FACTORS EFFECTING CALF MORTALITY IN CATTLE

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Data were collected from the LPRI., Bahadurnagar, LES, Jahangirabad and Rakh Ghulama for the period from July, 1981 to June, 1990 to determine important causes of mortality in cattle calves. Overall mortality rate was higher in females than male calves. Still birth accounted to 3.92% of all births. The incidence of abortion was 8.05%. The age of dam and the birth weight of calf had significant correlation with calf mortality. Other parameters such as calving season, age of calf, cause of death and age of calf showed non-significant relationship with calf mortality.

INTRODUCTION

Cattle is very important source of animals protein (meat and milk) in Pakistan. Due to fast growing rate of population in the country, the gap between supply and demand for quality protein food is continuously widening. The early death of cow calves affects not only the milk and meat production but also result in reduction of genetic progress, and disruption of breeding programmes due to early mortality of male and female calves. Early mortality reduces the availability of males for the selection and production of quality sire and females for further replacement. .

The present work is an attempt to study the factors which contribute to early calf mortality in cows; Determination of such clues may possibly be a great tool to take appropriate measure to reduce the death losses and to improve the sources of protein availability.

MATERIALS AND METHODS

Data of all the calves born at Livestock Production Research Institute Bahadurnagar, Livestock Experimental Stations Jahangirabad and Rakh Ghulama from 1981-1990 was analysed in an attempt to investigate calf mortality.

At these stations animals were kept under the sheds. Weaning was practiced on all the farms. The schedule of milk feeding was 11l0th o body weight of the calf.

Post-rnartum register was consulted thoroughly and the following observations were recorded:

1) Tattoo/tag No. of dead calf (upto I year of age)
2) Cause of death
3) Sex of the calf
4) Age of the calf at death

Birth register was used to record the date of birth of the dead calf, type of birth (normal vs abnormal),' season of birth of the dead calf, birth weight of the calf, brand No.of the dam of the dead calf, history sheet and No. of still births and abortions.

Other records noted were age of dam at the time of parturition. Lactation No. of the dam, herd size, feeding system, housing system, weaning practices and amount of milk fed to calves.

The data obtained were arranged yearwise according to parameters under study. To determine the effect of age of dam on calf mortality three age groups were suggested as follows:

Group I = upto 4 years
Group II = 4-9 years and
Group III = Above 9 years

Similarly three age groups were used for calf to determine the most critical stage where the mortality was found to be maximum:

Group I = upto 1 month
Group Il = 19 - 23 kg
Group III = Above 23 Kg

The difference among the age group, birth weight group and sex of calf were calculated by using Z-test as given in the formula:

$$Z = \frac{P_1 - P_2}{\sqrt{P_1 q_1/n_1 + P_2 q_2/n_2}}$$

Where

P_1 = Percent mortality of group I which is calculated as

PI = D/B x 100

D = Total number of deaths

B = Total number of births

P_2 = Percent mortality of group Il, calculated in the same way i.e.

P_2 = D/B x 100

q_1 = Percent birth in group I which is calculated as $q_1 = 100 - P_1$;

q2 = Percent birth in group Il calculated in the same way i.e,

q2 = 100 - P2

n_1 = Number of observations in group I and

n2 = Number of observations in group Il

Still birth rates (SBR) was calculated by using the formula:

Abortion rate (AR) was obtained witht help of Formula:

$$SBR = \frac{SB}{c-a} \times 100$$

Where:

SB = Total number of still - births

c = Total number of conceptions

a = Number of abortions

Abortion rate (AR) was obtained with the help of formula:

$$AR = \frac{a}{c} \times 100$$

a = Total number of abortions

c = Total number of conception

RESULTS AND DISCUSSION

A: Overall Mortality:

Data showed that the mortality rate was 10.93 and 12.97, 8.86 and 10.08 and 9.85 & 81.17 percent among 1125 & 1002, 1455 and 1448 and 1035 & 1012 male and female calves, respectively (Table I). Non-significant relationship was observed between the sex of calves and mortality,

The present findings are close with the findings of Ranatunga (1974) who reported that the calf death rate was 15.6% before six months of age. Martin *et al.(1975)* reported that average calf mortality was 18.7% with a large variation among different farms (3.7 - 32.1%). Only at Rakh Ghulama farm higher mortality was found in male than in female calves. The findings of Nataranjan *et al.* (1980) was not in line with the findings o present study who reported that mortality rate was higher in male than in female.

