

## Original Article

# Effect of age, sex, area and management practices on cattle mortality in Rajshahi division, Bangladesh

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## ABSTRACT

**Objective:** The aim of the present study was to evaluate the effect of age, sex, location and management on cattle mortality rate in Rajshahi division of Bangladesh.

**Materials and methods:** The study was conducted in 8 districts of Rajshahi division during July 2011 to June 2012. A total of 17,982 cattle heads were investigated based on age, sex, area. Data were collected from the cattle owners using a closed structured questionnaire. Tentative cause of cattle mortality was identified based on clinical signs, laboratory tests, history, ante-mortem and postmortem reports. Management practices of the cattle were also investigated.

**Results:** Out of 17,982 cattle heads, 549 were found to be dead by various diseases, and an average mortality rate was 3.05%. Age-wise mortality rate of cattle revealed that the maximum mortality rate was found in the age group of <2 years (3.90%) and minimum was found in age group 2 to <8 years (2.36%). Sex-wise splitting data showed that the higher mortality rate was observed in the female (3.15%) than the male (2.90%). Area-wise cattle mortality rate revealed that Rajshahi (3.29%), Natore (2.84%), Chapai Noawabganj (3.77%), Naogaon (3.48%), Bogra (2.57%), Joypurhat (2.84%), Pabna (1.84%) and Sirajganj (3.06%). The significantly highest ( $P<0.05$ ) cattle mortality rate was found in Chapai Noawabgonj district (3.77%) and lowest was in Pabna district (1.84%). There is no significant difference ( $P>0.05$ ) between the cattle mortality rate in Natore district (2.84%) and Joypurhat districts (2.84%).

**Conclusion:** The overall mortality rate of cattle in Rajshahi division was found comparatively low. This might be due to improved management practices, better veterinary services, and awareness among farmers. However, cattle mortality rate in the age group <2-year is alarming due to bad management practices and disease.

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## KEYWORDS

Age, Cattle, Location, Management, Mortality, Sex

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## INTRODUCTION

Bangladesh is a densely populated country with an agricultural-based economy, and its livestock play an important role in national economy. In Bangladesh, livestock accounts for about 6.5% of total income, and about 25% people of the country are directly involved in this sector (Islam et al, 2006). Dairy is considered as an important part of livestock (Islam et al, 2006). Cattle are the integrated part of agricultural operation in Bangladesh, and it ranks 12<sup>th</sup> in the world, and 3<sup>rd</sup> in Asia (Sarder and Joarder, 2010). Livestock contributes >6% to the gross domestic product (GDP) through contributing in the production of meat, milk, hides, eggs and skins. Considering only hides and skins, Bangladesh earns about 13% of total foreign currency each year (Alam, 1991). As per the report of DLS (2013), livestock sector provides about 42.5% of the animal protein.

In Bangladesh, livestock sector generates employment opportunities for unemployment people; 20% for full-time and 50% for part-time population. On the other hand, this sector produces 80 million metric tons of dung per year (DLS, 2013).

The success of livestock industry mostly depends on sound health of livestock population. In every year, a number of cattle are died due to insufficient veterinary and other services which estimate BDT 1400-1600 crore (Khan, 2010). Mortality of cattle due to several diseases is mostly occurred in village areas of Bangladesh (Bangar et al., 2013).

Bangladesh has total 23.12 million cattle population (DLS, 2013), of which only Rajshahi division (Figure 1) comprises about 4.87 million that estimates 21.06% of total cattle population in Bangladesh, as reported in Livestock development activities of Rajshahi division and Annual workplan: 2012-2013. Since Rajshahi division contributes a significant amount of cattle production and there is no report of mortality rate of cattle, the study has been undertaken to determine the effects of age, sex, area, and management practices on cattle mortality rate in Rajshahi division of Bangladesh.

## MATERIALS AND METHODS

**Ethical approval:** This study was carried out with the approval of the Animal Care Committee of the University of Rajshahi, under the guidelines of the Bangladesh Animal Care Authority.

**Study area and period of study:** The study was conducted in the eight districts of Rajshahi division

(Figure 1). The eight districts are Rajshahi, Natore, Chapai Noawabgonj, Naogaon, Bogra, Joypurhat, Pabna and Sirajgonj. The data were collected covering during the period from July 2011 to June 2012.

**Data collection procedure:** Data were collected with the permission of the owners of cattle by direct interview using a closed structured questionnaire. The questionnaire contained various points such as breed, age, sex, cattle management system, and disease prevalence. After collection of data, the male and female cattle have been classified according to their age groups. The cattle were divided into 3 age groups; Group-I aging <2 years, Group-II aging 2 to <8 years, and Group-III aging >8 years. Tentative diagnosis of causes of death of cattle were identified by clinical signs and symptoms of diseases, death certificate, laboratory examinations, veterinarian comments, disease history from owners as well as ante-mortem and postmortem reports etc.

