Research Article

Prevalence of Abortion, Calf Mortality and Proportion of Cattle Population in Commercial Dairy Farms of Bangladesh

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Abstract | Abortion and calf mortality are representing significant economic loss in commercial dairy farms all over the world. The present study aimed to investigate the abortion rate, calf mortality and proportion of different types of cattle in commercial dairy farms of Bangladesh. A preset questionnaire was developed to collect information through active surveillance. This study was conducted in seven divisions a total of 73 registered dairy farms having 3260 cattle were considered as the source of population for epidemiological survey during 2014. The collected data revealed that the sex ratio was (752) 23.06% males and (2508) 76.94% female. Among of the total female cattle (2508), the milking cow, pregnant and heifers and female calf were 47.89%, 37.24%, 17.58% and 21.45% respectively. The results showed that a total of 98 abortion cases were observed in 1201 milch cows. The prevalence of abortion was 8.16%. The number of death calves was 126 among 1026 born calf. The calf mortality rate was revealed 12.28%. Finally the result found that total calf crop loss appears to be (8.16%+12.28%) 20.44%, which is very alarming in the growth of dairy industry. However, the study concluded that abortion and calf mortality are widely prevalent and distributed among commercial dairy farms in Bangladesh. Further studies need to be carried out by using this demographic data to prove the causes and implementation of preventive measures among the dairy farms to prevent abortion and calf mortality in Bangladesh.

Keywords | Abortion, Calf Mortality, Cattle Population, Dairy Farm, Bangladesh

INTRODUCTION

The dairy industry is one of the major parts of livestock in agricultural economic systems of Bangladesh. Livestock contributes biological products especially meat, milk and milk products to fulfill the daily requirement of protein for human being. Total cattle population 24.39 million, milk and meat production 106.80 and 76.74 lakh metric ton separately. There are deficient approximately 46 lakh metric ton milk productions. The livestock contributes about 1.43 % of the national Gross Domestic Product (Bangladesh Livestock Economy, 2019). Therefore Bangladesh government has paid considerable attention to commercial dairy farms to increase productivity (meat and milk) to meet the local demands (Shamsuddoha and Edwards, 2000).

Abortion, calf mortality which leads to decrease milk productions are becoming the major obstacles hindering the development of dairy industry all over the globe. Abortion is the early or late termination of pregnancy where the expelled fetus unable to survive at any stages of gestation period (Schlafer and Foster, 2016). Abortion is a condition where fetus is delivered live or dead before reaching survivable stage visualized by naked eye (Sarder et al., 2010). The success of any commercial dairy farms mainly depends on the survival rate of calf crop produced by the dairy farms, but most of the dairy farms are confronted with acute problems of calf morbidity & mortality (Wudu et al., 2008; Gitau et al., 2010). Abortions cause significant

Table 1: Prevalence of abortion, calf mortality and total calf crop loss in the year of 2014

Division	Milch Cow	Number of abortion			Number & (%) of Abortion	Calf (Male & female)	Number & (%) of calf died
		< 6m	> 6m	Stillbirth			
Chittagong	276	13	7	3	23(8.33)	246	25(10.16)
Sylhet	177	12	6	1	19(10.73)	114	17(14.91)
Rajshahi	163	4	3	5	12(7.36)	141	16(11.34)
Rangpur	189	1	8	2	11(5.82)	157	20(12.73)
Barisal	65	1	3	2	6(9.23)	76	9(11.84)
Khulna	131	10	4	1	15(11.45)	116	19 (14.50)
Dhaka	200	5	6	1	12(6.0)	176	20(11.36)
Total	1201	46	37	15	98(8.16)	1026	126 (**12.28**)
Total calf crop loss					8.16+12.28 = 20.44 (%)		

Table 2: Demographic data for cattle population in commercial dairy farms in the year of 2014

Division	No of farm	Male population in farm			Total Cattle	Female population in farm					Milking & pregnant
		calf	Bull	Total		Total	calf	Heifer	Milch	pregnant	
Chattogram	10	125	84	209	856	647	121	181	276	69	173
Sylhet	8	58	13	71	327	256	56	11	177	12	86
Rajshahi	10	63	69	132	472	340	78	56	163	43	117
Rangpur	12	64	9	73	466	393	93	51	189	60	89
Barisal	7	27	10	37	232	195	49	41	65	40	20
Khulna	15	57	24	81	363	282	59	47	131	45	48
Dhaka	11	94	55	149	544	395	82	54	200	59	73
Total	73	488	264	752	3260	2508	538	441	1201	328	*606
Ratio (%) of male		64.9	35.1	100%	Female%	100%	21.45	17.58	47.89	13.08	*24.16
Male& female ratio (%) in farm			23.06	3260(100)	76.94						

