



SUSCEPTIBILITY PATTERN OF NEONATAL CALVES TO DIARRHOEA AND PNEUMONIA IN ORGANISED DAIRY FARM

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Abstract

The aim of the study was to compare the susceptibility pattern in respect to Diarrhoea, Pneumonia and or combination of both in Vrindavani, Tharparkar and Murrah buffalo calves from 0-3 months of age. During the study of 132 calves, 38.63% were susceptible to diarrhoea, Pneumonia or its combination. However, 61.36% were resistant and 12 calves died, constituting 9.09% of the total calves born during the study period. The species wise indicates, Murrah buffaloes (54.54%) are more susceptible than cattle (37.19%), breed wise indicates, Tharparkar (46.42%) are more susceptible than Vrindavani (34.40%) and in sex wise, male (44.77%) are more susceptible than female (32.30%). The maximum fatality rate was expressed in Murrah buffalo calves (27.27%), followed by Tharparkar (17.85%) and Vrindavani cattle calves (4.30%). The analysis revealed that the overall mean for average age at first infection was at 11.47 ± 1.3 days and highest age of death was expressed in calves infected with Diarrhoea (23.67 ± 5.24 days) followed by pneumonia (3.00 ± 1.00 days). It can be concluded that Murrah calves are more susceptible to calfhood disease compared to Tharparkar and Vrindavani calves.

Key words: Calf morbidity, mortality, Diarrhoea, Pneumonia, Vrindavani, Murrah

I. INTRODUCTION

Survival of neonatal calf is imperative for livestock propagation, however a large number of calves die due to diarrhoea and pneumonia during the first 3 months of life causing heavy drain on economics of livestock production. Calf morbidity and mortality represents an irrefutable and irrecoverable financial and genetic loss to the dairy industry. It is roughly estimated that 20% calf mortality resulted in reduction of 38% profit of a livestock farm Khan and Khan, 1991(12). Digestive problems followed by respiratory disorders are the killer diseases of young calves and together accounted for 70-80% of the total deaths Shivahre *et al.*, 2014 (21). The knowledge of prevailing neonatal calfhood disease is very important for managing dairy farms efficiently. This will not only ensure constant profitability of dairy farm, but will also assist regular and time bound replacement of heifers in maintaining a constant ratio of milch to dry females in a herd i.e. 70:30. The study was taken up to compare the susceptibility pattern in young one of Vrindavani and Tharparkar cattle and Murrah buffalo calves with respect to diarrhoea, pneumonia and its combination.

II. MATERIALS AND METHODS

The relevant data were collected based on the observations from the study on Vrindavani and Tharparkar Cattle and Murrah buffalo calves (0 to 3 months) from Cattle and Buffalo Farm of Livestock Production and Management Section of Indian Veterinary Research Institute (IVRI), Izatnagar, Uttar Pradesh India. The climatic condition was extremely hot during summers, 43-45 °C (May to June) and

very cold during winters below 10°C (December to February). The data were classified according to species (cattle and buffaloes), breed (*Vrindavani* and Tharparkar in case of cattle and Murrah in buffaloes), season of birth (winter: December to February and summer: March to May) and sex of calf (male and female). A total of 132 calves were born during the study period, all the experimental calves were kept in individual pens (with a common open paddock) from 0-3 months of age. During the day, calves were housed in open paddocks and monitored for occurrence of Diarrhoea, Pneumonia and its combination. Diagnosis was done based on signs and symptoms. The disease calves was separated from the herd and kept in isolation ward to prevent further infection to its counterpart and treatment was giving based on disease. *Vrindavani* calves were weaned at birth and nursed artificially as per scientific recommendation. However, in Murrah and Tharparkar calves weaning was not practised and allowed to suckle before and after milking for short period of time. Calf starter were offered *ad libitum* from fourth days of life onwards.

A standard statistical analysis procedure was used for analysis of the data generated in the experiment as per Snedecor and Cochran (1994). The susceptibility between the species, breed and sex wise was analysed in the study.

