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ORIGINAL ARTICLE

Prevalence of surgical affections of sheep in Mymensingh division of Bangladesh

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Abstract

Background: This study aimed to investigate the occurrence of surgical conditions in sheep and analyze their distribution based on age, sex, sheep, and seasonal variation.

Methods: Retrospective data on surgical conditions in sheep were compiled from Upazila Livestock Offices and Veterinary Hospitals within Mymensingh division between January 2021 and December 2021. Simple descriptive statistics were used for data analysis.

Results: A total of 788 surgical cases in sheep were documented. The predominant surgical conditions observed in sheep included wounds (29.18%), myiasis (15.10%), bloat (14.08%), subcutaneous cysts (12.56%), and foot rot (8.24%). In addition, there were instances of abscesses (6.47%), horn fractures (4.56%), atresia ani (3.93%), dermoid cysts (1.64%), dog bites (1.90%), overgrown hooves (1.52%), and gangrenous mastitis (0.63%). Surgical affections were more prevalent in adult sheep (73.35%) compared to young ones (26.64%). Among adult sheep, myiasis, bloat, subcutaneous cysts, and foot rot showed higher prevalences. In females, myiasis, subcutaneous cysts, bloat, and abscesses occurred more frequently than in male sheep. The occurrence of surgical affections was relatively higher in adult sheep during the rainy season, followed by summer, autumn, and winter during the rainy season followed by summer, autumn, and winter.

Conclusion: The findings of this study highlight the variable demographic distribution of surgical affections in sheep. The observed patterns suggest that the surgical disorders pose a substantial threat to sheep rearing in the study areas.

Keywords: Wound, myiasis, subcutaneous cyst, abscess, foot rot

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Introduction

Sheep are globally renowned for their contribution to meat, milk, and wool production including in Bangladesh (Hassan and Talukder, 2011). The sheep population of Bangladesh was reported to be 3.752 million in 2021 (DLS, 2021). Livestock plays a significant role in the country's GDP, contributing 1.90%, with a growth rate of 3.10%, and the livestock sub-sector contributing 16.52% to the agricultural GDP (DLS, 2021). Over the last 12 years, the annual growth rate of the sheep population has been 5% (FAO, 2011), and approximately 32% of sheep are reared in the Barind, Jamuna basin, and Coastal areas (Hassan and Talukder, 2011).

Traditionally sheep are raised on harvested or fallow lands, roads, canal sides, and also on aquatic weeds and grass in shallow stagnant water (Sultana *et al.*, 2010). Most of the sheep in Bangladesh are indigenous, with a few crossbreds capable of bi-annual lambing. However, surgical diseases in sheep necessitate treatment, either partially or wholly, through manual operative procedures. These conditions represent morbid processes with diverse etiological factors, often non-infectious in nature and involving physical, chemical, and hereditary elements. In many cases, the etiology remains unknown. The development of surgical diseases varies in speed, ranging from slow, as in the case of tumors, to rapid, as seen in bone fractures. Surgical affections may manifest as per-acute, acute, or chronic and may affect any part of the body. Some diseases result in the death of the animal, while others cause temporary or permanent deformity and lameness (Malecki and Coffey, 1987). The economic impact of surgical diseases includes treatment and management costs (Khan *et al.*, 2006; Ali *et al.*, 2019).

Surgical disorders are major contributors to fatality in animals if not treated promptly and pose a substantial threat to the economy. Failure of surgical intervention leaves culling as the only alternative (Islam *et al.*, 2020; Sultana, 2011; Islam *et al.*, 2021). These disorders impede the growth, performance, and economic value of sheep if proper surgical measures are not implemented (Sultana, 2011). Despite their impact, the occurrence of various surgical disorders in sheep is not adequately reported or addressed in Bangladesh.

The objective of the current study was to investigate the prevalence of diverse surgical affections and their distribution based on age, sex, breed, and seasonal variations in the Mymensingh division of Bangladesh.

Materials and methods

Study area and period

This study was designed to describe the surgical affections observed in sheep across the Mymensingh division, including four districts (Mymensingh, Netrakona, Jamalpur, and Sherpur) in Bangladesh. The research spanned from January 2021 to December 2021.