B: Still birth and abortion rate:

In the present study, still birth rate was found 3.92% of all births and of the still-born calves 51.44% were males and 48.56% were females (Table 2). The incidence of still births obtained here was less than estimates pertaining to pure (5.8%).

The abortion rate observed in cow calves was 8.05% (Table 2). Greene (1978) found 3.1% abortion rate during the investigation of 8 Agriculture Institute Farms.

C: Age of dam and calf mortality:

The mortality rate in each of the three age groups was 47.49%, 6.18 and 51.43 percent at LPRI Bahadurnagar (Table 3). The mortality rate at LES Jahangirabad and Rakh Ghulama is presented in Table 3. After applying Z-test on the data, it Was found that the group I & 11 and group 11 & III were significantly different from each other, while there was non-significant difference between group I & III at each of the

Both breeding and off-breeding season were found to be non-significantly correlated with calf mortality. Higher mortality rate was observed in breeding season at two farms except at LES Jahangirabad.

Sharma *et al.(1975)* reported that summer and winter had non-significant effects on calf mortality. Rao and Nagarceukar (1980) reported that season of birth and sex of calf were non-significant correlated with mortality.

Table 1. Overall mortality

Farms	Male		Mortality %	Female		Mortality %
	Birth	Death		Birth	Death	
Bahadurnagar	1125	123	10.93	1002	130	12.97
Jahangirabad	1455	129	8.86	1448	146	10.08
Rakh Ghulama	1055	102	9.85	1012	86	8.17

Table 2. Incidence of still births and abortion

Total birth	Calves born alive	Abortion			Still-birth		
		Total number	Male	Female	Total number	Male	Female
7077	6799'	570	316	254	278	143	135
%	96.07^L	8.05^L	55.44^3	44.56^3	3.92^L	51.44^4	48.56^4

1 = Excluding still biths   2 = Percent of total births
3 = Percent of all abortions   4 = Percent of all still births

three farms. However, the mortality percentage was relatively higher in group III than in group 11. Auran (1972) found that the effect of month of calving, age, of dam and breed of dam on calf mortality was highly significant.

D: Calving season and calf mortality:

Mortality rate observed under the breeding season (July-October) at Bahadurnagar, Jahagirabad and Rakh Ghularna farms was 12.07 & 14.98, 9.79 & 8.96 and 14.0 & 5.88 percent in male and female cales respectively. There was statistically non-significant relationship between the sex of the calf and calf mortality (Table 4).

E: Birth weight and calf mortality:

The mortality observed in each group is shown in (Table 5).

There was statistically a significant relationship between group I & 11 and group I & Ill. Group 11 and III did not differ significantly at each of the three farms. Mortality percentage was higher in group 11 than in group III at Bahadurnagar and Jahangirabad, while it was relatively lower in group 11 than in group III at Rakh Ghulama Farm. Maximum mortality due to birth weight was observed in group I. Lower birth weight and high mortality rate in calves may be due to low survival rate, poor managemental practices

and more susceptibility to diseases. Hearnshaw *et at.* (1984) reported that the cow calves which die pre-natally had a lower birth weights than those survived to one week.

F: Causes of death and calf mortality:

The results obtained for causes of death and calf mortality are presented in (Table 6). Z-test showed non-significarit relationship between the sex of the calf and the causes of death. However, greatest losses were observed due to enteritis at Jahangirabad farm. The male calves showed relatively greater susceptibility

H.S. Parasitic gastroenteritis and pneumonia (14.8, 12.7,9.2,7.0 and 6.3% respectively).

The miscellaneous causes of death included some cases of Haemorrhagic Septicemia (H.S.), heatstroke, heart attack, typmpany, diarrhea, whitescour, hepatitis, snake bites, etc.

