



Research Paper

## Age-wise Clinical Morbidity Pattern in Black Bengal Goats Maintained at a Germplasm Conservation Centre in West Bengal, India

K. C. Dhara<sup>2\*</sup>, S. S. Kesh<sup>1</sup> and S Batabyal<sup>3</sup>

<sup>1</sup> Department of Veterinary Clinical Complex, West Bengal University of Animal and Fishery Sciences, Kolkata – 700037, West Bengal, India

<sup>2</sup> Biotech-KISAN Hub, Directorate of Research, Extension and Farms, West Bengal University of Animal and Fishery Sciences, 68 Kshudiram Bose Sarani, Kolkata – 700037, West Bengal, India

<sup>3</sup> Director of Research, Extension and Farms, West Bengal University of Animal and Fishery Sciences, 68 Kshudiram Bose Sarani, Kolkata – 700037, West Bengal, India

\*Corresponding author: K C Dhara

### Abstract

Black Bengal goats are an important indigenous genetic resource of eastern India, but clinical disease can constrain productivity and conservation efficiency. The present retrospective analysis evaluated the age-wise distribution of 19,824 clinical episodes recorded in four age classes: adults >1 year (n=4,752), growing goats 6–12 months (n=3,304), growing goats 3–6 months (n=6,424), and kids 0–3 months (n=5,344). Because the available totals represent clinical episodes rather than a population-at-risk denominator, disease frequencies were expressed as proportional morbidity. Overall, diarrhoea accounted for 4,168 episodes (21.03%) and pneumonia for 2,468 (12.45%). Diarrhoea constituted 25.59% and 25.22% of episodes in the 3–6- and 0–3-month groups, respectively, compared with 8.50% in adults. Pneumonia showed a similar age gradient (14.63% and 14.22% in the two youngest groups versus 6.73% in adults). The disease-pattern distribution differed significantly among age groups ( $\chi^2=4,226.54$ ,  $df=30$ ,  $P<0.001$ ; Cramér's  $V=0.267$ ). Goats <6 months had higher proportional diarrhoea than goats  $\geq 6$  months (25.42% vs 14.60%; ratio=1.74, 95% CI 1.64–1.85) and higher proportional pneumonia (14.45% vs 9.53%; ratio=1.52, 95% CI 1.40–1.64). Adult episodes additionally included reproductive disorders, abscesses and accidental injuries. The findings indicate a marked age-related morbidity profile and support intensified gastrointestinal and respiratory disease prevention during the first six months of life.

**Keywords:** Black Bengal goat; clinical morbidity; diarrhoea; pneumonia; kid health; germplasm conservation; West Bengal

Received 06 Oct., 2026; Revised 16 Oct., 2026; Accepted 18 Oct., 2026 © The author(s) 2026.

Published with open access at [www.questjournals.org](http://www.questjournals.org)

### I. INTRODUCTION

Black Bengal goats are among the most important indigenous caprine genetic resources of eastern India. They are valued for adaptability to low-input systems, prolificacy, early maturity, meat quality and their role in the livelihoods of small and marginal farmers. Organized germplasm conservation seeks not only to preserve breed characteristics but also to improve survival, health and lifetime productivity.

Disease morbidity can substantially reduce growth, reproductive efficiency and the number of animals available for selection and dissemination. Young goats are particularly vulnerable to gastrointestinal and respiratory disorders because of developing immunity, nutritional transitions, environmental stress and exposure to infectious agents. Adult animals, in contrast, may show a broader clinical spectrum that includes reproductive and management-associated disorders.

Age-stratified analysis of clinical records can therefore identify periods requiring intensified preventive healthcare. The objective of the present study was to characterize the age-wise clinical morbidity pattern of

Black Bengal goats maintained under an organized germplasm-conservation system and to quantify the association between age class and disease category.

## II. MATERIALS AND METHODS

### 2.1 Study design and data structure

A retrospective record-based analysis was undertaken using the supplied clinical morbidity dataset for Black Bengal goats maintained under a germplasm-conservation setting in West Bengal. Clinical episodes were classified into four age groups: adult (>1 year), growing (6–12 months), growing (3–6 months), and kids (0–3 months). The dataset contained 19,824 clinical episodes.

### 2.2 Disease classification

Recorded conditions were grouped as diarrhoea, pneumonia, skin diseases, ectoparasitic infestation, abortion, mastitis, metritis, bloat, abscess, accidental injuries and others. Sex-specific counts were retained where available. In the 6–12-month group, 224 clinical episodes could not be assigned to sex from the supplied records and were therefore treated as sex-unclassified rather than imputed.