Data collection

A total of 788 cases (260 from Mymensingh, 230 from Jamalpur, 191 from Netrakona, and 107 from Sherpur) were retrospectively gathered from the clinical case records of the Upazila Livestock Offices and Veterinary Hospitals in each district. Data on history, age, sex, season, and details of surgical disorders for each case were extracted from the registered books maintained by the hospital authorities. The recorded surgical disorders in sheep were categorized according to three key factors: sex (Male and Female), age (≤1 year, ≥1 year), and season (Winter - November to February, Summer - March to June, and Rainy - July to October).

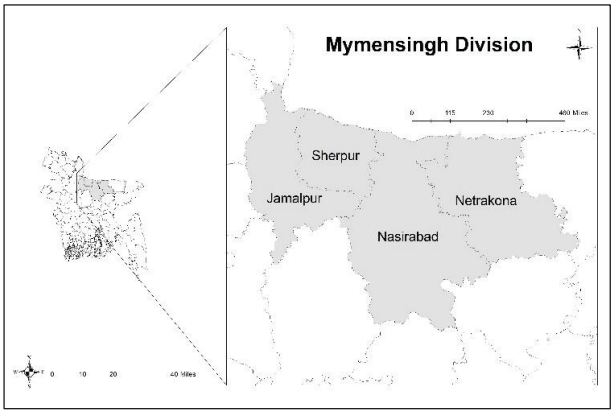

Figure 1. Geographical map indicating study location

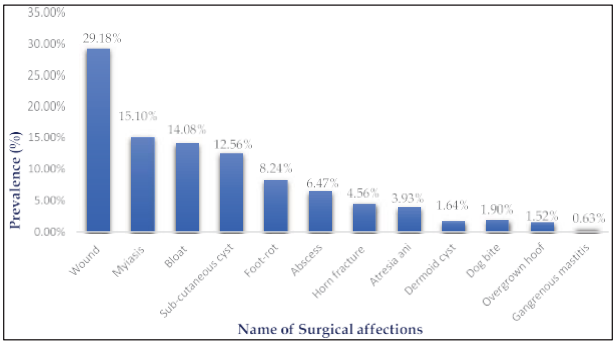

Figure 2. Overall prevalence of various surgical affections of sheep in Mymensingh division

Statistical analysis

The data obtained from the patient register books of each Upazila were entered in the Microsoft Excel spreadsheet. The proportionate prevalences of surgical disorders in different ages, sexes, and seasons were calculated in Microsoft Excel using the following formula:

$$\text{Proportinate prevalence (\%) of surgical disorder} = \frac{\text{Number of specific surgical affection}}{\text{Total number of affections}} \times 100$$

Results

Overall prevalence of surgical affections

This study observed a total of 788 sheep, encompassing various ages and sexes, afflicted with diverse surgical conditions. The prevalence of surgical affections was found to be 32.9%, 29.2%, 24.2%, and 13.6% in Mymensingh, Jamalpur, Netrakona, and Sherpur, respectively. Figure 2 illustrates the occurrence of various surgical affections in sheep across the Mymensingh Division. Wound (29.18%) emerged as the most prevalent condition in all Upazilas. The overall frequency of the most common surgical affections in sheep was as follows: wound (29.18%), myiasis (15.10%), bloat (14.08%), subcutaneous cyst (12.56%), and footrot (8.24%). In addition, abscess (6.47%), horn fracture (4.56%), atresia ani (3.93%), dermoid cyst (1.64%), dog bite (1.90%), overgrown hoof (1.52%), and gangrenous mastitis (0.63%) were noted. Among these, dermoid cyst (1.64%), dog bite (1.90%), overgrown hoof (1.52%), and gangrenous mastitis (0.63%) occurred less frequently across all Upazilas (Figure 2).

The prevalence of wounds was highest in Netrakona at 35.07% (67 out of 191), followed by Sherpur at 29.09% (31 out of 107), Mymensingh at 27.69% (72 out of 260), and Jamalpur at 26.08% (60 out of 230) (Table 1). For myiasis, Netrakona recorded the highest prevalence at 24.60% (47 out of 191), while Mymensingh had the lowest at 9.23% (24 out of 260). The greatest occurrence of bloat was observed in Jamalpur at 17.82% (41 out of 230), while Netrakona had the lowest at 11.51% (22 out of 191). Netrakona, however, reported the highest occurrence of subcutaneous cysts at 14.65% (28 out of 191), with Sherpur having the lowest at 5.60% (6 out of 107) (Table 1). In addition, Jamalpur recorded the highest prevalence of abscess at 8.69% (20 out of 230). Dermoid cysts, dog bites, and atresia ani were predominantly found in Sherpur. In contrast, overgrown hooves and gangrenous mastitis in sheep were exclusively reported in the Mymensingh district (Table 1).

