Risk Factors of Improper Colostrum Management Practices in Calves in Village Areas of Bangladesh

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Key words: Calves, village areas, colostrum management, timing and amount, bottle and bucket feeding, failure of passive transfer

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Abstract: Colostrum management is the single most important factor in determining calf health and survival. To know about the colostrum management practices in village areas of Bangladesh we conducted a pilot study at Fenchuganj. A questionnaire was developed based on the existing literature to identify risk factors of failure of the passive transfer due to improper colostrum management practices in village areas. Our study indicates that 85% of the farmers gave access to the colostrum to their calves. However, they were not aware of the timing and amount of colostrum required for calves. Only 24% of farmers supplied colostrum to calves within two hours of birth, ideal timing for the first colostrum supply and the rest of them provided within 8-12 h. In terms of the feeding method, 100% of farmers gave access to claves to suckle colostrum from their dams which might not ensure the required amount of colostrum for calves. None of the farmers provided colostrum by bottle or bucket feeding methods which ensure the proper amount of colostrum feeding of calves. Furthermore, farmers in the village areas of Bangladesh were not aware of other colostrum management practices such as evaluation of colostrum before feeding and how to store colostrum for future use. This study highlights that extension programme among farmers in village areas are required for proper colostrum management practices in calves to prevent failure of passive transfer.

INTRODUCTION

Calves do not acquire any antibody from cows unless consuming colostrum from the dam due to syndesmochorial placenta which prevents absorption of immunoglobulin from mother to foetus during the gestational period[1]. Calves require approximately 2-4 weeks to achieve active immunity after birth[2]. As they require roughly a month to achieve active immunity to fight against pathogens, calves heavily rely on passive immunity from their mother before active immunity become functional[3-5]. The significant amount of passive antibody they acquire is from their mother through colostrum ingestion[3]. Failure to provide an adequate

amount of colostrum at the right time results in failure of the passive immunity in calves which may contribute to gastrointestinal and systemic infection[4, 6-8]. Not only the amount and time of ingestion but other variables also affect the acquisition of passive immunity such as the quality of colostrum, hand feeding or feeding by dam, breed and the way colostrum was stored before being feed[9].

Infectious diseases are often considered as the principal cause of calf mortality, especially gastro-intestinal disorders[10-12]. Data suggest that in any place, a large proportion of calf mortality would have been prevented by proper colostrum management, adequate feeding and maintaining the proper hygienic practice for the first few months of calves' life[10, 13]. In the dairy sector of Bangladesh, calf mortality causes substantial economic losses to the farmers[14]. Infectious pathogens are the primary cause of this mortality in Bangladesh[14-17]. However, we have limited study on the predisposing factors of infectious mortality in calves. As mentioned earlier that standard colostrum management and hygiene practice are the keys to limit the infection in calves in their early life, knowing colostrum managementin dairy farming in Bangladesh is worthy of further research.

We have limited data on how small scale dairy farmers in village areas of Bangladesh manage colostrum feeding to their calves. As management of colostrum is directly related to the acquisition of passive immunity in calves to combat pathogens and reduce calf mortality, knowing the risk factors of inadequate colostrum management in rural dairy farming is critical. Identification of risk factors of inadequate colostrum management is one of the keys to reducing calf mortality in future by interveningappropriate measures to reduce the risk of inadequate passive immunity in calves. We hypothesize that lack of proper education and poor knowledge on dairy farming by the small scale dairy farmers in Bangladesh may contribute to improper colostrum managementof calves after their birth. Accordingly, a pilot study was conducted to understand the colostrum management practices by small scale dairy farmers in the village areas of Bangladesh.

MATERIALS AND METHODS

A questionnaire was developed based on the information in the existing literature to find out the risk factors of inadequate colostrum management such as farmer's education, herd size, the timing of first colostrum feeding, volume of colostrum feeding, colostrum storage, colostrum quality, testing of passive immunity in calves after colostrum ingestion.

Study area and period: The study was conducted in the Fenchuganj area under Sylhet district in Bangladesh from November 2019 to December 2019.

Sampling strategy and study population: Farms under the Fenchuganj area were selected by using a random sampling strategy. A total of 70 farms from 13 villages under the study area was selected for data collection.

