. Most of the farmers had not proper knowledge which implies that was not costless but requires investment. Lack of knowledge might be regarded as a factor causing inefficiency. From this study, Data collected from 200 women and farmers, among them 39% have knowledge about signs of health of goat, 74% have knowledge about management, 24% have knowledge about any diseases of goat, 20% have knowledge about veterinary drugs. 14% women and farmers know vaccine used for the prevention and control of different infectious diseases. About 6% respondents have training on goat rearing. Similar observation was also found by Rokonuzzaman and Islam (2009). Only 13% have knowledge about biosecurity. Few respondents had know about mass media. Respondents listened radio programme on livestock (14%) and goat farming (11%). Respondents showed television programme on livestock (32%) and goat farming (23%). This findings supported by the earlier works of Rokonuzzaman and Islam (2009). Farmers kept their animals in a separate house. Most of the house were kaçha (53%) followed by tin (41%) and pukka (2%). The present finding was in agreement with the works of

Nandi *et al.* (2011). Both extensive and semi-intensive feeding systems were practiced reported by the respondents for goat farming. Goat received feed from own fodder areas for supply and allow grazing (52%), purchase concentrate (5%) and both (43%). Similar observation was also found by Rokonuzzaman and Islam (2009). Respondents used tube-well (24%), river (18%), canal (26%) and ponds (32%) as the source of water for their goat.

Table 1. Distribution of destitute women and poor farmers rearing goat according to their sex, marital status, educational qualification and occupation.

Parameters	Frequency	Percentage (%)
Sex		
Male	60	30
Female	140	70
Marital status		
Single/unmarried	32	16
Married	142	71
Divorced	18	9
Widowed	8	4
Educational qualification		
Illiterate	54	27
Able to sign	34	17
Primary	70	35
Secondary	28	14
Higher Secondary	10	5
Graduate	4	2
Occupation		
Farmer	130	65
Own business	26	13
Shared business	6	3
Govt. Service	4	2
Non-Govt. Service	34	17

Table 2. Factors associated with destitute women and poor farmers rearing goat.

Parameters	Numbers of respondents (n = 200)	Per cent of total respondents (n = 200)
Knowledge		
Signs of health of goat	78	39
Management	148	74
Goat diseases	48	24
Veterinary drugs	40	20
Animal vaccine	28	14
Biosecurity	26	13
Training on goat rearing	12	6
Mass Media		
Radio programme on livestock	28	14
Radio programme on goat farming	22	11
Television programme on livestock	64	32
Television programme on goat farming	46	23
Animal housing		
Natural Roof/Kacha (Bamboo/Chon/Wood)	106	53
Rudimentary Roof/Tin	82	41
Finished Roof (Pukka/Cement/Concrete)	4	2
Other	8	4
Source of drinking water		
Tube well	48	24

Parameters	Numbers of respondents (n = 200)	Per cent of total respondents (n = 200)
River	36	18
Canal	52	26
Pond	64	32
Source of feed		
Own fodder areas for supply and allow grazing	104	52
Purchase concentrate	10	5
Both (Party supported from own sources and party purchase	86	43

Table 3. Prevalence of infectious and parasitic diseases in goat in Babugonj thana of Barisal district during different seasons.

Diseases	Prevalence percentage (Total case-6799)				
	Whole year	Rainy season	Autumn	Winter	Summer
Infectious Diseases	39.34	32.42	37.55	52.60	37.47
Parasitic Diseases	41.33	51.28	41.61	27.98	40.37
Other Diseases	19.33	16.30	20.84	19.42	22.16

Table 4. Prevalence of various diseases in goat in Babugonj thana of Barisal district during different seasons.

