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# INVESTIGATION OF MORTALITY INCIDENCE AND MANAGEMENTAL PRACTICES IN BUFFALO CALVES AT COMMERCIAL DAIRY FARMS IN PESHAWAR CITY

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## ABSTRACT

Data regarding buffalo calves rearing and calf mortality was collected from 111 buffalo farms in Peshawar city. Total number of buffaloes was 3092 in these farms having 27.85 buffaloes on average. 2492 calves born in one year of which 448 calves were died (17.98% mortality rate). Colostrum feeding to newly born calves was practiced in all farms. In addition to suckling, solid feeding to calves was started during the second week of age. The weaning age ranged from 24 to 48 weeks. Calf mortality was influenced (P < 0.05) by total number of animals but did not vary due to number of buffaloes, number of cows, total calves, age and season.

**Keywords:** buffalo calves, calf mortality, dairy farms, Peshawar.

## INTRODUCTION

Survival of neonatal calves is imperative for livestock propagation; however, a large number of calves die during the first year of their life causing heavy drain on the economics of livestock production. Mortality of neonatal calves was attributed to conditions like diarrhea and pneumonia (Shimizu and Nagatoma., 1978). However, environmental and managemental factors hasten the occurrence of such conditions (Khan and Khan, 1991). Calf mortality was associated with the type of housing, feeding, managemental practices, weather conditions, external and internal parasitic infestation and bacterial infections especially those causing septicaemia and enteritis (Blood *et al*., 1994).

According to Afzal *et al.*, (1983) the mortality in cattle and buffalo calves ranged from 29.1% to 39.8%. Martin and Wiggins (1973) estimated that 20% calf mortality resulted in reduction of 38% profit of a livestock farm. Furthermore, 25% average early calf mortality hardly provides any chance for regular replacement of low production animals. A minimum mortality rate of 5% is usually acceptable to dairy farm having standard managemental conditions. In this paper, the existing on-farm practices of buffalo calves rearing and mortality incidence in buffalo calves in commercial dairy farms of Peshawar city is reported.

## MATERIALS AND METHODS

A survey of one hundred and eleven Dairy Farms situated in Peshawar city was conducted. Farms having more than 10 buffaloes were surveyed. The survey documented the information of existing on-farm practices relating to rearing of buffalo calves and factors affecting calf mortality. The above Information was collected using a pre-designed questionnaire (annexure-I).

### Statistical analysis

The data collected was analyzed statistically by using general linear model (GLM), in statistical analysis system (SAS; Inst. Inc 1988).

$$Y_{ijklmn} = m + a_i + b_j + l_k + g_l + y_m + d_n + e_{ijklmn}$$

Where

$Y_{ijklmn}$ = Buffalo calf mortality

$m$ = Constant

$a_i$ = Effect of total number of animals at the farm on calf mortality.

$b_j$ = Effect of number of buffaloes at the farm on calf mortality.

$l_k$ = Effect of number of cows at the farm on calf mortality.

$g_l$ = Effect of total calves at the farm on calf mortality.

$y_m$ = Effect of age on calf mortality;
   m = birth to 3 months, 3 to 6 months, 6 months and above.

$d_n$ = Effect of season on birth;   j = winter, summer.

$e_{ijklmn}$ was the residual term associated with each $Y_{ijklmn}$ assumed to be Normally Independently Identically Distributed (NIID) with mean zero and unit variance.

## RESULTS AND DISCUSSION

### Herd composition

In the present study one hundred and eleven commercial dairy farms, located in Peshawar city, were surveyed. In these farms total number of buffaloes was 3092 with an average of 27.85 buffaloes per farm. Total number of cows was 161 (1.45 head per farm). During one year, 2492 calves were born (22.45 calves per farm) of which 448 calves (4.03 calves per farm) were died. Only 547 calves (4.92 calves per farm) were available with the dairy farmers (Table-1). Calves were raised, apparently to stimulate milk let down from their dams and herd replacers. 1502 calves (13.53 calves per farm) were sold alive. The calves were usually sold at very young age due to high risk of disease and mortality in young calves. For herd replacement, these farmers usually purchased buffaloes from Punjab. So, little attention was paid to calf management (Qureshi, 1998). The early disposal of

buffalo calves was practiced with the idea to save milk for sale; this reduced the opportunity to select better animals for future breeding and to improve milk and meat production.

