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Article Information

Received: January 6, 2022

Accepted: January 28, 2022

Published: February 5, 2022

**Running title:** Surgical affections in goats

Keywords

Chuadanga, Goat, Prevalence, Risk factors, Surgical affections.

Authors' Contribution

AS and RAR conceived and designed the study; AS collected and analyzed data; AS and RAR performed experiments. RAR and MMR supervised the study. AS, MAA, MMR, and RAR wrote, revised, and edited the paper and RAR gave final approval for publication.

How to cite

Salam, A., Akter, M.A., Rahman, M.M., Runa, R.A., 2022. Prevalence of Surgical Affections and their Risk Factors in Goats in Selected Upazilas of Chuadanga District, Bangladesh. PSM Vet. Res., 7(1): 1-10.

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## Prevalence of Surgical Affections and their Risk Factors in Goats in Selected Upazilas of Chuadanga District, Bangladesh

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**Abstract:**

Surgical affections are frequent in goats, and they have a significant detrimental impact on the animals' development, production, and survivorship, resulting in significant financial losses. The current study assessed the prevalence of surgical affections and the risk factors associated with the occurrence of surgical affections in goats at Alamdanga and Chuadanga Sadar Upazila in Chuadanga district. The surgical affections were classified on the basis of age, sex, seasons, and breed. Simple descriptive statistics were applied to analyze the data. The prevalence of castration was higher among all the surgical affections in both Upazilas. The other common surgical affections were subcutaneous cysts (11.65% and 13.59%), fractures (9.71% and 10.68%), myiasis (9.71% and 8.35%), and wounds (7.77% and 8.74%), followed by an abscess (5.83% and 4.08%), gid disease (3.88% and 2.91%), overgrowth of the hoof (3.88% and 2.52%), navel ill (1.94% and 2.91%), atresia ani (2.91% and 2.33%), and dog bite (1.94% and 1.17%) in Alamdanga and Chuadanga Sadar Upazila, respectively. Gangrenous mastitis was very low in both Upazilas which was 1.94% only. In both Upazilas, the navel ill and castration were more in young goats, whereas gangrenous mastitis, overgrown hoofs, and gid disease were greater in adult goats. According to sex variation, gid disease was more in females, and sub-cutaneous cysts navel ill and atresia ani were in male goats. The surgical affections were highest in summer (44.66% and 40.97%), followed by the rainy season (27.77% and 30.87%) and winter (27.57% and 28.16%) in Alamdanga and Chuadanga Sadar Upazila, respectively. In this study, a higher occurrence of all surgical affections was found in Black Bengal goats compared to Jamunapari in both Upazilas. This present study will help to understand the prevalence of various surgical conditions in this field, depending on age, sex, breed, and season, which will help to reduce the number of surgical conditions in goats in these areas.



## INTRODUCTION

The majority of goat varieties are found in the tropics and sub-tropics. Black Bengal Goat comprises of the major portion of the total goat population (Islam *et al.*, 2020). More than 90% of the goats in Bangladesh are kept by rural people. Economically and culturally, goat has been playing important role in Bangladesh. Goat husbandry is becoming an attractive activity mainly among the poor women (Choudhury *et al.*, 2013). The limitations in the development of this species in Bangladesh are some fatal diseases like gid, urolithiasis, PPR, bloat etc.

Surgical diseases in animals are very often associated with defects in the leather quality, decrease in production performances and even death of the animals (Juyena *et al.*, 2014). In Bangladesh a considerable number of surgical affections are found in goats. Castration, gid disease, sub cutaneous cyst, abscess, myiasis, fracture, hoof deformity, open wound etc. are the common acquired surgical affections. Mostly adult goats are affected with these diseases. Other surgical affection may be complication of castration, malicious wound, hematoma due to traumatic injury, injury at the cornea, foot abscess and some congenital surgical defects are also found in goats. A mutant gene, chromosomal aberrations or a recessive gene are claimed to be responsible for these congenital defects (Omoike, 2009).

Given the economic importance of goats in Bangladesh, as well as the deleterious effects of surgical affections on their production and reproduction, this study is aimed to determine the prevalence of surgical diseases and disorders and to investigate the risk factors (breed, age, sex and season) associated with the occurrence of surgical affections in goat at Alamdanga Upazila and Chuadanga Sadar Upazila in Chuadanga district, Bangladesh.