G: Age of calf and mortality

The mortality observed under each age group is shown in (Table 7). The least mortality was found in group III at Bahadurnagar and Jahangirabad, whereas it

Table 3. A12eo fd am an dlfa mor tatity

Farms	OI upto 4 year %	GII 4-9 year %	GIll Above 9 year %
Bahadurnagar	47.49	6.18	51.43
Jahazirabad	44.04	4.15	44.91
Rakh Ghulama	42.07	3.~7	43.48

Table 4. CaIVIn2 season and caIf mor tatt v

Farms	Breeding Season (%)		Off-breeding season (%)	
	Male	Female	Male	Female
Bahadurnagar	12.07	14.98	10,54	12.58
Jahangirabad	9.79	8.96	9,40	10,47
Rakh Ghulama	14.00	5.88	8.86	8.62

Z = non-significant

Table 5. BIr th We12ht and caIf mor tatHy

Farms	GI upto 18 Kg	GII Uoto 19 - 23 Kg	GIll Above 23 Kg
Bahadurnazar	49.69	10,34	6.03
Jahagirabad	47,55	8,32	5.74
Rakh Ghulama	50.94	5.79	11,70

to death due to pneumonia than females at Bahadurnagar and Rakh Ghulama farms. Batabyal *et al.(1984)* found enteritis and pneumonia as main cause of death among 1370 crossbred cattle calves. Otesile *et al. (1983)* reported that the most common causes of post-natal death were neonatal weakness, FMD,

was maximum in this age group at Rakh Ghulama. Non-significant relationship was found among three age groups. The variations in results at Rakh Ghulama farm from the other two stations may be attributed to managemental practices and scarcity of fodder. Oxender *et al.* (1973) reported that the deaths between birth to 2 weeks and 2 weeks to two

months of age were 8.5 and 2.8 percent, respectively. Sharma *et al.(1975)* observed the greatest losses during the first month of life and decline thereafter.

H: Age **of calf and** cause **of death**

In each of three age groups the death losses due to different causes are shown in (Table 8).

On overall basis higher death losses were caused by Pneumonia in group I and Ill, at the same time Enteritis caused higher death losses in group Il. Statistical analysis showed non-significant relationship between various causes of death and age groups. Miscellaneous group included diseases such as tympany, heatstroke, heart attack, diarrhea, dystocia, whitescour, snake bite, etc. Ranatunga (1974) reported that of all the deaths in calves, 4.5, 3.5, 2.9, 1,4, 1,5 and 1.8 percent died during first, second, third, fourth,fifth and sixth months of age respectively. The present study concluded that major causes of mortality were Pneumonia (28.15%) and Enteritis (21.98%) in age group -I.

Table 6. Causes of death and calf mortality

Farms	Pneumonia %		Enteritis %		Gastro Entritis %		Retention of Urine %		H.S.%		Mise. %	
	Male	Fem-ale	Male	Fem-ale	Male	Fem-ale	Male	Fem-ale	Male	Fern ale	Male	Fem-ale
Bahadurnagar	3.02	2.79	2.24	3.09	1,95	2.95	2.24	1,99	-	-	2.53	2,49
Jahangirabad	2.75	3.04	3.16	3.38	0.55	0.90	-	-	-	-	2,41	2.76
Rakh Ghulama	3,48	2.85	1,55	2.38	1,06	0.76	1,93	0.47	-	-	1,83	1,71

Table 7. **Age of Calf and mortality**

Farms	GI upto 1 month %	GIl 1.1 - 3 months %	GIll Above 3 months %
Bahadumaaar	5.30	4.90	1,5
Jahagirabad	3.20	3.30	2.8 .
Rakh Ghulama	2.92	2.06	4.0

Table 8. Age of calf and cause ofd eath

Cause	GI upto 1 month %	GIl 1.1 - 3 months %	GIll Above 3 months %
Pnemonia	1,05	0.95	0.94
Enteritis	0.82	1,07	0.70
Gastro Enteritis	0.61	0,41	0.24
Retention of urine	0,45	0.38	0.23
Miscellaneous	0.80	0.72	0.77

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