### Milk Suckling and weaning Practices

Among the dairy farms of study area 77% of the calves were usually reared to stimulate milk let down and they were weaned at the age of 6-12 months. In modern dairy farming early weaning of calves is preferred to save milk for marketing. In contrast the weaning age was high in the majority of the farms of the study area. In the presence of suckling calves it is difficult to measure milk production of dams and also the amount of milk consumed by a calf. Traditionally farmers were doing little efforts to stimulate milk letdown in buffaloes with the help of managemental practices other than calf suckling. Some of the farmers used intramuscular injection of Oxytocin for milk letdown. Only 23% of the calves were reared as replacement herd in the farms of study area.

### Colostrum feeding practices

Colostrum is the first milk produced during the early three days after parturition. As transplacental transmission of antibodies does not occur in domestic animals, the newly born calves are passively immunized by ingestion of colostrum containing high concentration of antibodies. However, the absorption of antibodies in the intestine occurs only for a very short period after birth. The immunity thus produced, protects young calves from various environmental pathogens and helps in reducing disease incidence and mortality in young calves. Present study revealed that all of the farmers in the surveyed area allowed their calves to suckle the colostrum for three days. Some farmers believed that colostrum feeding on first day immediately after birth caused worm infestation and obstruction of gastro-intestinal tract in calves. Managemental practices other than colostrum feeding might be responsible for calf mortality in the study areas.

### Feeding practices of the calves

Solid feeding to calves in addition to suckling was started from $2^{nd}$ to $7^{th}$ week and consisted of green fodder with concentrate and wheat straw. Restricted suckling was commonly practiced in all farms and the calves were allowed to suck milk from one teat. After weaning calves were given green fodder with concentrate and wheat straw.

### Deworming practices

Incidence of gastro-intestinal parasites was high among both young and adult buffaloes. Farmers in study area were aware about the use of dewormers. Some farmers were not treating their pregnant stock against the intestinal parasites due to fear of abortion. In young calves the intestinal parasites are usually considered responsible for early calf mortality. Only 8.1 % of the calves were regularly de-wormed (Table-2). Scientific deworming practices were not properly adopted in many farms. All the animals present under one shed are not given the dewormers at the same time. It was also observed that most farmers were not using the recommended dose of a de-wormer. Dewormers are usually very expensive and their proper dosing is important not only to obtain maximum efficacy but also to reduce the treatment cost.

### Buffalo calf mortality

Calf mortality is considered as one of the major cause of losses in livestock production. The buffalo calf mortality in the present study was observed as 17.98 %. Khan and khan (1995) reported calf mortality at Punjab Government, farms as 7.08%. Low calf mortality in government farms may be attributed to better housing, feeding and other managemental practices.

Total number of animals had a significant (P < 0.0002) effect on calf mortality while number of buffaloes, number of cows, total calves, age and season had no effect (Table-3). Brunning et al., (1992) reported calf mortality in large dairy farms as 2-20%, while in small farms mortality in young calves was more than 50%. The calf mortality in well-managed farms did not exceed 5% during first 30 days of life.

Mortality rate in different farms was different and attributed to difference in total number of animals and managemental practices adopted in these farms. Some farmers had good housing with good drainage system than others. All the farms included in the present study were located in the same area; hence, the type of feed/ fodder available to these farms at one time was almost the same. However, depending on their economical conditions, feeding practices were different in different farms. Different hygienic conditions maintained at these farms might have exposed young calves to various pathogens and led to variations in mortality rate at these farms. Other factors including vaccination, deworming practices, care of calf, concerns of the farmers for treating a sick calf, involvement of family members in management and general economical condition of a farmer can also contribute toward calf mortality at a farm.