### 2.3 Statistical analysis

Disease-category frequency was expressed as proportional morbidity: number of episodes in a disease category divided by all recorded clinical episodes in the corresponding age group  $\times 100$ . This measure is not interpreted as population incidence because animal-at-risk and animal-time denominators were not available. Association between disease category and age group was evaluated by Pearson's chi-square test, with Cramér's V used as an effect-size measure. For diarrhoea and pneumonia, goats <6 months were compared with goats  $\geq 6$  months using case-proportion ratios and odds ratios with 95% confidence intervals. Statistical significance was set at  $P < 0.05$ .

## III. RESULTS

### 3.1 Distribution of clinical episodes by age

| Age group             | Episodes | M     | F      | Sex unclassified | Share (%) |
|-----------------------|----------|-------|--------|------------------|-----------|
| Adult (>1 year)       | 4,752    | 856   | 3,896  | 0                | 23.97     |
| Growing (6–12 months) | 3,304    | 992   | 2,088  | 224              | 16.67     |
| Growing (3–6 months)  | 6,424    | 2,608 | 3,816  | 0                | 32.41     |
| Kids (0–3 months)     | 5,344    | 1,952 | 3,392  | 0                | 26.96     |
| Total                 | 19,824   | 6,408 | 13,192 | 224              | 100.00    |

The largest share of clinical episodes occurred in goats aged 3–6 months (32.41%), followed by kids aged 0–3 months (26.96%). Together, goats younger than six months accounted for 59.36% of all recorded clinical episodes.

### 3.2 Age-wise proportional morbidity

| Condition           | Adult >1 yr    | 6–12 mo        | 3–6 mo         | 0–3 mo         | Overall        |
|---------------------|----------------|----------------|----------------|----------------|----------------|
| Diarrhoea           | 404 (8.50%)    | 772 (23.37%)   | 1,644 (25.59%) | 1,348 (25.22%) | 4,168 (21.03%) |
| Pneumonia           | 320 (6.73%)    | 448 (13.56%)   | 940 (14.63%)   | 760 (14.22%)   | 2,468 (12.45%) |
| Skin diseases       | 64 (1.35%)     | 192 (5.81%)    | 320 (4.98%)    | 264 (4.94%)    | 840 (4.24%)    |
| Ectoparasites       | 64 (1.35%)     | 0 (0.00%)      | 0 (0.00%)      | 0 (0.00%)      | 64 (0.32%)     |
| Abortion            | 128 (2.69%)    | 0 (0.00%)      | 0 (0.00%)      | 0 (0.00%)      | 128 (0.65%)    |
| Mastitis            | 280 (5.89%)    | 0 (0.00%)      | 0 (0.00%)      | 0 (0.00%)      | 280 (1.41%)    |
| Metritis            | 128 (2.69%)    | 20 (0.61%)     | 48 (0.75%)     | 72 (1.35%)     | 268 (1.35%)    |
| Bloat               | 44 (0.93%)     | 0 (0.00%)      | 40 (0.62%)     | 36 (0.67%)     | 120 (0.61%)    |
| Abscess             | 516 (10.86%)   | 0 (0.00%)      | 0 (0.00%)      | 0 (0.00%)      | 516 (2.60%)    |
| Accidental injuries | 428 (9.01%)    | 220 (6.66%)    | 220 (3.42%)    | 192 (3.59%)    | 1,060 (5.35%)  |
| Others              | 2,376 (50.00%) | 1,652 (50.00%) | 3,212 (50.00%) | 2,672 (50.00%) | 9,912 (50.00%) |

Diarrhoea was the most prominent specified condition overall (4,168 episodes; 21.03%), followed by pneumonia (2,468; 12.45%). The proportional burden of both conditions increased markedly in animals younger than six months. The broad 'Others' category accounted for exactly 50% of episodes in every age class and should be disaggregated in future record systems to improve epidemiological resolution.