## MATERIALS AND METHODS

### Study Location and Duration

This study was designed to determine the surgical affections of goat at Alamdanga and Chuadanga Sadar Upazila, Bangladesh during the period from January 2016 to December 2020. All animals were brought to Upazila Veterinary Hospital with the complaints of surgical affections.

### Collection of Retrospective Data

A total 1030 (515 from Alamdanga and 515 from Chuadanga Sadar Upazila) retrospective data were collected from the clinical datasheet of each Upazila Veterinary Hospital. The history of each case, data regarding species, age, sex, breed, season and surgical disorders were obtained from the data sheet recorded by the hospital authority during the study period and also directly from the owners.

### Study Designs and Sampling Strategy

The recorded surgical diseases of animals were classified based on the breed (Black Bengal and Jamunapari), age (< 1 year and > 1 year), sex (male and female) and season (summer, rainy and winter). Based on the climatic feature of the country round the year, we categorized the season into 3: summer (March to June); rainy (July to October); winter (November to February). The distribution of surgical disorders was evaluated by observing the date of the cases recorded.

### Data Arrangement and Analysis

The data obtained from the case record, were organized in the Microsoft Excel spread sheet and percentages of surgical disorders in different breeds, age, sex and seasons were calculated. The collected data were coded, scored, compiled, tabulated and analyzed in accordance with the objective. The prevalence of surgical attachments was estimated as the specific cases of surgical affections divided by the total number of infected animals  $\times 100$ .

## RESULTS

### Overall Occurrences of Surgical Affections

The overall occurrence of various surgical affections of goats in Alamdanga and Chuadanga Sadar upazila are presented in Figures 1 and 2, respectively. The highest number of surgical affection found in both upazila was castration. The occurrence of castration was 38.83% in Alamdanga upazila and 40.78% in Chuadanga Sadar upazila. The

incidence of other common surgical affections was subcutaneous cyst (11.65% and 13.59%), fracture (9.71% and 10.68%), myiasis (9.71% and 8.35%), wound (7.77% and 8.74%), followed by abscess (5.83% and 4.08%), gid disease (3.88% and 2.91%), overgrowth of hoof (3.88% and 2.52%), navel ill (1.94% and 2.91%), atresia ani (2.91% and 2.33%), and dog bite (1.94% and 1.17%) in Alamdanga and Chuadanga Sadar upazila, respectively. Gangrenous mastitis was very low in both upazila which was 1.94% only.

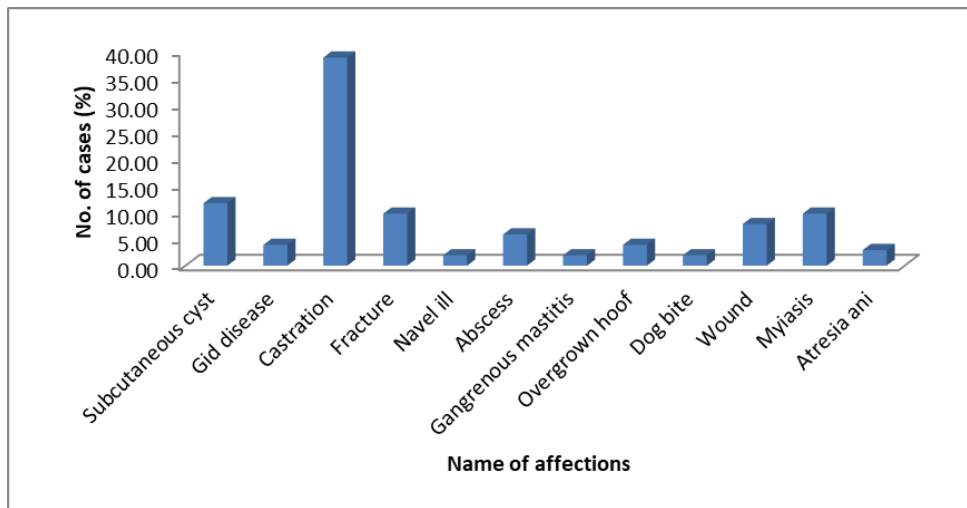


Fig. 1. Occurrence of most common surgical affections at Alamdanga Upazila (n =515).

