

**Investigation into calf management systems in some selected dairy farms  
of Chattogram district in Bangladesh.**



**A clinical report submitted in partial satisfaction of the requirement for the  
Degree of Doctor of Veterinary Medicine (DVM)**

**By:**

**Klinton Barua**

**Roll No: 17/62**

**Reg No: 01898**

**Intern ID: 52**

**Session: 2016-17**

**Faculty of Veterinary Medicine**

**Chattogram Veterinary and Animal Sciences University  
Khulshi, Chattogram – 4225, Bangladesh**

**Investigation into calf management systems in some selected dairy farms  
of Chattogram district in Bangladesh.**



**Approved by:**

---

(Dr. Monoar Sayeed Pallab)

Professor  
Department of Medicine and Surgery

**Faculty of Veterinary Medicine**

**Chattogram Veterinary and Animal Sciences University  
Khulshi, Chattogram – 4225, Bangladesh**

<b>Contents</b>	<b>Page number</b>
Content	ii
List of Tables	iii
List of Figures	iii
Abstract	iv
<b>Chapter 1.Introduction</b>	1-3
<b>Chapter 2. Materials and Methods</b>	4-5
2.1. Methodology	4
2.2. Study area and period	4
2.3. Sampling strategy and study population	4
2.4. Study design and data collection tool	4
2.5. Data management and statistical analysis	5
<b>Chapter 3. Results and Discussion</b>	6-14
3.1 Socio demographic characteristics of respondents and herd size	6
3.2 Colostrum feeding management	7-8
3.3 Calf health management	10
3.4 Calf housing management	11-12
3.5 Calf feeding management	14
<b>Chapter 4. Conclusion</b>	15
Limitations and recommendation	15
References	16-20
Acknowledgement	20
Biography of Author	21
Annex	22-28

<b>List of Tables</b>	<b>Page number</b>
Table 1: Colostrum feeding management	9
Table 2: Calf feeding management practices in some selected dairy farms of Chattogram	13
Fig 1: Education of farm owner	6
Fig 2: Farm herd size	6
Fig 3: Education farm employee	7
Fig 4: Calf health management practices in some selected dairy farms of Chattogram	11
Fig 5: Calf housing management practices in some selected dairy farms of Chattogram	12

## **Abstract**

This study aimed to characterize the dairy calves raising systems in some selected farms of Chattogram district face to face survey. Fifty farmers were interviewed. The questionnaire addressed issues related to the Socio demographic characteristics of respondents and herd size, management of the colostrum, nutritional management of the feeding phase, housing and health management. In our survey, about 40% farmers education level were secondary. We found that most village farmers were aware of colostrum feeding, but not in an appropriate way. and only 42% of the calves receive colostrum within the first 2 h of life. About 56% producers allow the calf to suckle colostrum directly from the mother. Regarding the health management, only 30% calf and 44% periparturient dam were vaccinated. In case of housing 84% calves were housed in groups, where 78% within cows barn. And regarding the feeding management 76% calves were milking directly from the dam by suckling, most of the farmers were not supply access of water, hay, green grass and concentrate at early age. It was possible to identify several areas of improvement in the raising system; for instance, greater attention could be given to the establishment of adequate protocols to colostrum feeding, and feeding management.

**Key words:** Dairy calves, Chattogram, colostrum management, feeding, housing, health management.

# Chapter 1: Introduction

High mortality and morbidity rates of newborn animals, caused mainly by failures in the transfer of passive immunity, are the main causes for this inefficiency in the dairy activity. However, the identification of inadequate management practices and improvements in the processing of colostrum feeding can reduce morbidity and mortality of calf.

Colostrum, the first production of the mammary gland following delivery, is a vital source of nutrition and immunity for the newborn (Bielmann et al., 2010). The single most crucial management aspect in determining the health and survival of neonatal calves is universally acknowledged to be ensuring early and appropriate intake of high-quality colostrum (McGuirk & Collins, 2004; Urie et al., 2018). Passive transfer, the process by which maternal Ig is absorbed across the small intestine within the first 24 hours after birth, aids in defending the newborn calf against pathogens until its own immature immune system is able to do so and decreasing preweaning morbidity and mortality rate (Robison et al., 1988). Although vaccination is unlikely to increase total IgG in colostrum of pregnant cows in the final 3 to 6 weeks before calving (Waltner-Toews et al., 1985)(Hodgins & Shewen, 1996). The majority of research indicate that the Ig concentration in colostrum is highest right after calving but gradually decreases over time (Constable et al., 2010)(Conneely et al., 2013). At their first feeding, calves should receive 10% to 12% of their body weight (BW) in colostrum (3–4 L for a Holstein calf) (Morin et al., 1997). Colostrum delivery method is important. Suckling the dam is the least desirable method since it can increase failure of passive transfer rates and cause suckling delays and ingested amount and quality to be uncontrolled (Edwards & Broom, 1979). Therefore, when colostrum is supplied via nipple bottle or esophageal tube feeder, equal and acceptable amounts of passive transfer are attained, provided that an adequate volume of colostrum is delivered (Desjardins-Morrisette et al., 2018; Godden et al., 2009).