### Effect of total animals at the farm on calf mortality

Significantly (P < 0.05) highest calf mortality was found when the total animals were 87 and 38. Significantly (P < 0.05) lowest calf mortality was found when the total animals were 107 and 68 (Table-4).

Calf mortality in relation to total animals varied because different farmers adopted different feeding and managemental practices. If the farms are better managed and animal are efficiently fed, the calf mortality in buffalo calves could be significantly reduced.

### Effect of number of buffaloes at the farm on calf mortality

Significantly (P < 0.05) highest calf mortality was found when the number of buffaloes was 100. While Significantly (P < 0.05) lowest calf mortality was found when the number of buffaloes was 28 (Table-5). This indicated an increase in calf mortality with increase in

number of buffaloes on the farm. However, when the number of buffaloes at the farm rose above 100, the mortality rate was decreased. Farmers were unable to give full attention to the buffalo calves due to the increased workload associated with large number of buffaloes. Farms having above 100 buffaloes might have proper managerial system that could have adopted the improved managemental practices.

**Effect of total calves at the farm on calf mortality**

Significantly ($P < 0.05$) highest calf mortality was found when the total calves were 35. While significantly ($P < 0.05$) lowest calf mortality was found when the total calves were 88 and 70 (Table-6). This indicated high calf mortality in farms with less number of calves while it was lower when the number of calves was increased. It indicated the increased interest of the farmers in the calves with larger investment, providing better management and extra care when the total calves at the farm were increased. In contrast Martin et al., (1975) reported that the average mortality rate over a period of at least 2 years on individual farms varied from a low of 3.5 +/- 1.1% to a high of 30.6 +/- 3.1%. Calf management personnel was the only factor significantly related to the mortality rate, with considerably fewer death losses on farms where the owner managed the calves than on farms where employees performed these duties.

**Effect of sex on buffalo calf mortality**

The calf mortality in male calves was 50.66% while it was 49.33% in female calves (Table-7). There was non-significant difference in mortality of both sexes. In study area both male and female calves were equally cared because calves in early age were usually required to stimulate milk let down. However, after weaning the preference was given to female calves as future herd replacement while male calves were usually sold out for beef purposes. Khan and Khan (1995) reported that the sex had no effect on the rate of mortality in young buffalo calves. It was observed that in suburban areas of Peshawar commercial buffalo farmers were not paying attention to young calves. For milk let down they were heavily depended on Oxytocin injections.

**Effect of age on buffalo calf mortality**

Mortality in buffalo calves was higher during the first three months of age, while it was lower at the age group of three months and above (Table-8). Statistically mortality rate was influenced by age ($P < 0.05$) of the calves. Age from 3-6 months and above had no effect on calf mortality (Table-9). Patil et al., (1991) reported high mortality rate (33%) in Surti buffalo calves during first month of age. Pradhan and Panda (1994) also reported higher mortality rate (36.8%) in Murrah buffalo calves during first month of their age. In early age immune system of a young calf is under development.

Colostrum can provide passive immunity only against those diseases for which a dam possesses antibodies. Even the provision of antibodies to young calves in colostrum cannot guarantee the protection against a disease. Poor hygienic conditions may expose young calves to pathogens like E. Coli, Salmonella, Pasteurella and parasites, which are responsible for neonatal mortality (Blood et al., 1994).

Vorster et al., (1994) reported outbreaks of diarrhea in 3-28 days old calves in South Africa. Various strains of E.Coli were isolated from small and large intestine. In some outbreaks Rotavirus and Corona virus were also identified in faeces of the affected calves.