Table 2 presents age-related variations in surgical affections. The study identified a total of 578 cases in adults and 210 in young animals. In Mymensingh, there were 177 cases in adults and 83 in young animals. Jamalpur had 124 cases in adults and 106 in young animals. Netrakona reported 109 cases in adults and 82 in young animals, while Sherpur had 63 cases in adults and 44 in young animals. Regarding myiasis, the incidence rate was lower in young animals and higher in adults across all four study areas: 83.33% in young and 16.67% in adults in Mymensingh; 88.88% in young and 11.12% in adults in Jamalpur; 74.46% in young and 25.54% in adults in Netrakona; and 76.19% in young and 23.81% in adults in Sherpur. For fractures, age-related variation was minor. Bloat prevalence was lower in young animals and higher in adults. Subcutaneous cyst incidence was lower in young animals and higher in adults. Foot rot incidence was lowest in young animals and highest in adults across all four areas: 100% in adults in Mymensingh; 10.52% in young and 89.48% in adults in Jamalpur; 23.52% in young and 76.48% in adults in Netrakona; 20% in young and 80% in adults in Sherpur (Table 2).

Table 1. District-wise distribution of proportionate prevalence of various surgical affections of sheep in Mymensingh Division.

Name of Surgical affections	**No. of surgical affect ons (total case (%))**				**Total**	**Overall prevalence (*N* = 788)**
	Mymensingh	Jamalpur	Netrakona	Sherpur		
Wound	72 (31.3)	60 (26.08)	67 (29.13)	31 (13.47)	230	29.18%
Myiasis	24 (20.19)	27 (22.68)	47 (39.49)	21 (17.64)	119	15.10%
Bloat	32 (28.82)	41 (36.93)	22 (19.81)	16 (14.41)	111	14.08%
Sub cutaneous cyst	33 (33.33)	32 (32.32)	28 (28.28)	6 (6.06)	99	12.56%
Foot-rot	19 (29.23)	19 (29.23)	17 (26.15)	10 (15.38)	65	8.24%
Abscess	18 (35.29)	20 (39.21)	5 (9.80)	8 (15.6)	51	6.47%
Horn fracture	20 (55.55)	16 (44.44)	0	0	36	4.56%
Atresia ani	11 (35.48)	11 (35.48)	3 (9.67)	6 (19.35)	31	3.93%
Dermoid cyst	7 (53.84)	0	2 (15.38)	5 (38.46)	13	1.64%
Dog bite	7 (46.46)	4 (26.66)	0	4 (26.66)	15	1.90%
Overgrown hoof	12 (100)	0	0	0	12	1.52%
Gangrenous mastitis	5 (100)	0	0	0	5	0.63%
Total cases	260	230	191	107	788	100%
Overall prevalence (%)	32.9	29.2	24.2	13.6		

Table 2. Age-wise distribution of proportionate prevalence of surgical affections in sheep at Mymensingh, Jamalpur, Netrakona, and Sherpur districts.