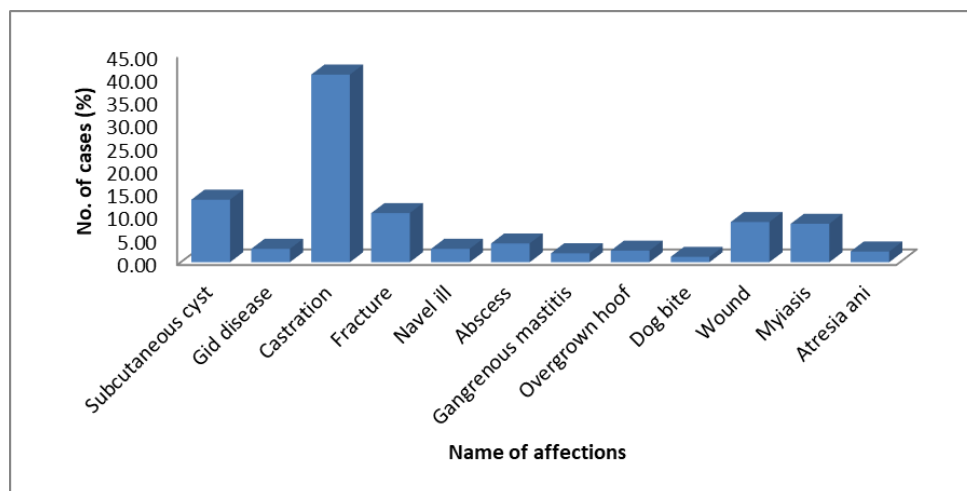


Fig. 2. Occurrence of most common surgical affections at Chuadanga Sadar Upazila (n =515).

### Surgical Affections of Goats According to Age and Sex

Surgical affections of goats according to age and sex are presented in the Tables 1 and 2. Myiasis occurrence in male goats was 36% and female was 64% in Alamdanga, whereas it was 25.58% in male goats and 74.42% in female in Chuadanga Sadar upazila. According to age the rate of myiasis was 40% and 18.60% in young and 60% and 81.40% in adult, respectively in Alamdanga and Chuadanga Sadar upazila. Gid disease occurred mostly observed in female

goats (70% in Alamdanga and 73.33% in Chuadanga Sadar) than male. According to age the adult goats (75% in Alamdanga and 73.33% in Chuadanga Sadar) are more prone to gid disease than young. Abscess is common for both male and female of any age and only young goats are affected with navel ill. Atresia ani occurred only in young goats and the rate varied according to the sex. In case of subcutaneous cyst, fracture, wound, overgrown hoof and dog bite, the sex and age variation are minor and only adult female goats are affected with gangrenous mastitis.

**Table 1.** Occurrence of surgical affections in goat at Alamdanga Upazila according to age and sex.

Name of affections	No. of cases	No. of cases (%)	Occurrence (%)			
			Age		Sex	
			Young (%)	Adult (%)	Male (%)	Female (%)
Subcutaneous cyst	60	11.65	66.67	33.33	58.33	41.67
Gid disease	20	3.88	25.00	75.00	30.00	70.00
Castration	200	38.83	90.00	10.00	100.00	0.00
Fracture	50	9.71	60.00	40.00	70.00	30.00
Navel ill	10	1.94	100.00	0.00	70.00	30.00
Abscess	30	5.83	40.00	60.00	46.67	53.33
Gangrenous mastitis	10	1.94	0.00	100.00	0.00	100.00
Overgrown hoof	20	3.88	25.00	75.00	35.00	65.00
Dog bite	10	1.94	41.00	59.00	31.00	69.00
Wound	40	7.77	42.50	57.50	62.50	37.50
Myiasis	50	9.71	40.00	60.00	36.00	64.00
Atresia ani	15	2.91	100.00	0.00	66.67	33.33
Total	515					