Study design and data collection tool: The survey followed a cross-sectional design. Each farm was visited once during the study period. A standard questionnaire was used as a data collection tool for the study.

The questionnaire was divided into three sections, i.e., about farmers, herd characteristics and colostrum management systems. The farmers were asked about their education and who manage the day to day activity of their farms, farm and herd characteristics, colostrum management such as the timing of first colostrum feeding, the volume of colostrum feeding, colostrum storage, colostrum quality, testing of passive immunity in calves after colostrum ingestion.

Data management and statistical analysis: Initially, data were recorded in a paper format questionnaire. Later data were transferred to the Microsoft EXCEL sheet. Descriptive statistics were done after the compilation of all data.

RESULTS AND DISCUSSION

A total of 69 questionnaires were finally analysed and the response rate was around 98%. Most of the farmer's education level was secondary and most of them took care of their farms (Table 1). Only 24% of farmers supplied colostrum to calves within two hours of birth. After birth, 100% of farmers allowed calves to suckle colostrum from their dams. No bottle-feeding or bucket feeding of colostrum was practised (Table 2). Farmers did not supply extra colostrum to calves. None of them was aware of the storage of extra colostrum by frozen method for future use. They also did not know about the passive transfer of immunity in calves, neither about refractometer nor

Table 1: Characteristics of the respondents and herd size

Variables	Respondents (n)	Percentage
Education		
Primary (class 1-5)	25	33.23
Secondary (class 6-10)	39	56.52
Higher secondary or graduate degree	05	7.25
Farm operation		
By owner	62	89.86
By another person	07	10.14
Herd size		
<5	52	75.36
5-10	17	24.64

Table 2: Colostrum management practices in calves in village areas of Bangladesh

Variables	Total respondents (n)	Percentage
Colostrum supply		
Yes	59	85.50
No	10	14.50
The required amount of colostrum feeding		
Yes	0	0.00
Do not know	59	85.50
Not supplying colostrum at all	10	14.50
Time of feeding first colostrum		
Within 2 h	14	23.72
Within 8-12 h or later	45	76.27
Method of colostrum supplement		
By dam	59	85.50
Bottle feeding	0	0.00
Bucket feeding	0	0.00

colostrometer to check colostrum quality. If any calf was born overnight, they supplied colostrum to calves the next morning.

The survey in this study highlights a good overview of colostrum management practices in calves in village settings in Bangladesh. In our study, we see that the herd size of the farms in the village areas is very small. The average number is 3-5 and this indicates small scale dairy farming is the most popular in the villages of our study area. The main finding of this study is that the vast majority of the farmers provide colostrum to calves after birth; however, most of them do not provide the colostrum timely. A clear risk factor of failure of passive transfer of immunity in calves. Numerous studies support that the first quarter of colostrum should be given within 4 h of birth[9, 18-20]. As time increase, intestinal pores which allow absorbing large molecule of immunoglobulin in colostrum, decrease. Ultimately, delay colostrum feeding failing in passive transfer[1]. In our study, we also find another potential risk factor of inadequate passive transfer of immunity in calves is the lack of understanding by the farmers regarding the total amount of colostrum feeding to their calves. Previous researches indicate that the daily requirements of colostrum are equal to 10% of the calf's body weight[1, 20]. In our study, we have found that farmers rely on what calf can consume on its own. Reports suggest that this practice does not guarantee the total requirement of feeding. The best practice is to isolate calves and feed them by bottle or bucket feeding according to their requirements[21-23]. This management ensures an adequate amount of colostrum feeding. Before conducting the study, we hypothesised that dairy farmers in rural areas might not provide colostrum to their calves due to lack of awareness, however, this was not the case. In reality, most of the farmers give access to their calves to suckle colostrum from dams but they are not aware of the proper timing and amount of colostrum feeding. Farmers in village areas were also not aware of other colostrum management practices such as evaluation of colostrum quality and storage of colostrum for future use.

CONCLUSION

In conclusion, this pilot study indicates that most of the dairy farmers in village areas of Fenchuganj provide colostrum to their calves, however, the majority of them do not know the best colostrum management practices which highlights that extension programmes are needed in rural areas to educate farmers on proper colostrum management practices to help calves to acquire passive immunity after birth.

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