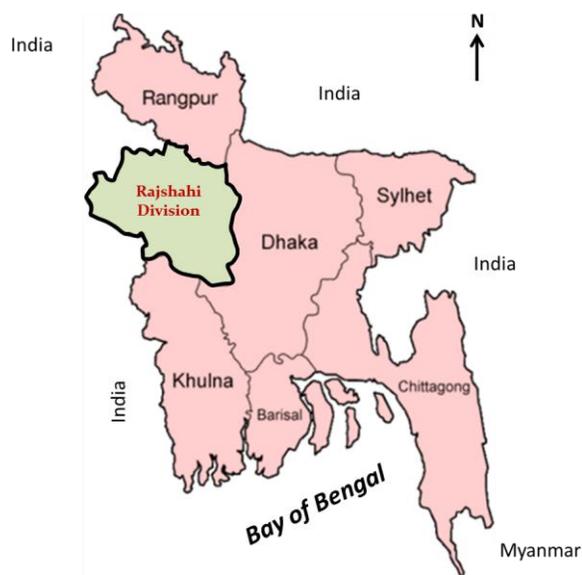


Figure 1: Map of Bangladesh showing the study area (Rajshahi division) of this study.

**Management of cattle:** Cattle management system was observed based on the rearing practice, floor type, shed type, air flow, feed type and content, artificial insemination and deworming practice.

**Data Analysis:** The raw data were structured to calculate the cattle mortality rate in relation to age, sex, location and management by basic descriptive statistical rates from the information obtained and compared to detect the change among age, sex, location and management by using software SPSS Ver. 10.

## RESULTS AND DISSCUSION

The cattle are reared in both conventional and unconventional farming system. There are different types of floor system such as mad floor, semi-concrete floor, and concrete floor. In Bangladesh, floor surface in cattle shed is even, and usually no bedding material is used on the floor. There are both natural and artificial air flow systems in the house. Farmers provide both roughage and concentrates to their cattle. Some farmers grow green fodders. Concentrates supplied by the farmers included rice polish, anchor bran, wheat bran, rice gruel, broken rice, broken maize, til oil cake, coconut oil cake, mustard oil cake, pulse husk, salt, molasses and toxin binder. They used irregular deworming and vaccination for their cattle. Artificial and natural both types of insemination were practiced by the farmers.

Cattle owners always lose their cattle in various regions in Bangladesh. As a result, the farmers face big problem in maintaining their cultivation, meat and milk production. Cattle mortality varies according to breed, age, sex, location, management and several other factors. The overall cattle mortality rate in the study area was 3.05% (**Table 1**). The effect of age on cattle mortality rate in Rajshahi division of Bangladesh is presented in **Table 1**. Age had a significant effect ( $P<0.05$ ) on cattle mortality rate. The highest cattle mortality rate was found in the cattle aging <2 years (3.90%), followed by age group >8 years (3.79%) and in age group 2 to <8 years (2.36%). At the same time it was found that sex had also a significant effect ( $P<0.05$ ) on cattle mortality rate, as stated in **Table 2**.

The present study revealed that the cattle mortality rate was significantly higher ( $P<0.05$ ) in female cattle (3.15%) than in male cattle (2.90%). [Hossain et al. \(2014\)](#) reported that calves (71.01%) had higher mortality rate as compared to young (10.85%) and adult cattle (18.13%). Higher percentage of deaths was observed within 365 days of age, and the mortality rate decreased gradually after 1 month of age, and dropped to lower rate with the increase of age, and female cattle (55.71%) were found to die more than males (44.29%). [Bangar et al. \(2013\)](#) stated that highest mortality rate (16.81%) was observed in

calves than young stock (1.46%) and male cattle showed maximum (17.86%) mortality than female (2.13%) in Pune division of Maharashtra state. [Chaudhary et al. \(2013\)](#) reported that amongst the three age groups, calves showed highest mortality (21.53%), followed by young stocks (9.35%) and adults (4.73%), and male bovine showed higher (20.91%) mortality than female (4.81%) in Himachal Pradesh, India. Calf mortality up to 12 months of age has been reported to be 9.0% under rural ([Debnath et al, 1990](#)) and 13.4% under farm ([Debnath et al, 1995](#)) conditions in Bangladesh. Age-wise cattle mortality rate was agreed with [Hossain et al. \(2014\)](#), [Bangar et al. \(2013\)](#) and [Chaudhary et al. \(2013\)](#) but disagreed with [Debnath et al. \(1990\)](#). At the same time sex-wise cattle mortality rate was agreed with [Hossain et al. \(2014\)](#) but disagreed with [Bangar et al. \(2013\)](#) and [Chaudhary et al. \(2013\)](#). The result was disagreed might be due to variation of sample size, environmental stress, breed, disease prevalence, geographic location, seasons, veterinary care after infection, type of insemination in cattle, and care of new born calves.