**Table 2.** Occurrence of surgical affections in goat at Chuadanga Sadar Upazila according to age and sex

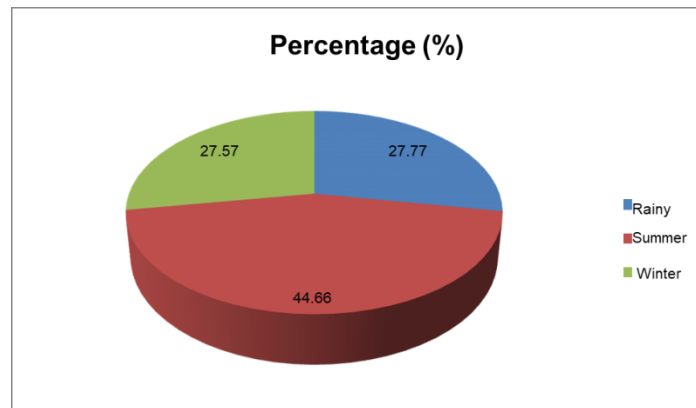
Name of affections	No. of cases	No. of cases (%)	Occurrence (%)			
			Age		Sex	
			Young (%)	Adult (%)	Male (%)	Female (%)
Subcutaneous cyst	70	13.59	61.43	38.57	65.71	34.29
Gid disease	15	2.91	26.67	73.33	21.83	78.17
Castration	210	40.78	92.86	7.14	100.00	0.00
Fracture	55	10.68	72.73	27.27	77.73	22.27
Navel ill	15	2.91	100.00	0.00	60.00	40.00
Abscess	21	4.08	38.10	61.90	43.10	56.9
Gangrenous mastitis	10	1.94	0.00	100.00	0.00	100.00
Overgrown hoof	13	2.52	0.00	100.00	30.77	69.23
Dog bite	6	1.17	66.67	33.33	38.54	61.46

Wound	45	8.74	35.56	64.44	33.33	66.67
Myiasis	43	8.35	18.60	81.40	25.58	74.42
Atresia ani	12	2.33	100.00	0.00	66.67	33.33
Total	515					

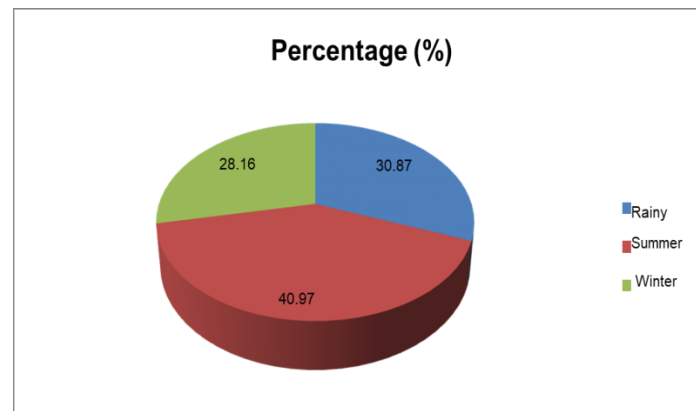
**Surgical Affections of Goats according to Season**

The overall prevalence of surgical affections according to the season was highest in Summer

(44.66% and 40.97%) followed by rainy season (27.77% and 30.87%) and winter (27.57% and 28.16%) in Alamdanga and Chuadanga Sadar upazila, respectively (Figures 3 and 4).



**Fig. 3.** Overall occurrences according to the season in Alamdanga Upazila.



**Fig. 4.** Overall occurrences according to the season in Chuadanga Sadar Upazila.

The occurrence of castration in Alamdanga was 45% in summer, 25% in rainy season, 30% in winter and in case of Chuadanga Sadar upazila, 52.38% in summer, 21.43% in rainy season, and 26.19% in winter. Subcutaneous cyst may affect all over the year but the rate of infection in

Alamdanga is higher in summer whereas higher rate was observed in rainy season (60%) in Chuadanga Sadar. The effect of season on abscess, overgrown hoof, wound and atresia ani was negligible. Gid disease mostly occurred in rainy season (60% and 53.33%) in Alamdanga

and in Chuadanga Sadar upazila, respectively. In both upazila, fracture occurred at any season, however, mostly in summer (60% in Alamdanga and 69.09% in Chuadanga Sadar upazila). The incidence of navel ill was 30% in rainy season, 50% in summer and 20% in winter at Alamdanga and 20% in rainy season, 53.33 % in summer and 26.67 % in winter at Chuadanga Sadar

upazila. Dog bite was high in summer season in both upazilas (60% and 50%). In Alamdanga, the occurrence of myiasis was 36%, 40% and 24% in rainy season, summer and winter, respectively and 46.51%, 41.86% and 11.63% in Chuadanga Sadar upazila. In case of gangrenous mastitis, the occurrence was 60% in summer at both upazilas (Tables 3 and 4).