During the preweaning period, the most common ailments affecting calves are diarrhea, pneumonia and navel infection. The following vaccinations are most frequently administered at properties in the United States (Jason, 2007): Leptospirosis (63%), IBR/BVD (65%), and BRSV (60%) were the top three respiratory diseases in cattle. Routine navel care is one of the most important practices for dairy farm. Failure to treat the navel can result in omphalitis, myiasis, hernias, infections, and pathogenic bacteria that can produce an ascending infection (Place et al., 1998). When calves are grown separately, there is less of a chance of diseases spreading and less rivalry for food (Veissier et al., 2010). Compared to individually housed calves, calves kept in the barn suffered some type of respiratory illness and diarrhea (Weaver et al., 2000a). Natural milk feeding makes it impossible to provide calves with known volumes of milk; as a result, in the majority of systems, the animal's nutritional needs are not met, which in turn reduces performance (dos Santos & Bittar, 2015). Feeding waste milk to calves cause for mastitis pathogen inoculation (Hill et al., 2007). Weaning age of calf depend on the proper exposure of water, hay, green grass and concentrate (Quigley et al., 1990). Water supply for neonates is crucial from the very beginning of life because it is closely tied to concentrate consumption (Kertz et al., 1981). According to studies, calves' roughage consumption during the milk-feeding phase is beneficial to the rumen's physical development (Hill et al., 2008) . In previous study authors reported that, concentrate is added to the diets of calves to promote rumen expansion and hasten the newborn animal's adaptation to this component of the diet. This allows the animal to be weaned (Quigley et al., 1990).

In dairy sector of Bangladesh, calf mortality can cause economic loses (Islam et al.). It is well established that, mortality and morbidity of dairy calf is influenced by management practices (Hena & Kamal, 2013). In Bangladesh, enteritis and pneumonia are regarded as the most important cause of calf death (Samad et al.), which indicate the farmers are unaware about the vaccination and deworming of calf. Maximum calves are suffering from gastro intestinal and navel infection (Debnath et al., 1990), which indicate the poor management system of farms. Most of the farmers provide first fed colostrum to calf lately, allow the calf to suckling milk from dam directly and fed waste milk (Chowdhury et al., 2017).

The weaning of calf is done at lately. Concentrate, hay and green grass are not provide at early period of life (Islam et al.). There limited information regarding dairy calf management systems in Bangladesh especially in Chattogram district. To our knowledge, very few surveys were done before.

Accordingly, the objective of this study was to characterize the current dairy calf management practices in some selected dairy farms of Chattogram, Bangladesh.



## **Chapter 2: Materials and Methods**

### **2.1. Methodology**

After developing a questionnaire, we went to some selected farms and asked directly to farm owner and or employed person regarding their calf management systems.

### **2.2. Study area and period**

Data collection for the present study was performed during February 2022 to April 2022. Two distinct geographical areas under Chattogram division of Bangladesh was shorted out to conduct this present study. We selected Lohagara and Chakaria upazilla for this study.

### **2.3. Sampling strategy and study population**

Farms under Lohagara and Cakaria upazilas were selected by using random sampling strategy. A total of 50 Holstein Friesians intensive farms from of 15 villages under the study area were selected for data collection.

### **2.4. Study design and data collection tool**

There was a cross sectional design to the survey. During the course of the study, each farm was visited once. The study's data collection instrument was a common questionnaire.

The questionnaire was divided into six sections for data collection i.e., about farmers and farm employ, farm and herd characteristics, colostrum management systems, management of calf health, housing and feeding. The farmers were asked about farm and herd characteristics, timing of first colostrum feeding and amount, volume of extra feeding, monitoring of colostrum quality, method of giving colostrum to calf, storage of colostrums, checking passive transfer of immunity, how many times colostrum supply, periparturient vaccination of dam, presence or absence of the dam during colostrum feeding and about the management of calf health, housing and feeding (Annex 1).

## **2.5. Data management and statistical analysis**

Initially data were recorded in paper format. Later data were transferred to Excel spreadsheet. Descriptive statistics were done after compilation of all data by Excel.