Surgical affections	**Proportionate prevalence (%)**							
	Mymensingh		Jamalpur		Netrakona		Sherpur	
	Young	Adult	Young	Adult	Young	Adult	Young	Adult
Wound	21 (30)	51 (70)	15 (25)	45 (75)	26 (38.80)	41 (61.2)	10 (32.25)	21 (67.75)
Sub-cutaneous cyst	8 (24.24)	25 (75.76)	6 (18.75)	26 (81.25)	8 (28.57)	20 (71.43)	2 (33.33)	4 (66.67)
Bloat	4 (12.5)	28 (87.5)	34 (82.92)	7 (17.08)	4 (18.18)	18 (81.82)	4 (25)	12 (75)
Myiasis	20 (83.33)	4 (16.67)	24 (88.88)	3 (11.12)	35 (74.46)	12 (25.54)	16 (76.19)	5 (23.81)
Horn fracture	5 (25)	15 (75)	5 (31.25)	11 (68.75)	0	0	0	0
Foot-rot	(0)0	19 (100)	2 (10.52)	17 (89.48)	4 (23.52)	13 (76.48)	2 (20)	8 (80)
Abscess	6 (33.33)	12 (66.67)	6 (30)	14 (70)	2 (40)	3 (60)	3 (37.5)	5 (62.5)
Overgrown hoof	3(25)	9 (75)	0	0	0	0	0	0
Atresia ani	11 (100)	(0)0	11 (100)	(0)0	3 (100)	0	6 (100)	(0)0
Dog bite	5 (71.42)	2 (28.58)	3 (75)	1 (25)	0	0	1 (33.33)	3 (66.67)
Dermoid cyst	0	7 (100)	0	0	0	2 (100)	0	5 (100)
Gangrenous mastitis	0	5 (100)	0	0	0	0	0	0

Table 3 presents the gender-wise distribution of surgical affections in sheep. In Mymensingh, the prevalence of myiasis was 58.33% in females and 41.67% in males. In Netrakona, the prevalence was 42.56% in females and 57.44% in males. In Sherpur, the prevalence was 47.62% in females and 52.38% in males. In Jamalpur, the prevalence was 48.15% in females and 51.85% in males. The occurrence of myiasis was lower in males and higher in females. Table 4 displays the occurrence of surgical affections in sheep across various seasons in Mymensingh, Jamalpur, Netrakona, and Sherpur, respectively. In Mymensingh, the prevalence of foot rot was 5.26% in summer, 47.36% in rainy season, 31.57% in autumn, and 15.78% in winter. In Jamalpur, the prevalence of foot rot was 26.31% in summer, 47.36% in rainy season, 15.78% in autumn, and 10.52% in winter. Netrakona reported a prevalence of 11.76% in summer, 52.94% in rainy season, 29.41% in autumn, and 5.88% in winter. In Sherpur, the prevalence of foot rot was 30% in summer, 50% in rainy season, 20% in autumn, and 0% in winter.

The highest prevalence of foot rot was consistently observed during the rainy season in all four districts. Bloat and dog bites were found to be highest in autumn. In addition, the prevalence of wound and subcutaneous cysts was higher during the rainy seasons.

Discussion

This study was conducted to observe the surgical affections of sheep in the Mymensingh Division of Bangladesh. The recorded common surgical affections of sheep in the Mymensingh division were wound, subcutaneous cyst, bloat, myiasis, horn fracture, foot rot, abscess, overgrown hoof, atresia ani, dog bite wound, hernia, and dermoid cyst.

We observed demographic and seasonal variations of surgical disorders in sheep of the Mymensingh division. The incidence of the diseases varies with the species, age, sex of the animal, and season of the year (Samad, 2000). Wound prevalence was highest in the rainy season at 53.91%, which aligns with Arju *et al.* (2014) but differs from Samad (2001) who reported a lower

Table 3. Gender-wise distribution of proportionate prevalence of surgical affections in sheep at Mymensingh, Jamalpur, Netrakona, and Sherpur districts.

Surgical affections	Proportionate prevalence (total case (%))							
	Mymensingh		Jamalpur		Netrakona		Sherpur	
	Male	Female	Male	Female	Male	Female	Male	Female
Wound	13 (18.05)	59 (81.95)	12 (20)	48 (80)	22 (32.83)	45 (67.17)	13 (41.95)	18 (58.05)
Sub-cutaneous cyst	14 (42.42)	19 (57.58)	14 (43.75)	18 (56.25)	16 (57.14)	12 (42.86)	5 (50)	1 (50)
Bloat	13 (40.62)	19 (59.38)	16 (39.02)	25 (60.98)	11 (50)	11 (50)	7 (43.70)	9 (56.30)
Myiasis	10 (41.67)	14 (58.33)	14 (51.85)	13 (48.15)	27 (57.44)	20 (42.56)	11 (52.38)	10 (47.62)
Horn fracture	15 (75)	5 (25)	12 (75)	4 (25)	0	0	0	0
Foot-rot	6 (31.57)	13 (68.43)	6 (31.57)	13 (68.73)	7 (41.17)	10 (58.83)	4 (40)	6 (60)
Abscess	8 (44.44)	10 (55.56)	11 (55)	9 (45)	3 (60)	2 (40)	5 (62.50)	3 (37.50)
Overgrown hoof	10 (83.33)	2 (16.67)	0	0	0	0	0	0
Atresia ani	3 (27.27)	8 (72.73)	5 (45.45)	6 (54.55)	1 (33.33)	2 (66.67)	4 (66.67)	2 (33.33)
Dog bite	5 (71.24)	2 (28.76)	2 (50)	2 (50)	0	0	2 (50)	2 (50)
Dermoid cyst	7 (100)	0(0)			1 (50)	1 (50)	3 (60)	2 (40)
Gangrenous mastitis	0(0)	5 (100)	0	0	0	0	0	0