Cattle mortality rates in different districts in Rajshahi division of Bangladesh are shown in **Table 3**. Area-wise cattle mortality rate revealed as 3.29% in Rajshahi, 2.84% in Natore, 3.77% in Chapai Noawabgonj, 3.48% in Naogaon, 2.57% in Bogra, 2.84% in Joypurhat, 1.84% in Pabna and 3.06% in Sirajgonj districts. The significantly highest ( $P<0.05$ ) cattle mortality rate was found in Chapai Noawabgonj district (3.77%) and lowest in Pabna district (1.84%). There is no significant difference ( $P>0.05$ ) between the cattle mortality rate in Natore district (2.84%) and Joypurhat districts (2.84%). It is observed that the overall mortality rate of cattle was found comparatively lower in the study area specially it was surprising in case of Pabna district (1.84%). This might be due to excellent management practices adopted by the farmers and efficient veterinary services as well as awareness among farmers. [Bangar et al. \(2013\)](#) and [Shaikh et al. \(2009\)](#) reported that overall cattle mortality rate of Pune division and Maharashtra state in India were 4.42% and 12.48%, respectively. [Maher et al. \(2008\)](#) stated that the cattle mortality rate in Ireland was 3.2-4.1%.

**Table 1:** Effect of age on cattle mortality rate in Rajshahi division of Bangladesh.

| Age groups    | Number of surveyed (n) | Death cases (n) | % of cases (basis of population) | % of cases (basis of disease) |
|---------------|------------------------|-----------------|----------------------------------|-------------------------------|
| <2 years      | 7127                   | 278             | 3.90                             | 50.64 <sup>a</sup>            |
| 2 to <8 years | 9853                   | 333             | 2.36                             | 42.44 <sup>b</sup>            |
| >8 years      | 1002                   | 38              | 3.79                             | 6.92 <sup>c</sup>             |
| Grand Total   | 17982                  | 549             | 3.05                             | 100                           |

The values are a, b, and c with different superscript letters in same column differs significantly with each other ( $P<0.05$ ).

**Table 2:** Effect of sex on cattle mortality rate in Rajshahi division of Bangladesh.

| Sex         | Number of surveyed (n) | Death cases (n) | % of cases (basis of population) | % of cases (basis of disease) |
|-------------|------------------------|-----------------|----------------------------------|-------------------------------|
| Male        | 6865                   | 199             | 2.90                             | 36.25 <sup>b</sup>            |
| Female      | 11117                  | 350             | 3.15                             | 63.75 <sup>a</sup>            |
| Grand Total | 17982                  | 549             | 3.05                             | 100                           |

The values are a and b with different superscript letters in same column differs significantly with each other ( $P < 0.05$ ).

**Table 3:** Effect of Location on cattle mortality rate in Rajshahi division of Bangladesh.

| Name of District  | Number of surveyed (n) | Death cases (n) | % of cases (basis of population) | % of cases (basis of disease) |
|-------------------|------------------------|-----------------|----------------------------------|-------------------------------|
| Rajshahi          | 3307                   | 109             | 3.29                             | 19.85 <sup>ab</sup>           |
| Natore            | 2390                   | 68              | 2.84                             | 12.39 <sup>cd</sup>           |
| Chapai Noawabgonj | 3000                   | 113             | 3.77                             | 20.58 <sup>a</sup>            |
| Naogaon           | 2382                   | 83              | 3.48                             | 15.12 <sup>b</sup>            |
| Bogra             | 1010                   | 26              | 2.57                             | 4.73 <sup>c</sup>             |
| Joypurhat         | 1230                   | 35              | 2.84                             | 6.38 <sup>de</sup>            |
| Pabna             | 2283                   | 42              | 1.84                             | 7.65 <sup>d</sup>             |
| Sirajganj         | 2380                   | 73              | 3.06                             | 13.30 <sup>c</sup>            |
| Grand total       | 17982                  | 549             | 3.05                             | 100                           |

The values are a, b, c, d and e with different superscript letters in the same column differs significantly with each other ( $P < 0.05$ ).