Milking and pregnant: Cows giving milk already counted in the column of mich cow but this column is represents to investigate total number of pregnant cow in commercial dairy farm that was 328 (13.08%)+606(24.16%)=934 (37.24%). 24.16% pregnant cows remain within the milch cow 47.89%.

economic which can be attributed to loss of replacement of calves, reduced milk production, costs of treatment, feeding of animals and premature culling of productive cows and heifers (Abdelhadi et al., 2015). Calf mortality represents an irrefutable and irrevocable economic loss to the dairy farm due to loss of the present value of the calf and loss of genetic potential for herd improvement, increase treatment cost. However, there is very limited information on rate of abortion, calf mortality and proportion of cattle population in commercial dairy farms of Bangladesh. Therefore, the presented study was carried out, for the first time to estimate the prevalence of abortion, calf mortality as well as total calf crop loss and demographic data on the proportion of cattle population in the commercial dairy farms of Bangladesh reared by the farmers.

MATERIALS AND METHODS

The presented research work was conducted on commercial dairy farms in seven different divisions during 2014.

There are 73 commercial dairy farms registered by the Department of Livestock Services (DLS, Bangladesh). A total of 3260 cattle populations have been taken into consideration as the source of population for this epidemiological survey. The study area and number of farms consisted of Chattogram (10), Sylhet (8), Rajshahi (10), Rangpur (12), Barisal (7), Khulna (15) and Dhaka (11) (Figure 1). A structured questionnaire was developed to acquire information regarding farm and cow level by active surveillance. The questionnaire was designed to close and open ended (categorical) questions for easy data processing and improve precision of responses (Thrusfield, 2005). The questionnaire was taken up by repeated questioning to capture intended information from the farm owner, managers and attendants, and farm register or log books etc. Important data includes total population at farm, breed, pregnancy status and age determined from birth records and dentition given by observing the animal.

STATISTICAL ANALYSIS

Data were collected, sorted from preset questionnaire input into Microsoft Excel 2007@ ® spreadsheet and stored separately. The prevalence of abortion, calf mortality, male and female ratio was calculated. The collected data exported to analytical software STATA 11.2® for further descriptive analysis.
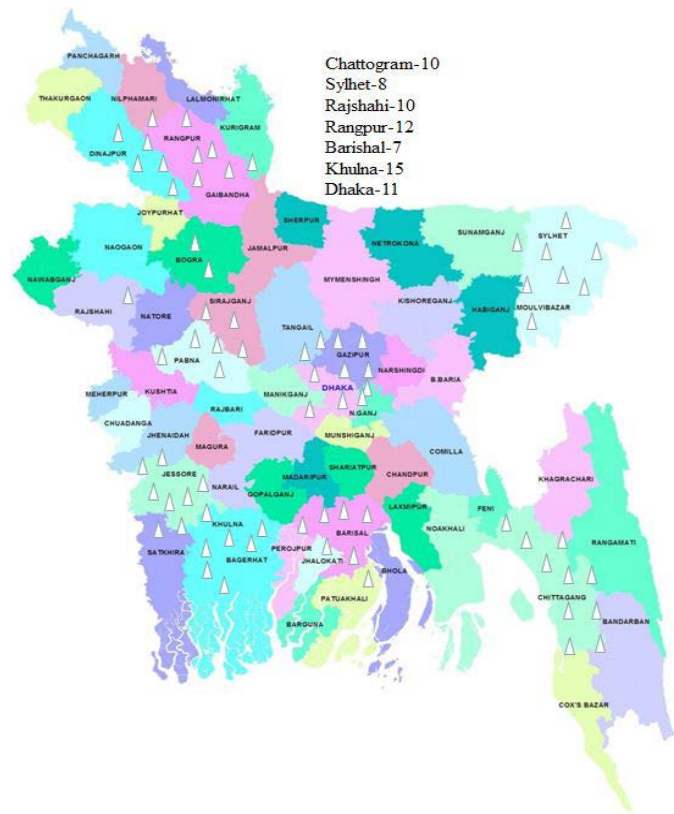

Figure 1: Geographical distribution of commercial dairy farms marked as white triangle located in different regions of seven divisions in Bangladesh.

RESULTS

The prevalence of abortion was found (98/1201) 8.16% in commercial dairy farms of Bangladesh. The highest prevalence of abortion was observed in Khulna division was (15/131) 11.45% and the lowest prevalence was found in Rangpur division (11/189) 5.82%. But there is no significant variation among other divisions. The calf mortality rate was revealed (126/1026)12.28% in commercial dairy farms all over Bangladesh. The highest mortality rate was (17/114) 14.91% in Sylhet and lowest mortality rate was (25/246) 10.16% in Chattogram. Therefore the total calf crop loss in the year 2014 in commercial dairy farms of Bangladesh was (8.16+12.28) 20.44% (Table 1)

The total cattle population of this study was 3260. So that the proportion of males was (752) 23.06% and female was (2508) 76.94%. Among the total female cattle (2508), the milking cow, pregnant, female heifers with calf were

47.89%, 37.24%, 17.58% and 21.45% respectively. (A sum of total 124.16% where 24.16% pregnant as well as milking cows which are already counted as a milch cow but this column represents for showing the results of total pregnant cow in dairy farm of Bangladesh that was 37.24%). The male and female calf ratios were appeared (488/1026) 47.56% and (538/1026) 52.44%. In case of male cattle, the result seemed to be 64.9 % male calf and 35.1% bull (Table 2).

