# Study on Calf Morbidity and Mortality on Farm Condition with Special Emphasis on Colibacillosis

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## ABSTRACT

*Diarrhoea in farm animals, especially in neonatal calves is one of the most challenging clinical syndromes encountered by practicing large animal's veterinary practitioners throughout the world. Therefore looking into the complexity of early age calf diarrhea primarily due to E. coli, the present study was conducted in different dairy farm in Sylhet Sadar in order to determine the major cause and risk factor associated with calf morbidity and mortality due to colibacillosis. The main result revealed that out of 121 calves different ages were selected where calf manifesting the characteristics clinical sign of colibacillosis. From thirteen dairy farms in Sylhet sadar out of 121 samples 75 were observed affected with colibacillosis. The overall morbidity of calf colibacillosis was 61.98% and mortality were 00.00%. Data analysis showed that the calf colibacillosis in dairy farms due to many factors such as age was the only risk factor (calf factor) which was highly significantly ($\chi^2$ = 13.003, P-value = 0.000) washing of udder just before sucking milk to calf was statistically highly significant ($\chi^2$ = 7.373, P-value = 0.007) which means washing of udder just before sucking milk to calf lowers the calf morbidity due to colibacillosis. Milk replacer sanitation was statistically significant ($\chi^2$ = 6.5, P-value = 0.011) water supply to the calf was statistically significant ($\chi^2$ = 4.247, P-value = 0.039) which means hygienic water supply to calf lowers the calf morbidity due to colibacillosis. Proper drainage system ($\chi^2$ = 4.069, P-value = 0.044) and daily use of disinfectant in farm premises ($\chi^2$ = 6.163, P-value = 0.013). The mortality of calf due to colibacillosis was null because of proper treatment, knowledge of management of diseased calf and availability of veterinarians. Morbidity and mortality of calf colibacillosis in different dairy farm at Sylhet sadarUpazila were 61.98% and 0.00% respectively.*

## INTRODUCTION

Calf morbidity and mortality is the major cause of econonomic losses in livestock production. It is roughly estimated that calf morbidity and mortality can reduce net profit to 38 per cent (Blood and Rhodostits 1989). Calf management plays an important role in the development of the dairy sector of the country. The success of the dairy industry depends on appropriate calf management. Calf-care is not only essential for sustenance of the dairy industry but is also essential for preserving and maintaining our good quality germ plasm. Important aspects in the calf rearing are the health management and proper nutrition (Mehmood, 1991). Calf morbidity and mortality are persistent problems in farm condition worldwide ( Heinrichs and Radostits, 2001) occurring mainly due to Collibacilosis caused by entero-pathogenic *Escherichia coli*, a gram-negative, aerobic, rod-shaped, flagellated, motile, oxidase negative, non-spore forming, small sized (2-3 x 0.6μ) and toxin producing bacteria (endotoxin), under the family Enterobacteriaceae (Buxton and Fraser, 1977) and characterized by watery white or yellowish diarrhoea,septicaemia, rise of body

temperature, general weakness, dehydrated, lack of appetite, dry skin coat, sunken eyeballs and high mortality ( Runnel *et.al.,* 1986). This organism (*E. coli*) is widely distributed in nature; being present in soil, surface water, animal and human faeces. So, calves are easily get exposure and infected with *E. coli* mostly at the age of 1-3 days and 3-8 weeks (Abraham *et.al.*, 1992).In Collibacilosis affected calves, the morbidity rate ranges from 30-75% and mortality rate varies from 10 to 50% depend on the level of clinical management (Radostits *et.al.* 2000).

The prevalence of morbidity and mortality in calves due to Colibacillosis are caused by several possible reasons which include improper housing system, non-cemented floor type, poor ventilation, contaminated feed, unclean and dirty water, poor biosecurity, large sized herd, method of colostrum feeding, house cleanness, amount of colostrum provision, the amount of milk fed daily, sex, age and parity of the dam (Kaper *et.al.,* 2004). Calf morbidity and mortality causes huge economic loss to the farmers arising from death, treatment cost, decreased lifetime productivity and survivorship. It also causes the loss of genetic material for herd improvement and decreases the number of dairy, beef and breeding calves available for herd replacement and expansion (Waltner-Toews *et.al.*, 1986).

