RESEARCH ARTICLE

Retrospective study of calf mortality on Central Cattle Breeding and Dairy Farm (CCBDF) in Bangladesh

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Özet

Hossain MM, Kamal AHM, Rahman AKMA. Bangladeş Merkez Sığır Yetiştiriciliği ve Süt Çiftliğinde (CCBDF) buzağı ölümleri üzerine geriye dönük araştırma. **Eurasian J Vet Sci, 2013, 29, 3, 121-125**

Amaç: Mevcut araştırmanın amacı buzağı ölümleri ile ilgili faktörlerin araştırılması amacı ile yapıldı.

Gereç ve Yöntem: Merkez Sığır Yetiştiriciliği ve Süt Çiftliğinde (CCBDF) 16 (1992-2007) yıl süresince kaydedilen buzağı ölümleri mevsim, yaş, cinsiyet, ırk ve etiyolojisine göre incelendi.

Bulgular: Dişi buzağıların (%56.77) erkek buzağılardan (%43.23) daha çok öldüğü gözlendi. Egzotik ve melez ırklardaki ölüm oranı yerli ırklardan daha fazla olarak belirlendi. Bahar, yaz ve kış mevsimdeki ölüm oranı sırası ile %28.99, %33.03 ve %37.98 olarak belirlendi. Esas ölüm sebebi olarak solunum sistemi hastalıkları (%38.75), tüberküloz (%20.02) ve sindirim sistemi hastalıkları (%16.73) olarak tespit edildi. Diğer ölüm sebepleri ise malnutrusion (%5.28), zayıflık (%4.72), hairball (%3.12), babezioz (%2.56), iç kanama (%2.56), timpani (%2.24), yanıkara (%2.24) ve şap (%1.76) olarak belirlendi. Yaşın ise ölümle ilişkisinin olmadığı belirlendi.

Öneri: Bir aylık buzağıların mortalite riskini yüksek oranda taşıdığı bildirilebilir.

Anahtar kelimeler: Mortalite, buzağı, geriye dönük araştırma

Abstract

Hossain MM, Kamal AHM, Rahman AKMA. Retrospective study of calf mortality on Central Cattle Breeding and Dairy Farm (CCBDF) in Bangladesh. **Eurasian J Vet Sci, 2013, 29, 3, 121-125**

Aim: The objective of this study was to find out the underlying causes and factors which are associated with calf mortality.

Materials and Methods: The 16 (1992-2007) year's data of calf mortality in the Central Cattle Breeding and Dairy Farm (CCBDF) were analyzed for season, age, sex, breed and etiology.

Results: Female calves (56.77%) died more than males (43.23%). The mortality was significantly higher in exotic and crossbred animals than in local/indigenous calves. Mortality rate were 28.99%, 33.03% and 37.98% in rainy, summer and winter season, respectively. The major causes of death were respiratory tract disease (38.75%), tuberculosis (20.02%) and alimentary tract infections (16.73%). The other causes of death in calves occurred in the following frequencies: Malnutrition (5.28%), debility (4.72%), hairball (3.12%), babesiosis (2.56%), internal haemorrhage (2.56%), tympanitis (2.24%), black quarter (2.24%) and foot and mouth disease (1.76%). Age is the most important factor and significantly associated with mortality.

Conclusion: Calves of first month of life may have higher mortality risk.

Keywords: Mortality, calves, retrospective study

Introduction

Calf morbidity and mortality are the problems of major concern in all countries (Radostits 2001) The important causes of calf mortality include immunodeficiency (White and Andrews 1986), season effects (Fink 1980), difficult parturition (Ahmad et al 1986) and faulty management conditions (Fedida et al 1984). Mortality patterns in organized dairy herds serve as a useful indicator for assessing the status of herd health and management programs and their efficacy (Prasad et al 2004). A rise in the mortality among a group of cattle can indicate sub-optimal health and welfare. Bangladesh is agriculture based densely populated country and its livestock is a very important and prospective one. Dairy industry is a crucial component of agro-based economy for a country like Bangladesh (Islam et al 2006). Calf mortality in every dairy and breeding farm causes a financial and genetic loss (Islam et al 2006). So, reductions in morbidity and mortality rate are the first and foremost targets of dairy farm management (Prasad et al 2004). Identification of factors that are responsible for dying of calves is an important prerequisite for avoiding excessive mortality.

The aim of this research was to document the pattern of calf mortality in Central Cattle Breeding and Dairy Farm (CCBDF) and to identify factors associated with mortality as well as to recommend appropriate measures to reduce the mortality.