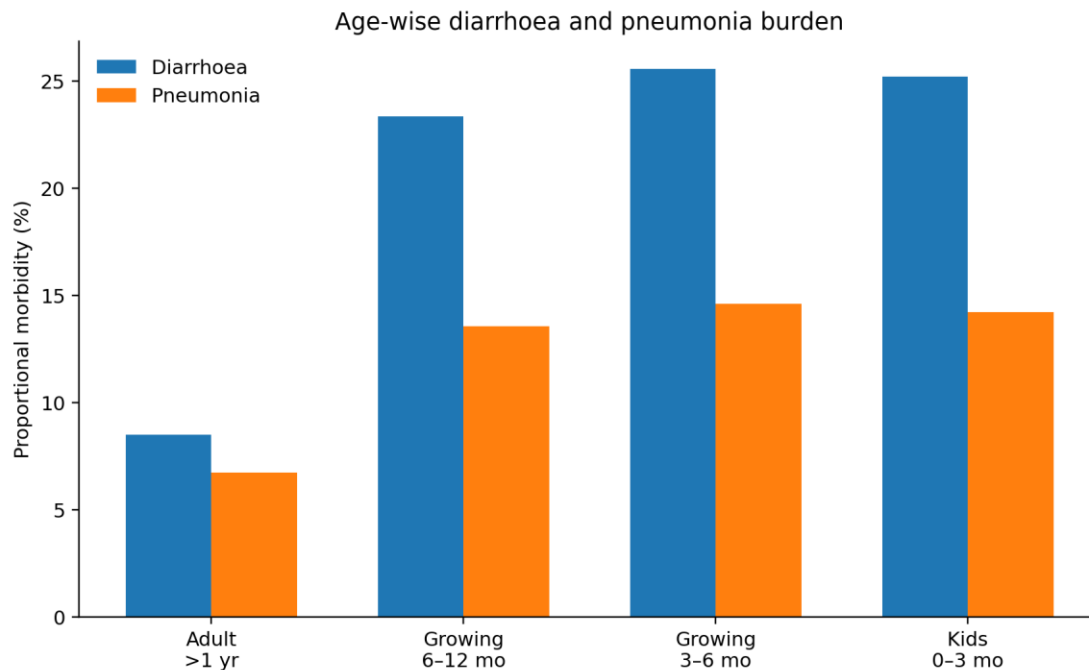


Figure 1. Age-wise proportional morbidity due to diarrhoea and pneumonia.

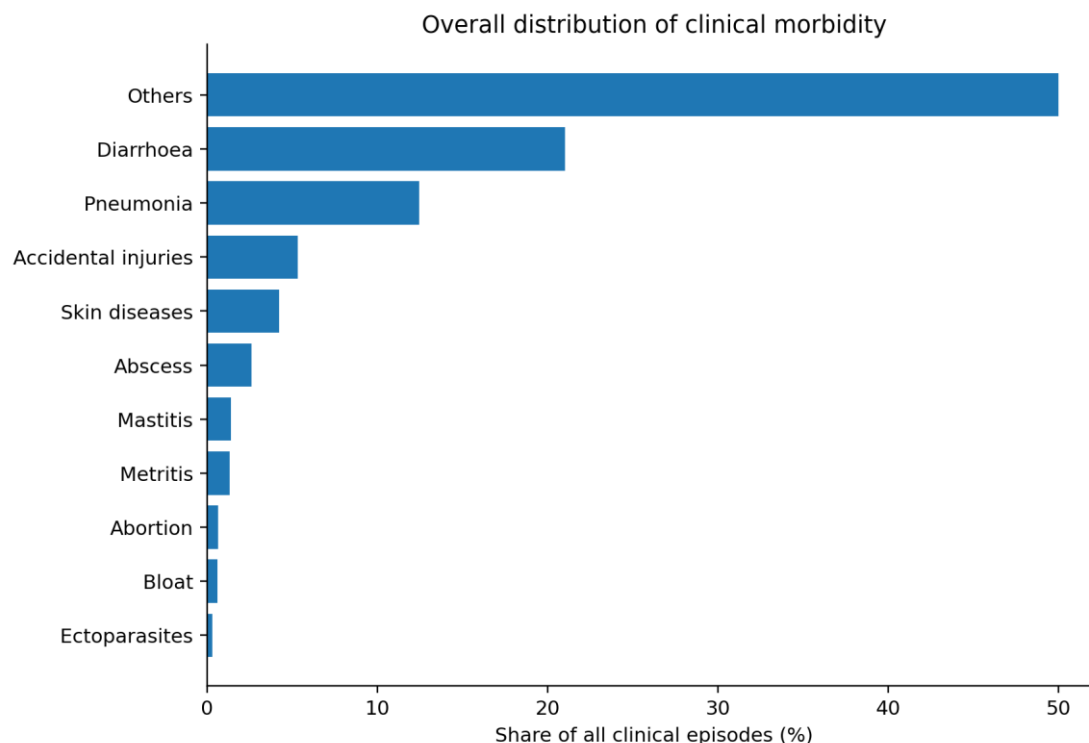


Figure 2. Overall distribution of recorded clinical morbidity.