Table 4. Seasonal distribution of proportionate prevalence of surgical affections in sheep at Mymensingh, Jamalpur, Netrakona, and Sherpur districts.

District	Name of seasons	Proportionate prevalence (total case (%))						
		Wound	Sub cutaneous cyst	Bloat	Myiasis	Foot-rot	Overgrown hoof	Dog bite
Mymensingh	Summer	6 (8.33)	6 (18.18)	4 (12.5)	10 (41.67)	1 (5.26)	3 (25)	1 (14.28)
	Rainy	42 (58.3)	17 (51.51)	8 (25)	8 (33.33)	9 (47.36)	2 (16.67)	2 (28.57)
	Autumn	4 (5.55)	2 (6.06)	18 (56.26)	4 (16.67)	6 (31.57)	0 (0)	4 (57.14)
	Winter	20 (27.7)	8 (24.24)	2 (6.25)	2 (8.33)	3 (15.78)	7 (58.33)	0 (0)
Jamalpur	Summer	8 (13.33)	5 (15.62)	6 (14.63)	13 (48.14)	5 (26.31)	3 (30)	1 (25)
	Rainy	32 (53.3)	15 (46.87)	8 (19.51)	7 (25.92)	9 (47.36)	1 (10)	1 (25)
	Autumn	4 (6.67)	3 (9.375)	22 (53.65)	4 (14.81)	3 (15.78)	0 (0)	2 (50)
	Winter	16 (26.6)	9 (28.12)	5 (12.19)	3 (11.11)	2 (10.52)	6 (60)	0 (0)
Netrakona	Summer	12 (17.91)	4 (14.28)	4 (18.18)	24 (51.06)	2 (11.76)	0 (0)	0 (0)
	Rainy	35 (52.23)	16 (57.14)	6 (27.27)	12 (25.53)	9 (52.94)	0 (0)	0 (0)
	Autumn	4 (5.97)	3 (10.71)	10 (45.45)	6 (12.76)	5 (29.41)	0 (0)	0 (0)
	Winter	16 (23.88)	5 (17.85)	2 (9.09)	5 (10.63)	1 (5.88)	0 (0)	0 (0)
Sherpur	Summer	10 (32.25)	2 (33.33)	2 (12.5)	11 (52.38)	3 (30)	0 (0)	0 (0)
	Rainy	15 (48.38)	3 (50)	3 (18.75)	6 (28.57)	5 (50)	0 (0)	1 (25)
	Autumn	2 (6.45)	0 (0)	9 (56.25)	3 (14.28)	2 (20)	0 (0)	2 (50)
	Winter	4 (12.90)	1 (16.67)	2 (12.5)	1 (4.75)	(0)0	0 (0)	1 (25)

prevalence of wounds in animals. The study found that wounds occurred more frequently in adult sheep, possibly due to activities such as running through barbed wires, fighting among animals, competitive food taking, and malicious hitting. The likelihood of wounds becoming infested with maggots increased during prolonged periods of rain and in a hot, humid atmosphere, coinciding with a higher number of flies (Farghali *et al.*, 2020; Patel *et al.*, 2014).

The occurrence of myiasis in the Mymensingh division was recorded at 15.10%. This result aligns closely with a previous report by Khalil *et al.* (2017), who documented a myiasis prevalence of 8.38%. However, it contrasts with the lower rates reported by Mia and Haque (1967) at 0.5% and Tana (1988) at 1.1%. In addition, this finding supports earlier reports of myiasis in other regions, such as 14% in Saudi Arabia (Abo-Shehada, 2005), 5% in France (Boulard *et al.*, 2008), and 5.08% in Turkey (Karatepe *et al.*, 2008).