**Table 4:** Effect of farm type on cattle mortality rate in Rajshahi division of Bangladesh.

| Farm type      | Number of surveyed (n) | Death cases (n) | % of cases (basis of population) | % of cases (basis of disease) |
|----------------|------------------------|-----------------|----------------------------------|-------------------------------|
| Conventional   | 14658                  | 429             | 2.93                             | 78.14 <sup>a</sup>            |
| Unconventional | 3324                   | 120             | 3.61                             | 21.86 <sup>b</sup>            |
| Grand Total    | 17982                  | 549             | 3.05                             | 100                           |

The values are a and b with different superscript letters in same column differs significantly with each other ( $P < 0.05$ ).

**Table 5:** Effect of Vaccination on cattle mortality rate in Rajshahi division of Bangladesh.

| Vaccination | Number of surveyed (n) | Death cases (n) | % of cases (basis of population) | % of cases (basis of disease) |
|-------------|------------------------|-----------------|----------------------------------|-------------------------------|
| Yes         | 9314                   | 256             | 2.74                             | 46.63 <sup>b</sup>            |
| No          | 8668                   | 293             | 3.38                             | 53.37 <sup>a</sup>            |
| Grand Total | 17982                  | 549             | 3.05                             | 100                           |

The values are a and b with different superscript letters in same column differs significantly with each other ( $P < 0.05$ ).

**Table 6:** Effect of Deworming on cattle mortality rate in Rajshahi division of Bangladesh.

| Deworming (Use) | Number of surveyed (n) | Death cases (n) | % of cases (basis of population) | % of cases (basis of disease) |
|-----------------|------------------------|-----------------|----------------------------------|-------------------------------|
| Yes             | 11515                  | 306             | 2.66                             | 55.74 <sup>a</sup>            |
| No              | 6467                   | 243             | 3.76                             | 44.26 <sup>b</sup>            |
| Grand Total     | 17982                  | 549             | 3.05                             | 100                           |

The values are a and b with different superscript letters in same column differs significantly with each other ( $P < 0.05$ ).

Hossain et al. (2014) found that the overall cattle mortality rate was 5.60% in the Central Cattle Breeding and Dairy Farm (CCBDF) in Bangladesh was carried out between 1992 and 2007. About 20% large animals are estimated to be died annually due to various infectious diseases but recently most of the infectious diseases of cattle in Bangladesh are controlled by routine vaccination programs and improved awareness (Haque, 2002). The cattle mortality rate in the study area was more or less similar to the reports of Bangar et al. (2013), Maher et al. (2008) and Hossain et al. (2014), but dissimilar to the findings of Shaikh et al (2009) and Haque (2002). This variation might be due to excellent cattle management practices, routine vaccination program, farmer awareness, geographic location, disease prevalence, breeds, age, sex, and variation in sample size.

The effect of farm type on cattle mortality rate is presented in **Table 4**. It is shown that cattle mortality is

significantly ( $P < 0.05$ ) higher (3.61%) in unconventional (confined) farming system as compared to conventional farming system (2.93%). Chaudhary et al. (2013) reported that high mortality (10.23%) was shown by non-grazing bovine than grazing (7.58%) cattle in Himachal Pradesh, India. Dechow et al. (2011) also stated tie-stalls that allowed out door access and that did not feed total mixed rations had the lowest mortality rate (2.0%). Free stalls with complete confinement had significantly higher levels of mortality (8.3%) in pensylvania dairy herds. The present study was agreed with Chaudhary et al. (2013) and Dechow et al. (2011).

The effect of vaccination and deworming on cattle mortality rate is shown in **Table 5** and **Table 6**, respectively. Significantly ( $P < 0.05$ ) higher mortality rate of cattle is observed in the cattle that did not receive vaccine (3.38%) and deworming (3.76%) drug as compared to the vaccinated (2.74%) and dewormed

(2.66%) cattle. Farmers did not vaccinate and use of deworming drug for their cattle might be due to lack of awareness, scarcity of vaccine, high price of anthelmintic, poor economic condition, and ignorance of veterinary care after infection, which increased the mortality rate of their cattle.

## CONCLUSION

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Age of the animal was found to be the most important risk factors for cattle mortality. Greater attention should be paid to the time of colostrum feeding, proper timing and management of calves, and hygiene of calf barns. Increasing the level of knowledge in farmers about the risks and common causes of mortality of cattle can help in reducing cattle mortality in Rajshahi division, Bangladesh. In addition, special veterinary care should be provided to the calves to avoid unexpected death.

## CONFLICT OF INTEREST

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The authors declare that they have no competing interest.

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