**Table 3.** Effects of seasons on surgical affections of goat at Alamdanga Upazila.

Name of affections	No. of cases	No. of cases (%)	Seasonal Occurrence (%)		
			Rainy (%)	Summer (%)	Winter (%)
Subcutaneous cyst	60	11.65	33.33	41.67	25.00
Gid disease	20	3.88	60.00	15.00	25.00
Castration	200	38.83	25.00	45.00	30.00
Fracture	50	9.71	20.00	60.00	20.00
Navel ill	10	1.94	30.00	50.00	20.00
Abscess	30	5.83	23.33	50.00	26.67
Gangrenous mastitis	10	1.94	20.00	60.00	20.00
Overgrown hoof	20	3.88	30.00	40.00	30.00
Dog bite	10	1.94	0.00	60.00	40.00
Wound	40	7.77	30.00	45.00	25.00
Myiasis	50	9.71	36.00	40.00	24.00
Atresia ani	15	2.91	20.00	26.67	53.33
Total	515				

**Table 4.** Effects of seasons on surgical affections of goat at Chuadanga Sadar Upazila.

Name of affections	No. of cases	No. of cases (%)	Seasonal Occurrence (%)		
			Rainy (%)	Summer (%)	Winter (%)
Subcutaneous cyst	70	13.59	60.00	11.43	28.57
Gid disease	15	2.91	53.33	20.00	26.67
Castration	210	40.78	21.43	52.38	26.19
Fracture	55	10.68	14.55	69.09	16.36
Navel ill	15	2.91	20.00	53.33	26.67
Abscess	21	4.08	28.57	47.62	23.81
Gangrenous mastitis	10	1.94	30.00	60.00	10.00
Overgrown hoof	13	2.52	23.08	46.15	30.77
Dog bite	6	1.17	16.67	50.00	33.33
Wound	45	8.74	33.33	44.44	22.22
Myiasis	43	8.35	46.51	41.86	11.63
Atresia ani	12	2.33	33.33	25.00	41.67
Total	515				

### Surgical Affections of Goats According to Breed

Results presented in Tables 5 and 6 show the effect of breed on various surgical affections in Alamdanga upazila and Chuadanga Sadar upazila, respectively. Among 515 goats there were 366 (71.07%) Black Bengal and only 149

(28.93%) were Jamunapari in Alamdanga upazila. Accordingly, among 515 goats in Chuadanga Sadar upazila there were 406 (78.34%) Black Bengal and only 109 (21.16%) were Jamunapari. Thus the occurrence of all surgical affections was higher in Black Bengal goats compare to Jamunapari breed.

**Table 5.** Effects of breeds on surgical affections (in percentages) of goat at Alamdanga Upazila.

Name of affections	No. of cases	No. of cases (%)	Occurrence (%)	
			Breeds	
			Black Bengal (%)	Jamunapari (%)
Subcutaneous cyst	60	11.65	75.00	25.00
Gid disease	20	3.88	90.00	10.00
Castration	200	38.83	65.00	35.00
Fracture	50	9.71	60.00	40.00
Navel ill	10	1.94	80.00	20.00
Abscess	30	5.83	73.33	26.67
Gangrenous mastitis	10	1.94	80.00	20.00
Overgrown hoof	20	3.88	85.00	15.00
Dog bite	10	1.94	70.00	30.00
Wound	40	7.77	70.00	30.00
Myiasis	50	9.71	96.00	24.00
Atresia ani	15	2.91	86.67	13.33
Total	515			

**Table 6.** Effects of breeds on surgical affections of goat at Chuadanga Sadar Upazila.

Name of affections	No. of cases	No. of cases (%)	Occurrence (%)	
			Breeds	
			Black Bengal (%)	Jamunapari (%)
Subcutaneous cyst	70	13.59	77.14	22.86
Gid disease	15	2.91	73.33	26.67
Castration	210	40.78	85.71	14.29
Fracture	55	10.68	67.27	32.73
Navel ill	15	2.91	73.33	26.67
Abscess	21	4.08	66.67	33.33
Gangrenous mastitis	10	1.94	70.00	30.00
Overgrown hoof	13	2.52	76.92	23.08
Dog bite	6	1.17	66.67	33.33
Wound	45	8.74	77.78	22.22
Myiasis	43	8.35	81.40	18.60
Atresia ani	12	2.33	66.67	33.33
Total	515			