Myiasis, commonly known as blowfly strike, tends to occur more frequently in sheep than in goats. It can manifest around the head following fights, in wounds in soiled areas around the tail, breech, and penis, or on the feet of animals with foot rot/scald. Notable myiasis flies include *Lucilia sericata* (green bottle), *Protophormia terraenovae* (blue bottle), and *Wohlfahrtia magnifica* (flesh fly) (Matthews, 2016). Female flies lay eggs on fresh wounds, and upon hatching, the larvae move within the tissue, feed, and thrive there. Common predisposing factors for myiasis in domestic animals include wounds, ulcers, sores, broken horns, wounded eyes, and disturbed skin (Farghali *et al.*, 2020). The prevalence of myiasis was recorded at 48.73% in the summer season, 27.73% in the rainy season, and lowest in the winter at 9.24%. This observation aligns with findings by Samad (2001), who also noted the highest myiasis cases in cattle, sheep, and goats during the summer season compared to the winter season. The affection rate of

myiasis was higher in females than males, potentially attributed to the elevated percentage of parturition during the summer season, leading to a persistently moist vulva region. Consequently, female animals may be more susceptible to fly infestation. This finding is consistent with reports by Sarker *et al.* (2014) and Rahman *et al.* (1972). However, it contrasts with the results of Mia and Haque (1967) and Tana (1988), who reported lower incidence rates of myiasis at 0.5% and 1.1% in sheep, goats, and cattle, respectively. Bloat occurred in 14.08% of sheep, aligning closely with the earlier report by Khalil *et al.* (2017) at 15.30%. The incidence of bloat was higher in adult sheep than in young ones, potentially associated with the larger rumen volume in adults. In young animals, bloat is often caused by feeds such as silage, corn fodder, and alfalfa. In the present study, bloat was predominantly observed during the autumn season (53.15%), which corresponds with findings by Schipper (1970) and Blood *et al.* (2000). Wrights and Curtis (1976) noted that the most persistent rigid foams were produced at temperatures below 25°C.

Various succulent plants in autumn might explain the increased incidence of bloat in sheep, as reported by Hall and Majak (1995). The occurrence of subcutaneous cysts in the Mymensingh division of Bangladesh was recorded at 12.56%. This finding aligns with the earlier report by Khalil *et al.* (2017) at 7.13%. In sheep under subsistence-based production and a semi-extensive system of management, the occurrence rate of 2.4% for subcutaneous cysts over 14 months indicates the endemic nature of the disease, confirming the findings of Karim *et al.* (1982) and Nooruddin *et al.* (2000). The occurrence of foot rot in the Mymensingh division of Bangladesh was recorded at 8.24%. This result is consistent with the earlier report by Khalil *et al.* (2017) at 8.13% and with the range reported by Aguiar *et al.* (2011) and Farghali *et al.* (2020) at 5.77% - 33.85%. Foot rot is most prevalent in warm and moist areas and can manifest in both acute and chronic forms (Malecki and Coffey, 1987). The prevalence of foot rot is higher in the rainy season than in summer, potentially due to factors such as foot and mouth disease outbreaks, muddy land conditions in hilly areas, reduced exercise, and unhygienic flooring (Huang *et al.*, 1995). Small ruminant lameness is commonly caused by foot infections, resulting in significant economic losses. Previous studies have reported a prevalence of foot lesions in sheep and goats ranging from 5.77% to 33.85% on various farms. Among these, foot rot was identified as the most prevalent ailment, with malignant foot rot being more common in sheep than in goats. The isolation of bacteria such as *Dichelobacter nodosus* and *Fusobacterium* necrophorum was associated with cases of foot rot. In addition, Aguiar *et al.* (2011) noted the occurrence of white line disease, sole ulcers, foot abscesses, and hoof overgrowth in both sheep and goats. The occurrence of abscesses in the Mymensingh division was recorded at 6.47% (Figure 2), a finding supported by the report of Khalil *et al.* (2017), who recorded an abscess prevalence of 8.17% in sheep. The incidence of abscesses was noted to be higher in the summer than in the rainy and winter seasons, as reported by Samaddar *et al.* (2017).

