A longitudinal study of calf morbidity, mortality and its potential risk factors in rural buffalo dairy herds

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Abstract

A longitudinal observational study was conducted in rural buffalo dairy herds of Ludhiana, Punjab from Janauary 2019 to June 2019. Fifty buffalo calves of less than 15 days of age were selected randomly by visiting the herds. The selected calves were visited once in 15 days and monitored for morbidity and mortality up to 3 months of age. A questionnaire was prepared and information about various risk factors was collected by interacting with the farmers and by personal observation during the visits. Out of 50 calves studied, diarrhea was observed in 16 calves, which was the major cause of morbidity. The other diseases observed were respiratory disease, bloat, joint ill, pyrexia, external parasites and unthriftiness. The six calves died within 3 months of age. Out of 50 calves, 36 calves were born during night time. Forty eight calves were born with normal calving. Colostrum was fed to all the calves by suckling. Additional feed was introduced along with the milk (2 times/ day) at the age of 15- 20 days in 24 calves and at the age of 1 month in the remaining 26 calves. Thirteen calves were reared in separate calf pens and remaining calves were reared along with their dams. Separate calving pen facility was available in 9 herds. Practice of disinfection of calving pens and calf pen was not done by any of the farmer. Practice of deworming was irregular in majority of the herds. Navel treatment in the new born calves was not generally practiced. Twenty eight calves were reared by male laborers and 22 were reared by owners (9 of them were female). Half of the owners had a minimum matric education and dairy was their secondary source of income after agriculture. In logistic regression model of 20 risk factors, none of the factors was having significant effect on calf morbidity in the first three months of life in buffalo calves of rural dairy herds.

Key words: Mortality, Morbidity, Colostrum, Diarrhea, Risk factors, Longitudinal study, Rural dairy herds

Dairy farming is a growing livestock production system in India. Calf rearing is an essential part of dairy herd management and is a prerequisite for a productive lifetime of dairy animals (Hultgren and Svensson 2009). The period from birth to weaning is the most critical phase in a dairy calf rearing system, because it has direct costs with no financial return to the producer. The ubiquitous presence of infectious agents and lower immunity in calves make them more susceptible to contract infections. However, among the factors that have been hindering success of dairy industry, morbidity and mortality of calves is the one that causes of major concern (Acha et al., 2004). The calf morbidity and mortality is a perennial problem throughout the world and the most susceptible period is the first few weeks after its birth. Estimates showed that calf mortality of 20 per cent may reduce the net profit of farm by 38 percent (Radostitis et al., 2007). Calf diseases result from complex interaction of the environment, infectious agents and the calf itself, and are the major constraints for raising replacement stock.

Further, Raboisson et al., (2013) suggested that farmer's management style highly influences mortality and it is generally assumed that about half of the deaths can be prevented by proper management. Research studies have revealed the poor condition of calves in the village dairies wherein the farmers are not much aware about the scientific calf management practices. One emerging trend in the Indian dairying scenario is the growing number of the commercial dairy farms in the urban and periurban areas of the big cities. Awareness of the causes would enable to focus on preventing the predisposing factors that induce morbidity and mortality. Thus, it is necessary to identify risk factors that are responsible for dairy calf morbidity and mortality in order to design and implement preventive measures. Infectious diseases are often considered to be the primary reasons for calf mortality, particularly digestive disorders (Svensson et al., 2006, Torsein et al., 2011) and respiratory diseases (Gulliksen et al., 2009). It is not possible to outline one management system which is suitable for all herds under all circumstances. The incidence of calfhood diseases

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may be reduced by increasing the specific resistance of newborn calves and by reducing the concentration of pathogens in the environment. This study attempted to determine the incidence of calf morbidity and mortality in rural dairy herds, identifying the importance and magnitude of the factors that put dairy calves at risk of morbidity and mortality.

Materials and Methods

A longitudinal observational study was conducted in rural dairy herds of Ludhiana, Punjab. Fifty buffalo calves were selected randomly and regularly monitored for clinical health problems up to three months of age. Selected calves were individually identified and calf cards were prepared to record events surrounding the birth of the calf and routine management practices. The main activities accomplished during the visits were clinical examination of calves for health problems, observation of different calf management aspects like cleanliness of the calf barn and feeding practices and asking calf attendants the occurrence of ill health cases between the visits. Information on potential risk factors were collected by personal observation during visits to farms and from questionnaire survey as follows,

Calf factors: Birth time (born in day time or night time), birth condition (normal delivery or assisted delivery), sex, breed and parity of the dam.