The objectives of this study is to to determine the morbidity and mortality of calf due to Colibacillosis at Sylhet Sadar Upazila and to determine the risk factors associated with morbidity and mortality of calf due to Colibacillosis at Sylhet SadarUpazila.

## MATERIALS AND METHODS

The research work was conducted in the Department of Medicine, Sylhet Agricultural University (SAU) Sylhet-3100 during the period of November 2014 to June 2015.

**Collection of Samples:** A total of 121 faecal samples were collected aseptically from the rectum of different calves in each farm after collection, the samples were transported to the laboratory of Microbiology and Immunology, faculty of Veterinary and Animal Science, Sylhet Agricultural University, Sylhet, as soon as possible for bacteriological examinations and further characterization.

Table 1. Summary of samples of different farms

| S.No. | Name of the farms | No. of Sample Collected | Total |
|-------|-------------------|-------------------------|-------|
| 1. | Sylhet Dairy Farm | 12 | |
| 2. | BulBul Dairy Farm | 10 | |
| 3. | Aftabul Dairy Farm | 12 | |
| 4. | Mamun Mia Dairy Farm | 5 | |
| 5. | AlhadMokleshwor Rahman Dairy Farm | 18 | |
| 6. | Baby Dairy Farm | 8 | |
| 7. | Home Fresh Dairy Farm | 20 | 121 |
| 8. | Rahman Dairy Farm | 8 | |
| 9. | Dream Dairy Farm | 4 | |
| 10. | Jalalabad Dairy Farm | 6 | |
| 11. | Aaksha Dairy Farm | 5 | |
| 12. | Taskiya Dairy Farm | 10 | |
| 13. | Husna Dairy Farm | 3 | |

**Collection of Data:** The data was collected from the farmer's record books and also from a survey using a well design questionnaire. Owners of the selected farms were interviewed face to face for recording farms and calf information regarding calf morbidy and mortality due to calf colibacillosis.

**Examination of Faecal Sample:** A fresh faecal sample were placed in nutrient broth and incubated for overnight at 37°C for the growth of the organisms. After primary culture of the organisms, a small amount of inoculum from nutrient agar was sub-cultured in the nutrient agar and MacConkey agar to observe the colony morphology. Characteristic colony morphology of the organisms indicating the features of *E. coli* was selected for subculture on EMB agar (Carter, 1986). Morphological characteristics shape, size, surface texture, edge and elevation, color, opacity etc. of the suspected colonies on different agar media developed within 18 to 24 hours of incubation were carefully studied and recorded.

**Data Management and Analysis:** Data related to the major causes and risk factors regarding calves morbidity and mortality were analyzed using International business machine Statistical package for social sciences (IBM SPSS) version 20.

**RESULT AND DISCUSSION**

This study was conducted in different dairy farms in Sylhet sadarupazila in order to determine the calf morbidity and mortality due to colibacillosis and risk factors associated with calf colibacillosis in dairy farm. This study recorded that the overall calf morbidity and mortality due to colibacillosis in different dairy farm at Sylhet sadarupazila were 61.98% and 0.00% respectively (Table 2). But the calf morbidy due to colibacillosis was 66.67% in Sylhet Dairy Farm, 80% in BulBul Dairy Farm, 75% in Aftabul Dairy Farm, 60% in Mamun Mia Dairy Farm, 66.67% in AlhadMokleshwor Rahman Dairy Farm, 62.5% in Baby Dairy Farm, 75% in Home Fresh Dairy Farm, 25 % in Rahman Dairy Farm, 25% in Dream Dairy Farm, 50% in Jalalabad Dairy Farm, 60 % in Aaksha Dairy Farm, 50% in Taskiya Dairy Farm, 33.33% in Husna Dairy Farm. Among them, calf morbidity due to colibacillosiswas highest 80% inBulBul Dairy Farm and lowest 25% in Rahman Dairy Farm and Dream Dairy Farm.In contrast to the findings of this study, (Hossain *et.al.*, 2013) recorded that morbidity of calf colibacillosiswas 53.33% in Sirajganj and 40% in Mymensingh. (Navade *et.al.,* 2000) noticed morbidity of calfcolibacillosiswas53.37% in Mathura and (Gupta *et.al.*, 2006) observed morbidity of calf colibacillosis was only 23.72% in Mathura.