**Effect of season on buffalo calf mortality**

Season had no effect on calf mortality (Table-10). In contrast Patel et al., (1992) reported that in Surti buffalo calves mortality rate was highest in winter (38.29%) than during in other seasons. Enteritis accounted for 39.29% of the deaths, pneumonia for 24.94% and pneumoenteritis for 12.59%. There was a positive association between season and diseases, with the fewest deaths occurring in summer. Martin et al., (1975) reported that the calf mortality rate as17.3 to 20.2%. Inter farm variation in mortality rate was large, ranging from 3.7 to 32.1%. Time series studies indicated that death losses increased during midsummer and midwinter, with mortality rates in winter months being 20% greater than those in summer.

**Table-1.** Herd composition of commercial dairy farms in Peshawar city.

| Animals | No. of animals | No. of animals per farm |
|---|---|---|
| Buffaloes | 3092 | 27.85 |
| Cows | 161 | 1.45 |
| Calves born during one year | 2492 | 22.45 |
| Calves present | 547 | 4.92 |
| Calves died during One year | 448 | 4.03 |
| Calves sold | 1502 | 13.53 |

**Table-2.** Managemental practices of calf rearing.

| | |
|---|---|
| **Colostrum feeding to young calves** (% of the farms) | 100 |
| **Weaning age of the calves** (weeks) | 24 - 48 |
| **Age at which feeding to the calves was started** (days) | 10 - 60 |
| **De-worming** (% of the farms) | 8.1 |
| **Vaccination** (% of the farms) | 39.64 |
| **Consultancy** (% of the farms) | 100 |

**Table-3.** Analysis of variance of calf mortality as affected by various independent variables in buffalo calves in commercial dairy farms of Peshawar.

| Source | DF | SS | MS | F | P |
|---|---|---|---|---|---|
| **Total No. of animals** | 48 | 585.40 | 12.20 | 7.28 | 0.0002 |
| **Buffaloes** | 18 | 37.15 | 2.06 | 1.23 | 0.3560 |
| **Cows** | 6 | 7.86 | 1.31 | 0.78 | 0.5984 |
| **Total No. of buffalo calves** | 21 | 68.69 | 3.27 | 1.95 | 0.1079 |
| **Age** | 2 | 5.29 | 2.65 | 1.58 | 0.2430 |
| **Season** | 1 | 0.39 | 0.39 | 0.23 | 0.6365 |
| **Error** | 13 | 21.77 | 1.67 | | |
| **Total** | **109** | **726.55** | | | |

**Table-4.** Mean calf mortality in relation to total animals.

| Total animals | Mean |
|---|---|
| **87** | 10.00ab |
| **38** | 10.00ab |
| **39** | 9.00abc |
| **63** | 9.00abc |
| **61** | 9.00abc |
| **68** | 8.00abcd |
| **107** | 8.00abcd |

Mean with different subscripts are significantly different at a = 0.05

**Table-5.** Comparison of mean calf mortality in relation to the number of buffaloes.

| Number of buffaloes | Mean |
|---|---|
| **100** | 8.00ab |
| **60** | 7.33ab |
| **50** | 7.17abc |
| **105** | 7.00abc |
| **80** | 6.67abc |
| **40** | 5.67abc |
| **28** | 5.67abc |

Mean with different subscripts are significantly different at a = 0.05

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**Table-6.** Comparison of mean calf mortality in relation to total calves.

| Total calves | Mean |
|---|---|
| 35 | 9.50ab |
| 43 | 8.00abc |
| 45 | 8.00abcd |
| 100 | 8.00abcd |
| 40 | 7.50abcde |
| 70 | 7.00bcde |
| 88 | 7.00bcde |

Mean with different subscripts are significantly different at a = 0.05

**Table-7.** Incidence of mortality in male and female buffalo calves.

| Sex | No. of calves died | Percent of total calves died |
|---|---|---|
| Male | 227 | 50.66 |
| Female | 221 | 49.33 |