Management factors: Colostrum feeding (yes or no), age at first colostrum ingestion, amount of colostrum fed, method of colostrum feeding (suckling from its dam or hand feeding), time of introduction of additional feed, housing condition (separate calf pen or in the same barn with buffaloes), house cleanliness (clean or unclean), regular deworming (yes or no), naval care (yes or no).

Farm attributes: Owners education level, farm as source of income (primary source of income or secondary source of income), knowledge about the importance of colostrum, knowledge on the optimum age to feed colostrum, ownership of the calf: caretaker (owner or hired), sex of calf caretaker (male or female), experience of the calf caretaker.

Results and Discussion

Morbidity

Out of the 50 buffalo calves studied, 25 were healthy and 25 got affected with one or the other disease in

the first 3 months of age (Fig. 1). Diarrhea was observed in 16 calves which was the major cause of morbidity during 90 days of life in rural dairy herds. The other diseases observed were respiratory disease (n=1), bloat (n=1), joint ill (n=1), pyrexia (n=2), external parasites; lice and ticks (n=2) and unthriftiness (n=2).

Mortality

Out of 50 buffalo calves, 6 calves died within 3 months of age (Fig.2). Three calves died due to diarrhea, 1 due to respiratory disease, 1 due to bloat and 1 died suddenly without prior symptoms. The crude mortality was 12 per cent.



Fig. 1: Prevalence of morbidity in buffalo calves during first 3 months of age in rural dairy herds



Fig. 2: Proportionate mortality due to various diseases in buffalo calves in the first three months of age in rural herds

Risk factors

The average herd size ranged from 2 to 10 animals and most of them were milch animals. Majority of the dairy herds had a poor housing structure for these calves which was not suitable as per the requirement of the different seasons. Only 9 herds were having separate calving pen facility and the pregnant animals were moved into calving pens, 5-10 days prior to calving. Disinfection was practiced in none of the pens. Majority of the farmers were disposing the dung and waste material nearby animal houses.

Out of the 50 buffalo calves, 36 calves were born during night time and in those cases there might be a chance of lack of supervision on calving and delayed feeding of colostrum. According to the information from the producers, 48 calves were born without any dystocia signs. All the buffalo calves were of non descriptive breed and 24 were born to heifers, 13 to 2nd parity and 9 calves in 4th parity and 4 calves to 6th parity. Navel treatment of the new born was not generally practiced. Similar findings have been reported by Kumar (2002) and Tiwari et al., (2006), who found that buffalo owners in the small holder buffalo farms did not cut and disinfect the navel cord of the calves due to poor knowledge about the scientific management of calves. Colostrum was fed to all the calves by suckling. Majority of the producers had an idea of importance of colostrum but were not aware of the right time to feed the colostrum. Majority of the farmers used to wait until the fetal membranes are shed after calving. Only 24 farmers were allowing calves to suckle the colostrum within 2 to 3 hrs after birth. Verma et al., (1994), Malik and Nagpaul (1999) and Singh et al., (2003), Tiwari et al., (2001) and Singh et al., (2007) observed that buffalo owners allowed calves to suckle colostrum only after release of fetal membranes as they believed that if they allow the calf to suckle immediately then the dam will not shed the fetal membranes.

Thirteen buffalo calves were reared in separate calf pens and remaining calves were reared along with their dams. Minimum hygiene was observed in majority of the herds. Twenty eight calves were reared by male laborers and 22 were reared by owners (9 of them were female). Half of the owners had a minimum matric education and dairy was their secondary source of income after agriculture. Deworming was not practiced regularly in majority of the herds. Only 12 farmers dewormed their calves. Most of them dewormed the calves when the calf was off feed or they observed worms in the feces.

Logistic regression model was performed to know the effect of potential risk factors on health of the calf in the first three months of life. Twenty risk factors were included for the analysis of their effect on disease occurrence at 95% CI. In backward logistic regression, the insignificant risk factors were eliminated in step by step. All the risk factors with p>0.05 were eliminated from the model. In the final model, none of the factors was having significant effect on morbidity in three months of life in buffalo calves of rural dairy herds.

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