But there was not any calf mortality percentage due to colibacillosis in any farm in Sylhet sadarupazila because of proper treatment, knowledge of management of diseased calf, proper calving supervision and management of newborn calves.

Table 2. Overall calf morbidity and mortality due to colibacillosis in calf in different dairy farm at Sylhet Sadar Upazila

| S.No. | Name of the farms | No. of Sample Collected | Positive | Morbidity % | Mortality% |
|-------|-------------------|-------------------------|----------|-------------|------------|
| 1. | Sylhet Dairy Farm | 12 | 8 | 66.67 | 0 |
| 2. | BulBul Dairy Farm | 10 | 8 | 80 | 0 |
| 3. | Aftabul Dairy Farm | 12 | 9 | 75 | 0 |
| 4. | Mamun Mia Dairy Farm | 5 | 3 | 60 | 0 |
| 5. | AlhadMokleshworRahman Dairy Farm | 18 | 12 | 66.67 | 0 |
| 6. | Baby Dairy Farm | 8 | 5 | 62.5 | 0 |
| 7. | Home Fresh Dairy Farm | 20 | 15 | 75 | 0 |
| 8. | Rahman Dairy Farm | 8 | 2 | 25 | 0 |
| 9. | Dream Dairy Farm | 4 | 1 | 25 | 0 |
| 10. | Jalalabad Dairy Farm | 6 | 3 | 50 | 0 |
| 11. | Aaksha Dairy Farm | 5 | 3 | 60 | 0 |
| 12. | Taskiya Dairy Farm | 10 | 5 | 50 | 0 |
| 13. | Husna Dairy Farm | 3 | 1 | 33.33 | 0 |
| | Total | 121 | 75 | 61.98 | 0 |

A range of possible risk factors were tested for their association with calf morbidity and mortality due to colibacillosis in dairy farms. Age was the important risk factor found to affect calf morbidity and mortality due to colibacillosis in dairy farms. Age was the only risk factor (calf factor) which was highly significantly ($\chi^2 = 13.003$, P- value = 0.000) associated with risk of morbidity due to colibacillosis in all calves which agreed with earlier study. Another calf risk factors affecting calf morbidity and mortality due to colibacillosis in dairy farms was sex which was statistically insignificant ($\chi^2 = 0.287$, P- value = 0.592). This means calf colibacillosis can occurs in any sex either male or female calf (Table 3).

Table 3. Potential risk factors associated with morbidity due to calf colibacillosis

| S.no. | Variables | $x^2$ | P-value |
|---|---|---|---|
| | Calf factors | 13.003 | 0.000* |
| | Age | | |
| | Sex | 0.287 | 0.592 |
| | Managemental factors | | |
| | Ventilation | 0.624 | 0.429 |
| | Washing of udder | 7.373 | 0.007* |
| | Milk replacer sanitation | 6.5 | 0.011* |
| | Daily use of disinfectant in farm premises | 6.163 | 0.013* |
| | Water supply | 4.247 | 0.039* |
| | Proper drainage system | 4.069 | 0.044* |
| | Disinfectant used in footbath daily | 2.654 | 0.103 |
| | Floor type | 2.654 | 0.103 |
| | Calf kept together | 2.340 | 0.126 |
| | Milk feeding just after milking | 1.491 | 0.222 |
| | Barn clean properly | 1.387 | 0.239 |
| | Footbath | 0.872 | 0.350 |
| | Sanitary condition of calving site | 1.516 | 0.469 |
| | Weaning of calves | 0.010 | 0.921 |
| | Instrument properly cleaned | 0.005 | 0.941 |