Diseases	Prevalence percentage (Total case-6799)				
	Whole year	Rainy season	Autumn	Winter	Summer
Viral Diseases	20.02	15.13	18.71	27.79	20.35
Peste des petits ruminants	8.52	5.04	7.57	15.86	6.91
Goat pox	2.68	1.31	2.34	3.43	4.20
Contagious ecthyma	1.76	1.22	2.06	2.09	1.94
Foot and mouth disease	6.81	7.34	6.53	6.09	7.04
Rabies	0.25	0.23	0.21	0.32	0.26
Bacterial Diseases	17.88	16.52	18.02	21.38	16.15
Pneumonia	8.71	7.61	8.32	12.56	6.72
Tetanus	1.01	0.77	1.03	1.21	1.16
Enterotoxaemia	0.96	0.68	1.24	0.89	1.16
Foot rot	1.31	1.85	1.17	1.02	0.97
Mastitis	2.22	1.94	2.54	2.22	2.33
Black quarter	0.63	1.22	0.21	0.38	0.45
Colibacillosis	3.04	2.48	3.51	3.11	3.36
Fungal disease	1.44	0.77	0.83	3.43	0.97
Ringworm	1.44	0.77	0.83	3.43	0.97
Endo-parasitic diseases	29.27	38.68	28.06	19.10	27.26
Trematodiasis	12.60	18.01	12.24	6.85	11.05
Nematodiasis	11.27	16.16	11.00	6.15	9.69
Tape worm infection	2.03	2.79	2.27	0.51	2.26
Babesiosis	2.18	1.40	2.06	1.78	3.81
Coccidiosis	1.19	0.32	0.48	3.81	0.45
Ecto-parasitic diseases	12.06	12.61	13.55	8.88	13.11
Tick and mite infection	12.06	12.61	13.55	8.88	13.11
Other diseases	19.33	16.30	20.84	19.42	22.16
Milk fever	0.51	0.45	0.55	0.57	0.52
Pregnancy toxaemia	0.46	0.41	0.48	0.44	0.52
Bloat	1.78	2.57	0.96	1.21	2.00
Castration	14.15	10.31	17.26	15.67	15.18
Gid disease	1.66	2.03	0.76	0.70	2.97
Urolithiasis	0.76	0.54	0.83	0.82	0.97

3.3. Prevalence of common parasitic and infectious diseases of goat

The prevalence of parasitic and infectious diseases in goat was shown in the Table 3. The prevalence of parasitic diseases was highest in goat followed by infectious diseases and other diseases. The prevalence of parasitic diseases was 41.33% (rainy season-51.28%, autumn-41.61%, winter-27.98% and summer-40.37%). The prevalence of infectious diseases and other diseases were 39.34% (rainy season-32.42%, autumn-37.55%, winter-52.60% and summer-37.47%) and 19.33% (rainy season-16.30%, autumn-20.84%, winter-19.42% and summer-22.16%), respectively. The higher prevalence of parasites of goat in Bangladesh was also in agreement with the findings of Parvez *et al*. (2014) and Alam *et al*. (2015).

