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Causes and Consequences of Calf Mortality in a Dairy Farm of Bangladesh

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Abstract: The study was conducted in Milk and Cattle Improvement Farm, Bogra, Bangladesh with a view to identify the causes of calf mortality and its consequences on the reduction of milk yield. Records on 162 expired calves were used for the study that covered from 1995 to 2003. The dams of the farm were the crosses of indigenous zebu (*Bos indicus*) with Friesian and Shahiwal. Artificial insemination with deep frozen semen of exotic breeds was the means of breeding. Veterinary assistances were taken if and when necessary during parturition and newly born calves were fed colostrum *ad libitum* immediately after birth. Calf mortality was found highest in monsoon (36.4%) followed by winter (34.6%) and summer (29.0%). Mortality was higher in male calves (55.6%) than female (44.4%). Calf mortality rate was decreased with the increase in age of the calves and it was found highest in first month of life (35.2%). On the other hand, mortality decreased with the increase in birth weight. The predominant causes of calf mortality were pneumonia, foot and mouth disease (FMD), dystocia, calf scours etc. Among 162 expired calves, maximum 14.8% calves were died by pneumonia, followed by FMD (12.3%), dystocia (11.7%), calf scours (8.6%), black quarter (8.0%) etc. On an average 1012.39 kg of milk was lost for lose of each calf.

Key words: Causes, Consequences, Calf mortality, Dairy herd

Introduction

Calf mortality is the major causes of economic losses in livestock production. It is roughly estimated that a calf mortality of 20 per cent can reduce net profit to 38 per cent (Blood and Rhodostits, 1989). Neonatal calf mortality varied from 8.7 to 64 % throughout the world and the mortality in the first month of age was accounted to be 84 per cent of the total mortality (Jenny *et al*., 1981) where it was particularly high in the third week of life (Umoh, 1982). Mortality in neonatal calves had mostly been attributed to infectious agents, i.e. rotavirus, coronavirus, enteropathogenic *Escherichia coli*, salmonella species and crytosporidium (Snodgrass *et al*., 1986). Other important causes of calf mortality include immunodeficiency (White and Andrews, 1986), season effects (Fink, 1980), difficult parturition (Ahmad *et al*., 1986; Szenci and Kiss, 1982) and faulty management conditions (Fedida *et al*., 1984). The aim of the study was to find out the causes of calf mortality in a dairy herd and its consequences on reduction of milk yield.

Materials and Methods

The study was conducted in Milk and Cattle Improvement Farm, Sherpur, Bogra, Bangladesh. Department of Livestock Services, Bangladesh established the farm in 1995 with a view to improve the indigenous zebu cattle (*Bos indicus*) of Bangladesh. Crossbreeding program has been carried out since the establishment of the farm. The dams of the farm were the crosses of indigenous zebu (*Bos indicus)* and exotic breeds usually Friesian and Shahiwal. They were artificially inseminated with the deep frozen semen of exotic bulls. The average body weight of the dams was 315 kg. The pregnant cows were transferred to the maternity pen about two weeks before parturition. Veterinary assistances were taken if and when necessary during parturition. Colostrum feeding was ensured immediately after birth self suckling by the calves. The calves were isolated from their mothers and transferred to the calves' shed five days after birth. Hand milking was performed in the farm and the calves fed milk *ad libitum* by suckling twice daily i.e., morning and evening before milking of the mother cows. The cows were stimulated for milk let down by the suckling of their own calves. The weaning of calves was done at the end of lactation. After two weeks of age the concentrates feed and rice straw were provided at the rate of 0.5 kg of each per calf. During the age between 3 to 6 months the rate of concentrate and straw feeding was increased to 1.3 kg of each per calf. The ingredients of concentrate feed were wheat bran (*Triticum aestivum*), rice polish (*Oryza sativa*), sesame oil cake (*Sesamum indicum*), chick pea (*Lathyrus sativus)*, black gram (*Vigna mungo*), gram (*Cicer arietinum*) and common salt. The concentrate feed contained 18.38% crude protein and 2359 Kcal metabolizable energy per kg. The consequences of calf mortality were measured in terms of losses of milk yield. Milk yield of the previous and post lactation of the respective cows was considered during calculating the losses.