**Table-8.** Mortality in buffalo calves in relation to different age groups.

| Age of calves died (Months) | No. of calves died | Percent of total calves died |
|---|---|---|
| From birth to 3 months | 392 | 87.50 |
| 3 months to 6 months | 44 | 9.82 |
| 6 months and above | 12 | 2.67 |

**Table-9.** Comparison of mean calf mortality in relation to the age of calves.

| Age | Mean |
|---|---|
| 3 months to 6 months | 4.33a |
| From birth to 3 months | 4.08ab |
| 6 months and above | 3.22b |

Mean with different subscripts are significantly different at a = 0.05

**Table-10.** Comparison of mean calf mortality in relation to the season.

| Season | Mean |
|---|---|
| Winter | 4.12a |
| Summer | 3.38a |

Mean with the same subscripts are not significantly different at a = 0.05

## REFERENCES

Afzal, M., M. H. Javid and A. D. Anjum. 1983. Calf mortality: Season Pattern, age distribution and causes of calf Mortality. Pakistan. Vet. J., 3 (1): 30-33.

Agyemang, K. 1992. Adjustment of birth weight and relationship of standardized birth weight with early mortality in N' Dama calves under traditional husbandry systems in the Gambia. Animal Production. Vol. 55(3): 301-308.

Animal Census. 1996. Animal Census Organization. Economic Affairs Division, Islamabad, Government of Pakistan.

Ansari, M. Y., I. A. Yousaf and A. A. Yousaf. 1987. Animal diseases and their control. From pasture to laborartory. Pakistan Agriculture Research Council Islamabad, Pakistan.

Azam, M. 1999. Managemental practices and incidence of parasitic infection in buffalo calves in Khadagzai Village of District Dir. M.Sc. Thesis NWFP Agricultural University, Peshawar.

Balakrishnan, M., K. P. Ramesha, M. Sreenath, Satish-Kumar and S. Kumar. 1996. Factors affecting mortality of buffalo calves in an organized herd. Ind. J. of Dairy and Biosciences. Vol. 7: 61-65.

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Blood, D. C., O. M. Radostits, C. C. Gay, J. H. Arundel, B. O. Ikede, R. A. B. C. Mekenzie. 1994. Vet. Med. Eighth Ed. ELBS, London.

Bruning-Fann, C. and J. B. Kaneena. 1992. Perinatal diseases. Vet. Bull. 62, 399. Quoted by Blood D. C. 1994. Vet. Medicine, Eighth Ed., ELBS, London. pp. 107-112.

Husband, A. J. and A. K. Lascelle. 1975. Neonatal infection Res. Vet. Sci. 18.201. Quoted by Blood D. C. Vet. Medicine. 1994. Eighth Ed., ELBS, London. pp. 124-136.

Jasiorowski, H., H. Grodzki, R. Reklewska, R. Grabowski, and Z. Tomicki. 1990. The effect of crossbreeding and environment on rearing and metabolic profile of calves. Animal Science Papers and Reports Polish Academy of Sciences, Institute of Genetics and Animal Breeding-Jastrzebiec. 5: 5-14.

Jenny, B. F., G. E. Cramling and T. M. Gaze. 1981. Factors affecting calf mortality in South Carolina dairy herd. J. of Dairy Sci., 64 : 22-84.

Khan, A. and M. Z. Khan. 1991. Aetiopathology of neonatal calf mortality. J. of Islamic Academy Sc., 4: 159-165.

Khan, A. and M. Z. Khan. 1995. Epidemiological aspects of neonatal calf mortality in the Nili-Ravi buffaloes. Pakistan Vet. J., 15(4): 163-16.

Korogh, K., J. Agerholm, S. A. Basse, L. Ronsholt. 1993. Abortion and calf mortality in cattle herds. Acta Vet. Scandinavia. 34(4): 371-377.

Lance, S. E., G. V. Miller, D. D. Hancock and M. L. Moeschberger. 1992. Effects of environment and management on mortality in dairy calves. J. of the Amer. Vet. Med. Associ. 201(8): 1197-1202.