### 3.3 Association between age and disease pattern

The distribution of disease categories differed significantly among age groups (Pearson  $\chi^2=4,226.54$ ,  $df=30$ ,  $P<0.001$ ). Cramér's V was 0.267, indicating a meaningful age-related difference in the clinical morbidity profile.

| Comparison | <6 months             | ≥6 months            | $\chi^2$ | Proportion ratio (95% CI) | Odds ratio (95% CI) |
|------------|-----------------------|----------------------|----------|---------------------------|---------------------|
| Diarrhoea  | 2,992/11,768 (25.42%) | 1,176/8,056 (14.60%) | 337.62   | 1.74 (1.64–1.85)          | 1.99 (1.85–2.15)    |
| Pneumonia  | 1,700/11,768          | 768/8,056 (9.53%)    | 105.89   | 1.52 (1.40–1.64)          | 1.60 (1.46–1.75)    |

|  |          |  |  |  |  |
|--|----------|--|--|--|--|
|  | (14.45%) |  |  |  |  |
|--|----------|--|--|--|--|

Both comparisons were significant at  $P < 0.001$ . Thus, within the clinical-episode dataset, goats younger than six months showed substantially greater proportional representation of diarrhoea and pneumonia than older goats.

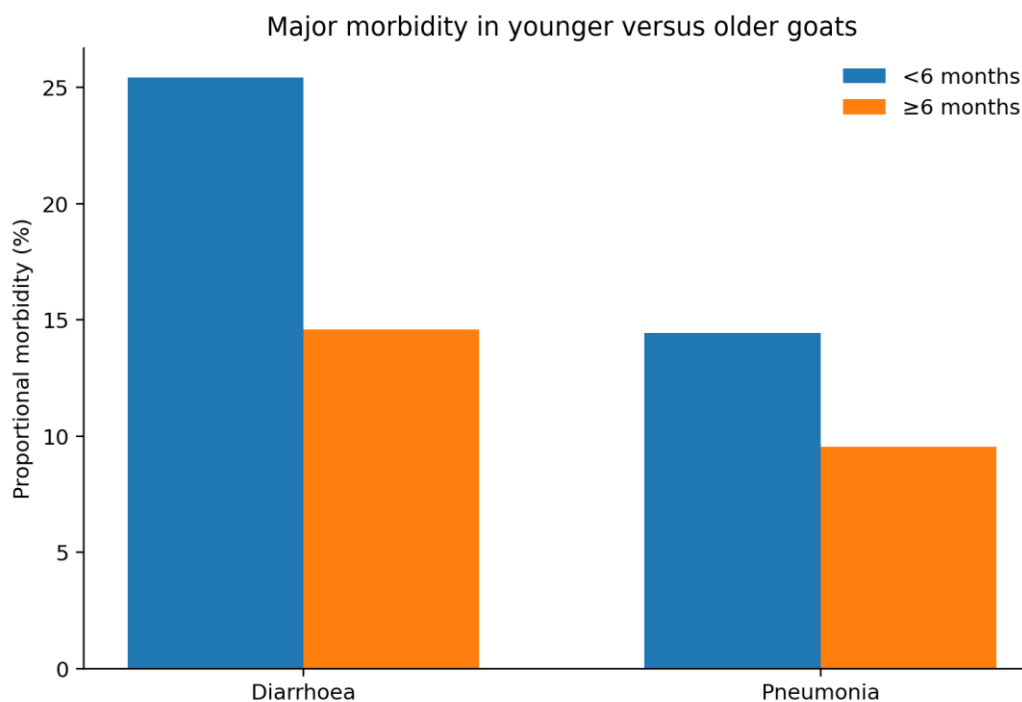


Figure 3. Proportional diarrhoea and pneumonia morbidity in goats <6 months versus ≥6 months.

### 3.4 Adult clinical profile

Adults showed a more heterogeneous clinical profile. Abscesses accounted for 10.86% of adult episodes, accidental injuries for 9.01%, mastitis for 5.89%, abortion for 2.69%, metritis for 2.69% and ectoparasitic infestation for 1.35%. Reproductive conditions were concentrated in the adult group, as expected from biological eligibility.

## IV. DISCUSSION

The analysis demonstrates a clear age-related structure in Black Bengal goat clinical morbidity. Nearly three-fifths of all episodes occurred before six months of age, and diarrhoea and pneumonia were disproportionately represented in these younger animals. This pattern is consistent with the recognized vulnerability of young goats during the neonatal, pre-weaning and post-weaning periods.