DISCUSSION

The reported prevalence of abortion in present study was found 8.16% in commercial dairy farms in Bangladesh, agreed with the results of Degefa et al. (2011) who reported an 8.7% prevalence of abortion in Ethiopia. Markusfeld-Nir (1997) reported that the abortion rate ranges from 4.2-10.2% in Israeli. However the lower prevalence of abortion has been reported by Khair etal. (2013) 0.20% in Shahjadpur Upazilla in Sirajgonj district of Bangladesh, Haftu and Gashaw (2009) 6.0% in Ethiopia. In contrary with that to a higher prevalence of abortion also recorded 13.3%in Ethiopia by Regassa et al. (2016). Differences within Bangladesh due to previous research work (0.20%) limited to a certain region, but present research work was performing all parts of Bangladesh. But others variations might be different geographical locations, time and management practices of this selected area.

This research also reported the calf mortality rate was 12.28% in commercial dairy farms of Bangladesh, similar observation also reported by Madalena et al. (1996) who showed the calf mortality ranges from 10.1-20.4% in Brazil. The lower calf mortality rate also reported 6.29% in (Muktagacha, Mymensing) Bangladesh by Islam et al. (2015), 9.3% in Ethiopia by Megersa et al. (2009). On the other hand higher prevalence of calf mortality also recorded by 30.7% Ferede et al. (2014), 29-36% in (Sherpur, Bogra) Bangladesh by Islam et al. (2005) and 71.1% Hossain et al. (2013). The calf mortality rate in Bangladesh was 6.29% and 29-36% in previous research, but this research was found 12.28% due to previous work was performed in one farm located in one certain region but present work represents entire Bangladesh. Calf mortality ranges from 15 to 25% at pre-weaning stage is common on many tropical dairy farms. Often it is high as 50% due to very poor calf management but the US identified less than 8% mortality and Australian farmers disclosed only 3% mortality published by Moran (2011).

The large group size can increase the risk for calf mortality, with large groups having several animals above the single digits showing a higher mortality rate announced by Losinger and Heinrichs (1997); Gulliksen et al. (2009).

But other factors influenced the rate of calf mortality might be due to health management, farm management, calf nursing, farm size, farm location and veterinary service availability of that region.

Roche et al. (2006) reported that the secondary sex ratio (SSR represents the proportion of male to female offspring born) should be 50:50 in situations of evolutionary balanced similar with the findings of presented research which were estimated 47.56% male calf and 52.44% female calf was born . In contrast with that the male and female cattle ratio was constituted 23.06% and 76.94%. Commercial dairy farms of Bangladesh mainly consisted of a higher percentage of milking cows (47.89%), pregnant (37.24%), heifer (17.58%) and female calf (21.45%). The farm owners reared milking cow for milk production and pregnant cow for newborn calf production which is highest in number. They also reared heifer and female calf as replacement stock for the future and replaced by culled or aged cattle. On the other hand, the male calf and bull were 64.9% and 35.1%. The male calf was sold out at the age of one year or less, sometimes used this calf for fattening. Bull animal was sold out as a meat purpose or during Eid-Ul-Azha. Occasionally bull was utilized as a breeding animal for gaining high genetic merit. The good quality semen is supplied by the Department of Livestock Services (DLS) throughout Bangladesh, for that reasons farmer do not rear a male calf or bull for breeding purpose.

CONCLUSION

The result of present study provided valuable information on the prevalence of abortion; calf mortality as well as total calf crop losses and demographic data on the proportion of cattle population in different groups are reared by the commercial dairy farms of Bangladesh. Further research is needed to find out the causes of abortion and calf mortality which helps in implementing the possible preventive measures against abortion and calf mortality by generating new technology. The outcome of this research will directly or indirectly help the dairy industry, researcher and government policy maker for an economically feasible commercial dairy farming system in Bangladesh and also enrich the literature of Veterinary Sciences.

ACKNOWLEDGEMENTS

CONFLICT OF INTEREST

No conflict of interest.

AUTHOR'S CONTRIBUTION

Md Anowar Parvez and Md. Rayhan Faruque implemented the study design and carried out the field and laboratory experimentation. Rokeya Khatun analyzed the sorted data. Finally Md Anowar Parvez drafted and revised the manuscript.

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