Calf mortality records kept at the farm were used for the study that covered 1995 to 2003. Number of calves born in this period was 1270 of which 162 died (12.76%). Data were analyzed using statistical package for social science (SPSS, 1999) for mean, standard error (SE) and analysis of variance (ANOVA).

Results

Greater percentage of calves was died in monsoon. Data presented in Table 1 show that out of 162 expired calves 59 were died in monsoon (36.4%), 56 in winter (34.6%) and 47 in summer (29.0%). Mortality was higher (55.6%) in case of male calves (Table 2). Calf mortality decreased with the increase in age and maximum percentage (35.2%) of calves expired at the first month of age (Table 3). Average birth weight of expired calves was 21.20 ± 0.53 and 20.78 ± 0.54 kg for male and female, respectively where the difference was non-significant ($P > 0.05$, Table 4). Calf mortality decreased with the increase in birth weight (Table 5). Greater percentage (56.2%) of calves were died those had minimum birth weight (15 to 20 kg). The predominant causes of calf mortality were pneumonia, foot and mouth disease (FMD), dystocia, calf scours etc. (Table 6). Among 162 expired calves, maximum calves were died by pneumonia (14.8%), followed by FMD (12.3%), dystocia (11.7%), calf scours (8.6%), black quarter (8.0%) etc. It was found that average 1012.39 kg of milk was lost for lose of each calf (Table 7).

Discussion

Seasons of Calves' Expire: Mortality rate was higher in monsoon, which revealed that monsoon was most susceptible season to calf diseases and mortality. Moist and humid conditions along with heavy rainfall may be suitable for growth and proliferation of disease causal agents. Season had a significant effect on the calf mortality as well as on the absorption of immunoglobulins in neonatal calves (Fink, 1980). The mean serum immunoglobulins concentrations were lowest in winter born calves and increased during the spring and early summer (Norheim, 1985), perhaps this was the reason that higher mortality rates of 69.6 per cent had been observed in winter born buffalo calves than 39.4 per cent in summer born calves (Afzal *et al.*, 1983). Similar pattern of mortality have been reported by other workers (Bhullar and Tiwana, 1985; Sharma *et al.*, 1984 and Varma *et al.*, 1988).

Sex of Expired Calves: The higher mortality of male calves in the present study was consistent with the result of Kaushik *et al.* (1980). Reason for this higher mortality of male calves might be due to serum immunoglobulins, required for the protection from different diseases during neonatal life, absorb less in male (20.69 mg/ml) than female (25.12 mg/ml) calves (Sangwan *et al.*, 1985). Competition between microorganisms and immunoglobulins for a common intestinal receptor does occur in early few hours of life (Staley and Bush, 1985), due to this competition male calves become more immunodeficient than female calves. Stillbirths as well as dystocia problems were more common incase of male calves (Patterson *et al.*, 1987 and Szenci and Kiss, 1982).

Age of Expired Calves: Maximum percentage (35.2%) of calves expired at the first month of age in the study had the harmony with the findings of Jenny *et al.* (Jenny *et al.*, 1981), they found comparatively larger percentage of calf mortality (84.0%) during first month of age. Mortality percentage was decreased with the increase in age of calves. These results revealed that first 30 days are more sensitive for calves rearing and special care and management should be maintained during this period.

Birth Weight of Expired Calves: Bhullar and Tiwana (1985) found significant effect of birth weight on calf mortality. Calf mortality decreased gradually with increase in birth weight and minimum (21.1%) in calves weighing 41 kg and above at birth (Bhullar and Tiwana, 1985). Singh *et al.* (1980) reported similar pattern of calf mortality according to birth weight. There was difference of opinion, as Verma *et al.* (1980) reported non-significant effect of birth weight of calves on their mortality. Male calves had a significant higher (37.2 kg) birth weight than female (33.7 kg) calves (Bellows *et al.*, 1987), this was the reason that dystocia was more common in male (Patterson *et al.*, 1987).