Note: *Significance level at 0.05

Among Managemental factors, washing of udder just before sucking milk to calf was statistically highly significant ($\chi^2$ = 7.373, P- value = 0.007) which means washing of udder just before sucking milk to calf lowers the calf morbidity due to colibacillosis. milk replacer sanitation was statistically significant ($\chi^2$ = 6.5, P- value = 0.011) which means good sanitation of milk replacer in weaned calf lowers the calf morbidity due to colibacillosis. water supply to the calf was statistically significant ($\chi^2$ = 4.247, P- value = 0.039) which means hygienic water Supply to calf lowers the calf morbidity due to colibacillosis. Proper drainage System ($\chi^2$ = 4.069, P- value = 0.044) and daily use of disinfectant in Farm Premises ($\chi^2$ = 6.163, P- value = 0.013) were statistically significant which were significantly associated with calf morbidity due to colibacillosis. These risk factors are closely associated with calf morbidity due to colibacillosis which agreed with (*Curtis et.al.,* 1988) who found that cleanliness of the calving area, calf housing, and feeding equipment and sanitation of milk replacer reduced the risk of neonatal colibacillosis in the calf.

Other managemental factors including ventilation ($\chi^2$ = 0.624, P- value = 0.429),disinfectant used In footbath daily ($\chi^2$ = 2.654, P- value = 0.103),Floor type ($\chi^2$ = 2.654, P- value = 0.103),calf kept together ($\chi^2$ = 2.340, P- value = 0.126), milk feeding just after milking ($\chi^2$ = 1.491, P- value =0.222),barn clean properly ($\chi^2$ = 1.387, P- value = 0.239),footbath ($\chi^2$ = 0.872, P- value = 0.350), sanitary condition of calving site ($\chi^2$ = 1.516, P- value = 0.469), weaning of calves ($\chi^2$ = 0.010, P- value =0.921), instrument properly cleaned ($\chi^2$ = 0.005, P- value = 0.941) were

insignificantly associated with calf morbidity due to colibacillosis. These risk factors are not associated with calf morbidity due to colibacillosis.

## CONCLUSION

In this study, the morbidity of calf colibacillosis was higher in Sylhet sadarupazila than other region of the Bangladesh which causes huge loss to farm due to increase of treatment and medicine cost but the mortality of calf due to colibacillosis was Null because of proper treatment, knowledge of management of diseased calf and availability of veterinarians. Morbidity and mortality of calf colibacillosis in different dairy farm at Sylhet sadarupazila were 61.98% and 0.00% respectively. Morbidity of calf colibacillosis was highest 80% in BulBul Dairy Farm and lowest 25% in both Rahman Dairy Farm and Dream Dairy Farm. Management of calf and farm plays an important role in morbidity of calf colibacillosis. There is poor management of calf and farm in BulBul Dairy Farm but good Management of calf and farm in both Rahman Dairy Farm and Dream Dairy Farm. As a result, there is high morbidity of calf colibacillosis in BulBul Dairy Farm and low in both Rahman Dairy Farm and Dream Dairy Farm.

From this study, it has been found that there were some risk factors such as age, washing of udder just before sucking milk to calf, milk Replacer Sanitation, water supply, drainage System and daily use of disinfectant in Farm Premises significantly associated with morbidity of calf colibacillosis. Therefore, implementation of improved calf management practices is greatly suggested to reduce the high level of morbidity of calf colibacillosis in the study herds and also in other areas with similar management system which will reduce the loss of farms and will get healthy calf for replacement stock.

## RECOMMENDATION

Efforts should be made to increase calving supervision, improve management of newborn calves, and prevent diseases. In addition, we recommend implementation of calves' vaccination programs to protect calf diarrhea caused by viruses and activating health laws aimed at reducing the spread of diseases through proper disposal of dead calves and employing of veterinarians at dairy farms. Likewise, extension services among dairy farms owners and labors are urgently needed on proper dairy farm practices such as record keeping, sanitary practices and cleaning programs.

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