The diarrhoea proportion was approximately 1.74 times higher in goats younger than six months than in older goats, while the corresponding pneumonia proportion was approximately 1.52 times higher. These ratios describe relative representation among clinical episodes and should not be interpreted as population-level disease risk because unique animals at risk and follow-up time were unavailable.

The high early-life burden supports intensive colostrum management, hygienic kidding pens, clean water and feed, gradual dietary transition, strategic parasite control, appropriate vaccination, ventilation and rapid clinical management of diarrhoea and respiratory disease. Routine recording of birth weight, litter size, dam identity and survival would further improve risk stratification.

Adult animals displayed conditions linked to reproductive activity and management, including mastitis, abortion and metritis, as well as abscesses and accidental injuries. These findings support integrating reproductive health, udder health, housing safety and wound management into adult-herd preventive programmes.

The broad 'Others' category represents 50% of episodes in each age class. This unusually large residual category limits disease-specific interpretation. Future digital health registers should use standardized diagnostic codes and minimize nonspecific categories. Such improvements would increase the value of clinical records for genetic selection, epidemiological surveillance and germplasm-conservation decisions.

## **V. IMPLICATIONS FOR GERMLASM CONSERVATION**

For Black Bengal germplasm conservation, health recording should be integrated with pedigree, reproductive and growth records. Particular emphasis should be placed on survival and morbidity during the first six months. Individual animal identification, date-specific disease recording, laboratory confirmation of major infectious syndromes, treatment outcome, vaccination status, parasite-control history and cause-of-death recording would permit estimation of true incidence, mortality and case-fatality rates. These traits could subsequently be incorporated into balanced selection objectives alongside prolificacy, growth and breed characteristics.

## **VI. LIMITATIONS**

The analysis is based on the supplied aggregated clinical-episode dataset. The number of unique animals at risk, animal-time under observation, repeated episodes in the same animal and death counts were not available. Consequently, the reported percentages are proportional morbidity rather than true incidence rates, and mortality or case-fatality cannot be estimated. The 6–12-month age group contained 224 episodes without resolvable sex classification. The 'Others' category accounted for half of all episodes and could not be further disaggregated. The source registers should therefore be retained and verified before journal submission, particularly if these aggregated values were generated from transformed or consolidated records.

## **VII. CONCLUSION**

Black Bengal goats showed a pronounced age-related clinical morbidity pattern, with 59.36% of all recorded episodes occurring before six months of age. Diarrhoea and pneumonia were the dominant specified conditions and were significantly more prominent in younger goats. Disease-category distribution differed strongly across age classes, supporting age-targeted preventive healthcare. Strengthening neonatal and growing-kid management, respiratory and gastrointestinal disease control, reproductive healthcare in adults and individual-level digital recording would enhance both herd health and the scientific value of Black Bengal germplasm-conservation programmes.

## **DECLARATIONS**

Conflict of interest: The authors declare no conflict of interest.

Ethics statement: This study involved retrospective analysis of aggregated clinical records and did not involve experimental intervention on animals. Institutional requirements for retrospective record-based studies should be confirmed before submission.

Data availability: The analysis is based on the aggregated dataset supplied for the study. Source clinical registers should be archived and made available in accordance with institutional and journal requirements.

Author contributions: S. S. Kesh and S Batabyal: clinical interpretation, conceptualization and manuscript drafting. K. C. Dhara: conceptualization, data interpretation, statistical analysis framework, germplasm-conservation implications and critical revision.

## **REFERENCES**

- [1]. Ershaduzzaman, M., Rahman, M.M., Roy, B.K. and Chowdhury, S.A. (2007). Studies on the diseases and mortality pattern of goats under farm conditions and some factors affecting mortality and survival rates in Black Bengal kids. *Bangladesh Journal of Veterinary Medicine*, 5(1–2), 71–76.
- [2]. Munsil, M.N., Ershaduzzaman, M., Akther, S., Rahman, M.M., Rahman, M.H. and Rahman, M.M. (2018). Incidence of clinical diseases and disorders in goats at Bangladesh Livestock Research Institute. *Asian Journal of Medical and Biological Research*, 4(4), 351–361.
- [3]. Datta, S., Roy, M., Sarkar, U., Taraphder, S., Bera, S. and Maity, A. (2024). Risk factors impacting kid survival of Black Bengal goats raised in field condition of West Bengal, India. *Exploratory Animal and Medical Research*, 14(2), 273–278.