Materials and Methods

This study was conducted in CCBDF at Savar, Dhaka, Bangladesh. In the CCBDF, the crossbred animals constitute 60% of the herd population and proportions of other breeds include 14% Holstein Friesian, 16% Sahiwal and other Indian subcontinental genotypes and 10% local/indigenous breed. For the retrospective study, the data were collected based on the farm records of all cattle deaths over a period of 16 years (1992 to 2007). Information on the date of birth, sex and breed, date of death and causes of death were collected from the farm at the individual animal level. Data on the causes of mortality were obtained from the death reports routinely prepared by the veterinarians in the Veterinary Hospital of CCBDF. Each death report usually consisted of history, clinical and macroscopic post-mortem findings and occasionally laboratory data. However, as most diagnoses were based on clinical grounds and post-mortem findings and in such cases confirmed by laboratory aids, the data were arranged into 5 (five) major diagnostic groups as follows: (1) Bacterial and mycobacterium disease (Black quarter and tuberculosis); (2) Viral disease (Foot and Mouth Disease); (3) Protozoan disease (Babesiosis); (4) Disease syndrome (Debility, enteritis, internal haemorrhage, malnutrition, pneumonia and tympanitis); and (5) Physiological disorder (Hair ball).

Data were transferred to STATA version 11 (Stata Corporation, Texas, USA, 2009) for statistical analysis. The correlations between ages and sex were analyzed by using Poisson regression model. All tests of statistical significance were carried out at the P≤0.05 level.

Results

Calves had a greater share (71.01%) in mortality and the differences are statistically significant (Table 1). Higher percentage of deaths was observed within 365 days of age and the mortality started to decrease gradually after their first month of life and dropped to a lower rate with the increase of age (Figure 1). Effects of calf sex and season and effects of genotype on cause of calf mortality are shown Table 1, 2, and 3, respectively.

Table 1. Descriptive statistics and Poisson regression analysis by age category of dairy cattle mortality in CCBDF.

Category of animal	Number of deaths	P-value
Female calves ≤ 365 days	709	0.000
Male calves ≤ 365 days	540	0.000
Heifers 365 days to ≤ 730 days	89	0.258
Young bull 365 days to ≤ 730 days	102	0.002
Bulls ≥ 731 days	137	0.037
Cows ≥ 731 days	182	0.000

Discussion

Among the deaths of animal in CCBDF, more than two-third of the mortality was within the first year of life. These mortality rates are higher than those reported in Bangladesh (Debnath et al 1995). This may be due to the higher proportion of exotic and crossbred calves on the CCBDF and their observed higher mortality rate. The management system variation after the cessation of technical and resource supports provided to the CCBDF by German Agency for Technical Cooperation may partly be associated. Of the deaths, the greater percentage occurred in the first months of life.

These reports correlate with other workers (Ibeawuchi et al 1983, Debnath et al 1995, Islam et al 2005). Young calves are highly susceptible to infectious diseases as a result of lower immunity which could be exacerbated by in adequate colostrums intake (Oluokun et al 1988, Brenner et al 1989). Although calf mortality in smallholder traditional dairy farms in Bangladesh has been estimated relatively lower (Debnath et al 1990), that estimate is not applicable to the CCBDF since it follows an intensive animal husbandry system which differs markedly from the traditional extensive husbandry systems in the villages. Female calves had a higher mortality rates than males. Similar findings also reported in a study of mortality pattern in a closed herd of dairy cattle in India where the mortality of female calves was higher than males (Somavanshi 1995). The mortality rate was higher in local and Holstein Friesian crossbreds calves compared with in-

Table 2. Effects of calf sex and season on cause of calf mortality in CCBDF.

Cause of death	Mortality rate		Sex		Season		
	n	%	Male	Female	Rainy	Summer	Winter
Pneumonia	484	38.75	246	238	17	308	169
Tuberculosis	250	20.02	221	29	-	-	250
Enteritis	209	16.73	12	197	181	14	14
Malnutrition	66	5.28	4	62	4	59	3
Debility	59	4.72	1	58	55	2	2
Hairball	39	3.12	1	38	37	1	1
Babesiosis	32	2.56	-	32	31	1	-
IH	32	2.56	-	32	21	11	-
Black quarter	28	2.24	-	28	28	-	-
Tympanitis	28	2.24	26	2	2	-	26
FMD	22	1.76	-	22	22	-	-

IH: Internal haemorrhage, FMD: Foot and mouth disease.

Table 3. Effects of genotype on cause of calf mortality in CCBDF.