III. RESULTS AND DISCUSSION

The analysis indicates that the species, breed, season of calving and type of infection are highly significant ($P \leq 0.01$) in susceptibility to diarrhoea, pneumonia and its combination however, sex of calves doesn't show significant effect in respect to diarrhoea and pneumonia or its combination (Table 1).

Table 1. χ^2 - statistic for different factors for calves susceptible to Diarrhoea and Pneumonia

Particulars	Species	Breed	Season of birth	Sex of calf	Type of infection
Chi- Square	29.82	21.29	24.02	1.59	64.35
d.f.	1	2	1	1	2
Significance	0.00	0.00	0.00	0.21	0.00

The overall mean for age at first infection was 11.47 ± 1.31 days where pneumonia, diarrhoea and its combination were 1.50 ± 0.64 , 12.34 ± 1.44 and 12.00 ± 0.57 days respectively, indicating, all the infection occurred within the first month of life and findings were supported by Cho 2012 (4), Cho and Yoon 2014 (3), Torsein *et al.*, 2014 (22), Islam *et al.*, 2015 (8) and Muktar *et al.*, 2015 (15), who reported that highest risk period of neonatal diarrhoea and pneumonia is from birth until about one month of age. Calves are very crucial to infection hence, care and management during their early life should be strengthened as per the scientific recommendations to increase their survivability.

The susceptibility pattern indicates that diarrhoea was the most common infectious disease in young calves of Tharparkar (35.71%), *Vrindavani* (36.55%) and Murrah buffalo (63.63%), (Figure 1). The present finding is in agreement to the report of Bartels *et al.*, 2010 (1), Cho 2012 (4), Eshetu 2014 (6), Raihan *et al.*, 2014 (18) and Islam *et al.*, 2015 (8), who reported that diarrhoea was the most common infectious and killer disease of neonatal dairy calves that cause major economic lose with high morbidity and mortality in the cattle industry worldwide.

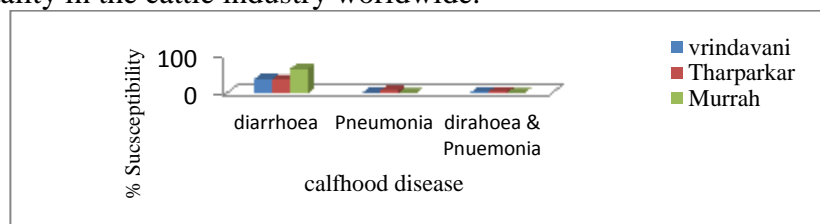


Figure 1. Susceptibility pattern of dairy calves to infectious diseases (0-3m)

Breed wise analysis indicated, Murrah calves are more susceptible (54.54%) than its counterpart of Tharparkar (46.42%) and Vrindavani (34.40%) towards Diarrhoea and Pneumonia (Figure 3) and the findings was in agreement to the reports of by Khan and Khan 1991 (12) and Kumar *et al.*, 2001 (14) who reported Murrah buffaloes calves are more susceptible to neonatal infectious diseases. Similarly, species wise indicated that Murrah calves are more susceptible than cattle calves (Figure 2). Though sex wise break up doesn't indicate any significant effect, however, it is observed that that males were comparatively more susceptible to different diseases (44.77%) in contrast to their female counterparts (32.30%) and the finding is supported by Islam *et al.*, 2005 (7), Raboisson *et al.*, 2013 (16) and Uetake 2013 (23).

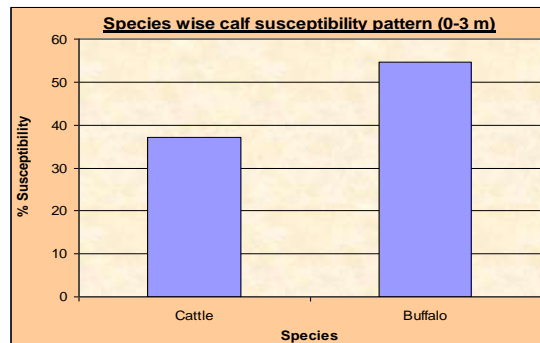


Figure 2. Species wise susceptibility pattern (0-3m).