Martin, S. W. and Wiggin. 1973. Perinatal diseases. Am. J. Vet. Res. 34, 1027. Quoted by Blood , D. C. 1994. Vet. Medicine, Eight Ed., ELBS, London. pp. 107-112.

Martin, S. W., C. W. Schwabe, C. E. Franti. 1975. Influence of management on calf mortality in Tulare County, California. Am. J. Res. 36(08): 1111-4.

Pardhan, B. and G. M. Panda. 1994. Calving pattern and Mortality trends in Murrah buffaloes calves in Orisa. Indian J. of Anim. Prod. and health, 10(4): 143-146.

Patil, N. A., S. Mallikarjunappa, S. Prasanna-Kumar and A. R. S. Bhat. 1991. Comparative study on calf mortality in Jersey crossbred and Surti buffalo calves. Indian Journal of Dairy Science. 44(8): 526-528.

Patil, N. A., S. P. Kumar, S. Mallikarjunappa and A. R. S. Bhat. 1992. Calf mortality in Surti buffaloes. Indian Vet. Journal. 69(11): 1018-1022.

Qureshi, M. S. 1998. Relationship of pre and postpartum nutritional status with reproductive performance in Nili Ravi buffaloes under the conventional farming system in NWFP. Ph. D. Thesis, Uni. of Agriculture Faisalabad, Pakistan. pp.170-171.

Ribeiro, M. G., J. A. Jerez, L. J. Richtzenhain and V. L. Barile. 1997. A study of IgG serum levels in buffalo calves from Sao Paulo, Brazil. Proceedings 5th World Buffalo Congress, Italy, 13-16 October. pp. 601-603.

Santra, A. K. and S. V. Pachalag. 1995. Factors affecting calf mortality in Murrah buffalo, season and age. Indian J. of Anim. Prod. and management. 11(1): 58-61.

Shimizu, T. and H. Nagatoma. 1978. Current status of calf diseases in Japan. Bull. Fac. Agri. Miyazaki Univ. 34: 329-336.

Shoo, M. K., R. Semvua, R. Kazwala and P. Msolla. 1992. A study on the cause-specific mortality rates of dairy calves in Tanzania. Preventive Vet. Med. 13(1): 59-62.

Singh, S., S. N. K. Katoch, N. K. Manuja, Y. P. Thakur. 1994. Factors affecting calf mortality in dairy herd. Indian J. of Dairy Sci., 46(12) : 592-594.

Statistical Analysis System. 1988. SAS Stat. User's Guide ver. 6.03. SAS Institute Inc. North Carolina, Raleigh.

Vorster, J. H., J. J. V. D. Lugt, M. M. Henten, S. S. Bastianello and J. J. Van-der-Lugt. 1994. Escherichia Coli strain as the cause of the diarrhea in calves in S. Africa. J. of S. Africa, Vet. Ass. 65: 1-3.

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**Annexure-I**

# *QUESTIONNAIRE*

Name of dairy farmer: _____

Particulars of the farm:

Address: _____

Number of animals: _____

Herd composition:

       Buffaloes_____Cattle_____

Number of buffalo calves born during last year: _____

Number of buffalo calves present at the farm: _____

Purpose of calf rearing and disposal: _____

Number of calves sold: _____

Age of disposal: _____

Calf mortality during last one year:  _____

       Sex     Male: _____ Female: _____

       Age: _____

       Season: _____

Calf feeding practices at the farm:

       Milk: _____

       Milk + concentrates/forage: _____

       Concentrates/forage: _____

       Colostrum feeding (Yes/No): _____

           When: _____

           How long: _____

       Weaning age: _____

Calf housing:

       Group Housing: _____ Individual Housing: _____

Calf health:

       Ecto and endo-parasites: _____

       Any ailments: _____

       Vaccination (Yes/No):_____

           What: _____

       De-worming (Yes/No): _____

           What: _____

       Consultancy (Yes/No): _____

           What: _____