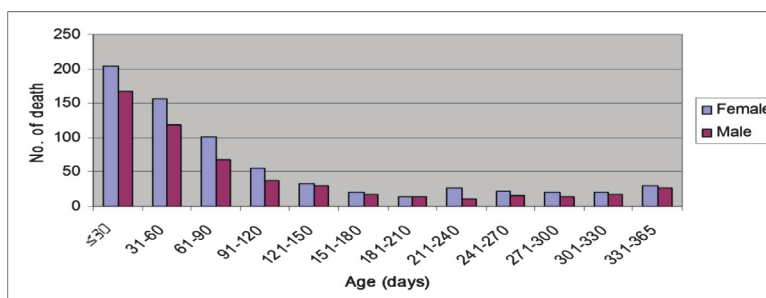| Cause of death	Holstein Friesian	Sahiwal	Indigenous	Crossbreds
Pneumonia	6	3	2	473
Tuberculosis	5	3	-	242
Enteritis	40	41	60	68
Malnutrition	2	2	-	62
Debility	51	5	-	3
Hairball	4	1	7	27
Babesiosis	9	2	-	21
Internal haemorrhage	-	-	8	24
Black quarter	7	2	4	15
Tympanitis	3	1	6	18
Foot and Mouth Disease	-	-	-	22

Figure 1. Relationship of calf mortality of different intervals age in CCBDF.

digenous/local and other genotypes available in the CCBDF. The higher mortality in these crossbred calves may be explained by the prevailing environmental conditions, including managemental and climatological aspects. This high rate of mortality in crossbred (Local x Holstein Friesian) calves may indicate lower survivability of this genotype compared with other genotypes under the prevailing conditions of Bangladesh. This observation was in agreement with the findings of higher mortality in exotic and crossbreeding animal (Debnath et al 1990, Prasad et al 2004). The overall highest number of calves died in winter season followed by summer and rainy season. The higher mortality of crossbred calves was observed during the summer season compared with local/indigenous and other sub-continent genotype. The trends of this study indicate that the better adaptability of local/in-

digenous genotype for the hot humid climate (summer) and higher susceptibility to cold (winter) and the opposite was seen as in crossbreds.

The tuberculosis was the second most important cause of deaths and the mortality was more common in winter season. This finding disagrees with the findings of other researchers (Mitra et al 2005, Ramesh 2007). They reported that the tuberculosis was more common in older animals and in rainy season. In a confined herd like CCBDF tuberculosis can be controlled and eradicated by following a "detect and discard" policy. Culling to reduce the population density can also decrease the transmission. The death of calves by BQ was lower and this may be possible by treating the infected animals and vaccination against the disease. Among

the deaths by BQ, the higher proportion was observed in female calves within first year of life. Similarly, others (Sultana et al 2008) reported that animals up to 12 months of age has probability and subsequent mortality 6.66 times more than animals over 12 months of age. It is to be pointed out that the previous study (Debnath et al 1995) showed FMD contributes significantly to calf mortality even after regular vaccination. This study revealed that FMD was controlled and no further cases were reported after a certain period of time. The higher number of calf was found to be died by babesiosis and most of them are in rainy season. This finding correlates with other (Somavanshi 1995). The higher rainfall during the rainy season might be the cause as the host ticks are more prevalent in higher rainfall areas. The other study (Debnath et al 1995) reported that 1.5% calves were died by babesiosis in the same farm. The disease can be eradicated from the farm by eliminating the ticks by treating all cattle with acaricides in every 2 to 3 weeks.

The most important disease syndrome of deaths was pneumonia. Similarly, others (Bhuller et al 1985, Shimizu et al 1987, Islam et al 2005) stated that higher proportion of calves died by pneumonia. However, Bellows et al (1987) found a larger percentage (40.60%) of calves dying due to pneumonia. Younger age, inadequate housing for newborn calves and climatic change might be the cause for pneumonia because of lack of care. Enteritis is of particular importance as the significant number of calves died by enteritis. Calves are more depended upon milk, milk replacer, and having incapability to digest all kinds of food materials. Overfeeding, sudden change in diet, poor hygienic condition of feeding utensils and calf barns might be the cause. Pneumonia and enteritis are multifactorial disease and are closely associated (Tikku 1986, Waltner-Toews et al 1986, Debnath et al 1995), and it has been suggested that some common factors related to either management technique or specific agents, predispose calves to both syndrome (Waltner-Toews et al 1986). The deaths caused by malnutrition were more common in female calves. Alternatively, Mulei et al (1995) reported that mortality by malnutrition were most common in male calves. In the CCBDF it is not uncommon to find emaciated and neglected calves. This might be particularly found when the feed supply is not always adequate for all animals or incorrect proportion of feed ingredients supplied to the animals. Debility was also seemed to be high in female calves and was highest during the rainy season. Similarly, Ramesh (2007) observed the higher proportion of female cattle were affected by debility and was more common during rainy season in the same farm. Lack of vegetation, unsuitable and insufficient food; and prevalence of other diseases might be the cause of debility. Among the deaths by tympanitis, male calves were more associated. This observation disagrees with the findings of others (Ramesh 2007) in the same farm where higher proportion (87.23%) of females were affected by tympanitis. High level of grains with minimal roughages or eructation problem by obstruction of esophagus might be the cause.

Conclusions

Among the risk factors associated with mortality, age of the animal was found to be the most important, before breed and season. Greater attention might be paid to the time of colostrum feeding, proper timing and management of calves and hygiene of calf barns. Because of the complex nature of dairy management systems, the varieties of causes are responsible for diseases and deaths of dairy calf.

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