## DISCUSSION

Disease occurrence varies with the species, age, sex of the animal, and season of the year (Samad, 2008). In this study, castration, subcutaneous cyst, fracture, myiasis, infection, abscess, gid disease are the most frequently observed surgical affections in goats. The frequency of castration was found to be highest in this study followed by subcutaneous cysts. In young male animals, castration is primarily performed to enhance the quality of meat and to increase the growth rate. It has been shown that castration decreases many illnesses, and generates goatee smell free meat with more intramuscular fat (Field, 1971). Most of the authors also suggested that the research be accompanied by castration of the kids between 4- 8 weeks of age.

Gid disease occurs most commonly in adult goats, according to this report. The highest incidence of gid in adult animals may be linked to the time of completion of development of the etiological agent in the intermediate host stated by Soulsby (1982). Gid disease occurs predominantly in female animals, particularly in pregnant does. Because the pregnant animals require extra feeding for the fetus and this may demand more grazing and thereby may be more vulnerable to the infection than male. Similar findings were reported by Abera and Abdela, 2016. In this study the occurrence of gid is found high in rainy season. Similar findings also reported by Islam *et al.*, 2020.

Young animals are affected with atresia ani. No gender predilection was found for atresia ani (Azizi *et al.*, 2010). Similarly, no substantial association was observed between gender and the incidence of atresia ani, however, Martens *et al.*, (1995) confirmed that most of their animals with atresia ani were male without statistical examination of the distribution of the sexes.

Navel ill is widespread in neonatal farm animals and appears to be especially prevalent in calves delivered in dirty environments (Ganga *et al.*, 2011; Radostits *et al.*, 2007) which supports our results. According to our report the incidence is

high in males and in the summer season. To endorse our findings, no report is available.

The prevalence of myiasis is 13% in Bangladesh and 18% in Chittagong Hill tract (Sarker *et al.*, 2014) and the occurrence is 9.71% at Alamdanga and 8.35% in Chuadanga Sadar upazila. The occurrence of myiasis is high in case of adult female goat and it is common in all season.

Age, gender and season are not unique to fracture, wound, and overgrown hoof. Due to presence of railway lines and some busy roads near the Upazila Veterinary Hospital, fracture can occur to any goat and at any time. Often, dog bite isn't exclusive to age and sex. But because of their physical vulnerability, young animals are more affected. The frequency of dog bite in this study was high in the summer season, due to extreme temperature and the mating season when dogs become more aggressive.

The study showed that the overall incidence of surgical affections was seen in the summer seasons, followed by the rainy season and, least of all, in the winter season, due to environmental factors. This study is also endorsed by Sarker *et al.*, (2014).

Gangrenous mastitis is a disease in adult females. The prevalence of mastitis in goats affected by the number of birth and lactation stage (Marogna *et al.*, 2012). During the first three months of lactation, gangrenous mastitis occurs sporadically, frequently associated with inadequate milk supply due to goat under feeding and over-vigorous sucking by kids. The incidence of gangrenous mastitis during the summer season was high. But to support our findings, no study is available.

In Bangladesh, the Black Bengal comprises more than 90% of the total goat population; the remaining ones include the Jamunapari and their crosses. As per our report, there are more than 70% of Black Bengal and less than 30% of Jamunapari breed. There is enormous demand of Black Bengal goats around the world due to its high quality hide (Hasan and Talukder, 2011; Shoriotullah *et al.*, 2017).



## CONCLUSION

The temperate environment, humidity, and heavy rainfall have made this region a vulnerable place for the occurrence of surgical affections in goat at Alamdanga Upazila and Chuadanga Sadar Upazila, Chuadanga, Bangladesh. Management practices and housing arrangement significantly affect the occurrence of surgical affections in goat. The present study will be helpful to know the occurrence of various surgical affections in goats in this area based on age, sex, breed and season and to take preventive measure to reduce the incidence of those diseases.

## ACKNOWLEDGMENT

We thank Upazila Livestock Officer and Veterinary Surgeon in Alamdanga and Chuadanga Sadar upazila in Chuadanga district for their cordial help in collecting retrospective data.

## CONFLICT OF INTEREST

Authors have no conflicts of interest to declare.

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