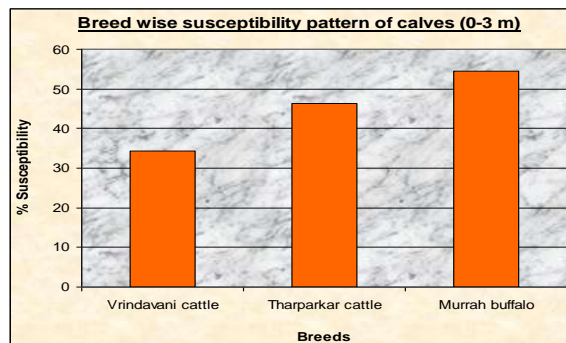


Figure 3. Breed wise susceptibility pattern

The study indicated that season of calving has a significant effect ($P \leq 0.01$) on calves morbidity and mortality. The overall season wise susceptibility pattern indicated that winter born calves were more crucial to Diarrhoea and Pneumonia (61.36%) as compared to summer born calves (22.72%). The findings were in agreement with the reports of Raboisson *et al.*, 2013 (16), Uetake 2013 (23) and Jobst *et al.*, 2015 (11). Higher susceptibility in winter season might be due to severe cold, therefore, management of calves specifically during winter season should be strengthened by providing dry and thick floor bedding along with fitting of heaters/heat convectors etc. to make the temperature comfortable for calves so as to overcome winter stress and increase its survivability.

The study shows that suckling groups or un-weaned groups (Murrah and Tharparkar calves) expressed higher susceptibility rates as compared to weaned Vrindavani calf (Figure 3) and the present findings is in support of Bartels *et al.*, 2010 (1) and Bunter *et al.*, 2013 (13). Higher percentage of susceptibility in un-weaned group could be due to over fed or under fed as exact amount of milk suckle by them was not known, thus leading to digestive problem particularly diarrhea. However, in Vrindavani calves, weaning was practiced on the first day of life and rise artificially by feeding based on their live body weight or scientific recommendation, thus overfeeding and or underfeeding problem was not encounter. Hence either weaning should be implemented in Murrah buffalo and Tharparkar cattle or

every care should be taken at the time of suckling to ensure the calves get sufficient colostrum and whole milk to nourish the nutrient required for growth providing best conditions of hygiene and sanitation to avoid infections.

IV. CONCLUSION

Calf mortality is an important economic factor in dairy production. Hence, identification of factors such as individual risk factors, cause specific factors, herd level risk factors, managerial factors, meteorological factors etc. that cause high morbidity and mortality is an important prerequisite for the design of healthy calf rearing programme and this will also assist in getting regular and time bound replacement of heifers.