Causes of Calf Mortality: Among 162 expired calves, maximum (14.8%) calves were died by pneumonia. Similarly, Shimizu and Nagatomo (1987), Bhullar and Tiwana (1985), Sharma *et al.* (1984) and Williams *et al.* (1975) stated that 14.1%, 12.0%, 13.79% and 14.36% calves were died by pneumonia, respectively. However, Bellows *et al.* (1987) found a larger percentage (40.6%) of calves were died by pneumonia. The mortality percentage was minimum (1.9%) by diarrhea, where Shimizu and Nagatomo (1987) found 3.6% mortality by diarrhea. However, larger percentages of mortality by diarrhea were stated by following authors, Bellows *et al.* (1985) (10.0%), Fink (1980) (35.9%) and Sharma *et al.* (1984) (26.43%).

The percentage of calves died by dystocia was much lower than the findings of Bellows *et al*. (1987) (50.9%), Fink (1980) (30.8%) and Zrelli *et al*. (1988) (20.5%). Dystocia was mainly due to abnormal presentation of calf especially backward and breech presentation. Incidence of dystocia was higher in primiparous dams than in multiparous dams

Table 1. Percentage of calves expired in different season

Seasons	Number of calves expired	Percentage
Summer (March-June)	47	29.0
Monsoon (July-Oct)	59	36.4
Winter (Nov-Feb)	56	34.6
Total	162	100.0

Table 2. Percentage of calves expired according to the sex

Sex of calf	Number of calves expired	Percentage
Male	90	55.6
Female	72	44.4
Total	162	100.0

Table 3. Percentage of calves expired according to age

Age group of calves	Number of calves expired	Percentage
Birth to 30 days	57	35.2
31 days to 60 days	38	23.5
61 to 90 days	29	17.9
Above 90 days	38	23.5
Total	162	100.0

Table 4. Birth weight (kg) of expired calves according to the sex

Sex	Number of calves	Mean	Std. Error	F-value
Male	90	21.20	0.53	0.30 (NS)
Female	72	20.78	0.54	
Total	162	21.01	0.38	

NS = Non-significant

Table 5. Percentage of calves expired according to birth weight

Birth weight	Number of calves expired	Percentage
15 to 20 kg	91	56.2
21 to 25 kg	47	29.0
26 to 30 kg	15	9.3
Above 30 kg	9	5.6
Total	162	100.0

Table 6. Causes of calf mortality

Causes	Number of calves expired	Percentage
Pneumonia	24	14.8
Foot and mouth disease	20	12.3
Dystocia	19	11.7
Calf scours	14	8.6
Black Quarter	13	8.0
Malnutrition	9	5.6
Cold stress	7	4.3
Parasite infestation	6	3.7
Anthrax	4	2.5
Diarrhea	3	1.9
Others	43	26.5
Total	162	100.0

Table 7. Milk yield loss due to calf expires

Number of observation	Mean	Std. Error
44	1012.39	110.81

and was significantly higher ($P<0.01$) in case of male calf (57.6%) but lowered (42.4%) in female (Patterson *et al.*, 1987). Persistent hymen in heifers was an important condition that delays the delivery of the young one in naturally bred heifers (Ahmad *et al.*, 1986). According to Jenny and his colleagues (Jenny *et al.*, 1981), stillborn calves were more likely to die as compared to normal delivered calves. Stillbirths varied with the parity of the dam (Simensen, 1982) and season of the year (Szenci and Kiss, 1982).

Consequences of Calf Mortality: Consequences of calf mortality were described in terms of milk yield loss for the loss of each calf. The authors of this article studied milk production performances of cows of the same farm and found average 1336.88 kg milk yield per lactation (Ahmed *et al.*, 2004). Due to calf expire the milk yield of mother cows was ceased as in the farm hand milking was performed and calves usually suck before milking to prepare cows for milk let down.

Due to the preparation of cows for milk let down by the suckling of their calves the milking was depended on the presence of own calf and for its consequences total milk production of the farm was hampered. Therefore, it can be recommended here that force weaning of calf at a suitable age can save the farm from milk yield loss due to the calf mortality as well as hand milking can be replaced with machine milking.

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