The prevalence of various diseases in goat was shown in the Table 4. Viral diseases (peste des petits ruminants, goat pox, contagious ecthyma, foot and mouth disease and rabies), bacterial diseases (pneumonia, tetanus, enterotoxaemia, foot rot, mastitis, black quarter and colibacillosis) and fungal diseases (ring worm infection) were common causes for goat mortality in the study areas. The prevalence of viral diseases was 20.02% (rainy season-15.13%, autumn-18.71%, winter-27.79% and summer-20.35%). Among viral diseases of goats, prevalence of peste des petits ruminants (PPR) was highest 8.52% (rainy season-5.04%, autumn-7.57%, winter-15.86% and summer-6.91%) followed by foot and mouth disease (FMD)-6.81% (rainy season-7.34%, autumn-6.53%, winter-6.09% and summer-7.04%), goat pox-2.68% (rainy season-1.31%, autumn-2.34%, winter-3.43% and summer-4.20%), contagious ecthyma-1.76% (rainy season-1.22%, autumn-2.06%, winter-2.09%, and summer-1.94%) and rabies-0.25% (rainy season-0.23%, autumn-0.21%, winter-0.32% and summer-0.26%), respectively. The prevalence of peste des petits ruminants (PPR) was highest in winter. Nath *et al*. (1995) observed PPR was found highest in winter season in goat. The similar findings were also reported by Sarker and Islam (2011). The prevalence of bacterial diseases was 17.88% (rainy season-16.52%, autumn-18.02%, winter-21.38% and summer-16.15%). Among bacterial diseases of goats, prevalence of pneumonia was highest 8.71% (rainy season-7.61%, autumn-8.32%, winter-12.56%, and summer-6.72%) followed by colibacillosis-3.04% (rainy season-2.48%, autumn-3.51%, winter-3.11% and summer-3.36%), mastitis-2.22% (rainy season-1.94%, autumn-2.54%, winter-2.22% and summer-2.33%), foot rot-1.31% (rainy season-1.85%, autumn-1.17%, winter-1.02% and summer-0.97%), tetanus- 1.01% (rainy season-0.77%, autumn-1.03%, winter-1.21%, and summer-1.16%), enterotoxaemia-0.96% (rainy season-0.68%, autumn-1.24%, winter-0.89% and summer-1.16%) and black quarter-0.63% (rainy season-1.22%, autumn-0.21%, winter-0.38% and summer-0.45%), respectively. The prevalence of fungal disease (ringworm) was 1.44% (rainy season-0.77%, autumn-0.83%, winter-3.43% and summer-0.97%) in goat.

Endo-parasitic diseases (trematodiasis, nematodiasis, tape worm infection, babesiosis and coccidiosis) and ecto-parasitic diseases (tick and mite infection) causes less mortality but affect body growth and reproduction of goat. The prevalence of endo-parasitic diseases was 29.27% (rainy season-38.68%, autumn-28.06%, winter-19.10% and summer-27.26%). Among endo-parasitic diseases of goats, the prevalence of trematodiasis was 12.60% (rainy season-18.01%, autumn-12.24%, winter-6.85% and summer-11.05%) followed by nematodiasis-11.27% (rainy season-16.16%, autumn-11.00%, winter-6.15% and summer-9.69%), babesiosis-2.18%, (rainy season-1.40%, autumn-2.06%, winter-1.78% and summer-3.81%), tape worm infection-2.03%, (rainy season-2.79%, autumn-2.27%, winter-0.51% and summer-2.26%) and coccidiosis-1.19% (rainy season-0.32%, autumn-0.48%, winter-3.81% and summer-0.45%), respectively. The prevalence of ecto-parasitic diseases was 12.06% (rainy season-12.61%, autumn-13.55%, winter-8.88%, and summer-13.11%). The prevalence of trematodiasis and nematodiasis was highest in rainy season followed by autumn, summer and winter. Talukder *et al.* (2010) stated that goats were more infected in rainy than in summer and winter seasons. This observation appeared in agreement with the earlier report of Selim *et al*. (1997) and Amin *et al*. (2009). The prevalence of babesiosis was highest in summer and coccidiosis in winter. The prevalence of ecto-parasitic diseases was lowest in winter. Besides parasitic and infectious diseases, farmer visited the hospitals for castration of goat.

4. Conclusions

Goat rearing can play a vital role in poverty elevation, creation of self employment opportunities in rural areas and animal protein supply. The small scale goat rearing programme is a profitable venture because there was no competition to major crop production in using family labour and land resources. Goat rearing made additional income and generate the employment for household members, especially the unemployed family members like housewife, children and old persons. Women in our country belong to conservative society who face different sorts of social obstacle to rear goat. So, there is a need for strengthening extension work to ensure a continuous flow of information to overcome these sorts of social obstacle in goat rearing. Parasitic and infectious diseases

in goat cause serious economic losses and also markedly decrease the production of the infected animals. Regular vaccination and proper surveillance and monitoring can eradicate those diseases. Based on the results obtained from the present study, improvement of husbandry practices, regular deworming and immunization programme is suggested.

Conflict of interest
None to declare.

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