According to Sadan (2019), sheep and goats can develop abscesses in various locations on their bodies, including the parotid region, submandibular region, umbilicus, chest wall, gluteal region, testes, and eyelids. Penetrating wounds may occasionally lead to abscess formation. Various bacteria, including Moraxella spp., Trueperella (*Arcanobacterium*, *Actinomyces*) pyogenes, *Streptococcus* spp., and *Staphylococcus* spp., have been identified in these abscesses, each presenting unique challenges in different species. Improper septic injection practices can result in an injection abscess at the site of a vaccine or other injection. Actinobacillosis lignieresi, typically found in ruminants' mouths, may occasionally be isolated from abscesses on a goat's face and neck. The management of abscesses should be approached carefully, avoiding lancing in situations that could lead to disease spread due to the risk of disseminating caseous lymphadenitis (Matthews, 2016). The occurrence of fractures in sheep in the Mymensingh division was recorded at 4.56%, a finding similar to the report by Khalil (2017), who found an incidence of 6.28% in sheep. Most fractures result from trauma, such as being hit by a car, falling from a height, being stepped on, or from a fight, with some fractures occurring due to relatively minor trauma (Arju *et al.*, 2014).

Bone fractures, often considered unintentional surgical affections, can occur in various parts of the body. Ribs are particularly susceptible, and the condylar process is a common location for mandibular fractures due to anatomical and mechanical reasons. According to Morris *et al.* (2015), condylar fractures account for 26% - 57% of all mandibular fractures, occurring in the condylar head, neck, and subcondylar regions based on the site's anatomy (Auer *et al.*, 1993).

At referral centers for ruminants, limb fractures can make up to 10% of the caseload (Matthews, 2016). Economic limitations and increased stresses on repairs pose challenges in ruminant fracture fixation. Internal repair techniques, such as plating and lag screw techniques, can achieve success rates of up to 90% when applied to ruminants (Auer *et al.*, 1993). The occurrence of atresia ani was recorded at 3.93% in the four districts of the Mymensingh division (Figure 2). This finding is consistent with the report by Khalil *et al.* (2017), where they documented a 3.14% occurrence of atresia ani. The lower prevalence of atresia ani in Bangladesh has been reported at 0.6% and 0.1%. Atresia ani is considered to be hereditary, and the causal factor may be attributed to a single recessive gene (Arju *et al.*, 2014). The presence of this recessive gene contributes to atresia being one of the relatively common intestinal disorders in sheep (Ali, 2018). The occurrence of the overgrown hoof was recorded at 1.25% in sheep in the Mymensingh division, which aligns with the report of Khalil *et al.* (2017).

Surgical affections in sheep due to dog bite wounds were found to be 1.90% in the Mymensingh region, which is lower than the 12.32% reported by Arju *et al.* (2014). It is worth noting that the highest number of clinically recorded dog bites was observed in goats (Samaddar *et al.*, 2017). The consequences of dog bites may lead to rabies, and in many developing countries, the re-emergence of this disease is attributed to inconsistent rabies control programs (Samaddar *et al.*, 2017).

The reported surgical affections in sheep may result in substantial economic losses, encompassing veterinary care expenses, the cost of medicines, and losses incurred from culling or the death of affected animals. These economic challenges have the potential to discourage rural farmers from engaging in sheep rearing. However, implementing proper and skilled veterinary care, including surgical interventions and postoperative care, can prove effective in the clinical management of these surgical affections. Such measures not only save farmers from economic losses but also serve as an encouragement for them to continue and sustain their involvement in sheep rearing.

Conclusion

Common surgical affections in sheep include wounds, subcutaneous cysts, bloat, myiasis, horn fractures, foot rot, abscesses, overgrown hooves, atresia ani, dog bites, gangrenous mastitis, and dermoid cysts. Prioritizing preventive measures for sheep with a high risk of surgical disorders during seasons identified as high-risk is crucial to mitigate their occurrence, especially when preventable. By focusing resources and interventions on identified high-risk periods, such as the rainy season, where foot rot, wounds, and subcutaneous cysts are more prevalent, we can strategically minimize the impact of surgical disorders on sheep health and welfare.

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Conflict of interest

The author does not have any conflict of interest.

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