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BIBLIOGRAPHY

- [1] Bartels C J, Holzhauer M, Jorritsma R, Swart W A and Lam T J. Prevalence, prediction and risk factors of enteropathogens in normal and non- normal faces of young Dutch dairy calves, Preventive Veterinary Medicine 2010; **93**: 162–169.
- [2] Bunter K L, Johnston D J, Wolcott M L and Fordyce G G. Factors associated with calf mortality in tropically adapted beef breeds managed in extensive Australian production systems, Animal Production Science 2013; **54**(1) 25-36.
- [3] Cho Y and Yoon K J. An overview of calf diarrhea - infectious etiology, diagnosis, and intervention. Journal of Veterinary Science 2014; **15**(1): 1–17.
- [4] Cho Yong-il. Ecology of calf diarrhea in cow-calf operations, Iowa State Univeristy theses and dissertation paper, 2012; 126-142.
- [5] Curtis C R, Scarlett J M, Erb H N and White M E. Path model of individual calf risk factors for calf hood morbidity and mortality in New York Holstein herds. Preventive Veterinary Medicine 1988; **6**: 43-62.
- [6] Eshetu G R. Major causes of calf mortality in intensive dairy farms, central Ethiopia. A cohort study. International Journal of Livestock Research 2014; **4**(3): 9-16.
- [7] Islam S S, Ahmed A R and Ashraf A. Causes and consequences of calf mortality in a diary farm of Bangladesh. Journal of Animal and Veterinary Advances 2005; **4**(2):260-264.
- [8] Islam T M N, Rahman A K, Nahar M S, Khair A and Alam M M. Incidence of calf morbidity and mortality at cig dairy farms of muktagacha upazila in mymensingh distric, Bangl. Journal of Veterinary Medicine 2015; **13**(1): 37-43
- [9] Jana D N and Nautiyal L P. Dairy herd Management and Housing in Tropics. Indian Veterinary Research Institute Publication 1993; 13.
- [10] Jenny B F, Cramling G E and Glaze T M. Management factors associated with calf mortality in South Carolina dairy herds. Journal of Dairy Science 1981; **64**:2284-2289.
- [11] Jobst D K, Arnholdt T, Sturmlechner F, Wersen M and Drillich M. Results of an online questionnaire to survey calf management practices on dairy cattle breeding farms in Austria and to estimate differences in disease incidences depending on farm structure and management practices, Acta Vet Scand 2015; **57**:(44): 1-10
- [12] Khan A and Khan M Z. Immunoglobulin in relation to neonatal calf mortality. Pakistan Veterinary Journal 1991. (In press).
- [13] Khan Z U, Khan S, Ahmad N and Raziq A. Investigation of mortality incidence and manage mental practices in buffalo calves at commercial dairy farms in Peshawar city. Journal of Agricultural and Biological Science 2007; **2**(3): 16-21.
- [14] Kumar C R , Sreenivasa P R and Rao K S. Study of species variation and influence of genetic group on calf mortality in cattle and buffalo. Cheiron 2001; **30** (1&2): 31-32.
- [15] Muktar Y, Mamo G, Tesfaye B and Belina D. A review on major bacterial causes of calf diarrhoea and its diagnostic method. Journal of Veterinary Medicines and Animal Health Vol. 2015; **7**(5): 173-185.
- [16] Raboisson D, Delor F, Cahuzac E, Gendr C, Sans P and Allaire G. Perinatal, neonatal, and rearing period mortality of dairy calves and replacement heifers in France. Journal of Dairy Science 2013; **96**: 2913–2924.
- [17] Raihan Md. Ansari H I, Rahman Md M, Islam Md Z, Das B C, Habib A, Belal S M S H and Islam K. Prevalence and Antimicrobial Resistance Profile of Escherichia Coli and Salmonella Isolated from Diarrheic Calves. Journal of Animal Health and Production 2014; **2**(1): 12 – 15

- [18] Roy P K, Ghosh A, Pal P K and Basu, S B. Mortality pattern in Jersey x Tharparkar crossbred female calves. *Indian Veterinary Journal*, 1997; **74**: 673-676.
- [19] Sharon M. The impact of early calthood disease. *Veterinary Ireland journal* 2014; **4** (5): 267-268
- [20] Shivahre P R, Gupta A K, Panmei A, Bhakat M, Kumar V, Dash S K, Dash S and Upadhyay A. Mortality pattern of Murrah buffalo males in an organised herd. *Veterinary World* 2014; **7**:356-359.
- [21] Torsein M, Mork M J, Lindberg A, Sandgren C H and Berg C. Associations between calf mortality during days 1 to 90 and herd-level cow and production variables in large Swedish dairy herds. *Journal of Dairy Science* 2014; **97**(10): 6613–662.
- [22] Uetake K. Newborn calf welfare: A review focusing on mortality rates. *Journal of Animal Science* 2013; **84**: 101–105.
- [23] Verma A K, Sastry N S R and Dipankar K. Mortality trend in female Murrah buffalo calves. *Indian Journal of Animal Production and Management* 1988; **4**(1): 18-21.
- [24] Windeyer M C, Leslie K E, Godden S M, Hodgins D C, Lissemore K D and LeBlanc S J. Factors associated with morbidity, mortality, and growth of dairy heifer calves up to 3 months of age. *Journal of Preventive Veterinary Medicine* 2014; **113**(2):231-240
- [25] Zucali M, Bava L, Tamburini A, Guerci M and Sandrucci A. Management Risk Factors for Calf Mortality in Intensive Italian Dairy Farms. *Italian Journal of Animal Science* 2013; **12**(2):458-462