# Chapter 3: Result and Discussion

## 3.1 Socio demographic characteristics of respondents and herd size:

Most of the farm owner education level is primary and secondly secondary (Figure 1). Which indicate that educated peoples are now interested to farming dairy cow. Most of the farms employ education level is primary (Figure 3). Maximum of the herd size in that villages are small,70% of them are 5 to 10 cow and large farm are very few like 2% (Figure 2).

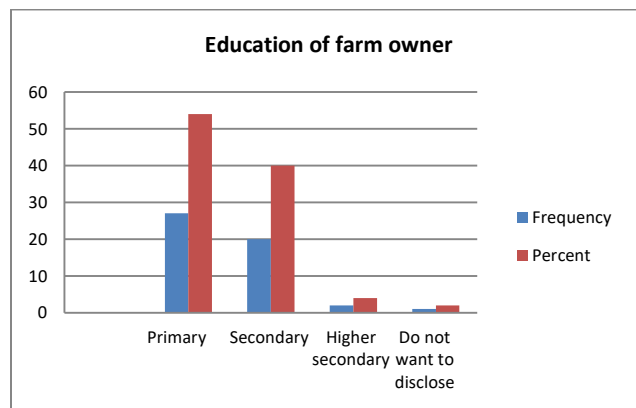


Fig 1: Education of farm owner

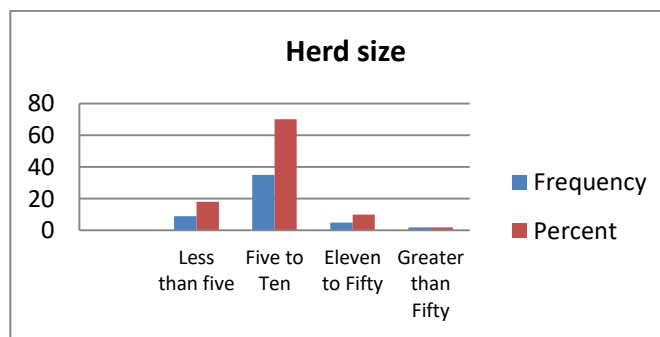
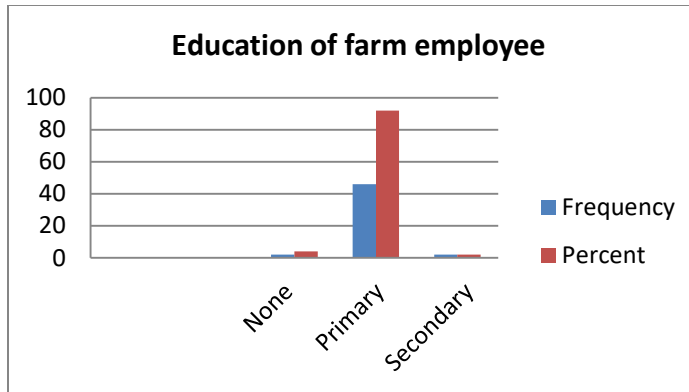


Fig 2: Farm herd size



**Fig 3:** Education of farm employee

### 3.2 Colostrum feeding management:

As shown in table 1, 42% of farmers provide colostrum to calves within two hour after delivery. . Which had higher levels of absorption efficiency and maximum serum IgG levels than calves fed at 6 hours and 12 hours (Fischer et al., 2018). In most of the (58%) farm calf drink colostrum unknown amount , in previous study we know that calf at their first feeding, calves should receive 10% to 12% of their body weight (BW) in colostrum (3–4 L for a Holstein calf) (Morin et al., 1997). Maximum (58%) farms allow calf to drink colostrum directly from dam. Suckling the dam is the least desirable method since it can increase FPT rates and cause suckling delays and ingested amount and quality to be uncontrolled (Edwards & Broom, 1979). Farmers don't give calf more extra colostrum. In one recent study, calves that were transitioned directly onto milk after the first colostrum meal had less overall gastrointestinal mass and less development of villi in the small intestine compared with calves fed either colostrum or transition milk for the first 3 days of life (Godden et al., 2019).

Maximum farmers have no idea about quality check of colostrum, though few farmers check quality bye eye. Any farm can use the colostrometer to estimate the colostrum quality because it is a simple and affordable tool (Vasseur et al., 2010).

Colostrum feedings in buckets or bottles have been used few numbers of farms, most of them allow calf directly to the dam. Therefore, when colostrum is supplied via nipple bottle or esophageal tube feeder, equal and acceptable amounts of passive transfer are attained, provided that an adequate volume of colostrum is delivered (Desjardins-Morrissette et al., 2018).

Therefore, when colostrum is supplied via nipple bottle or esophageal tube feeder, equal and acceptable amounts of passive transfer are attained, provided that an adequate volume of colostrum is delivered (Desjardins-Morrissette et al., 2018).

They are not aware of the frozen method of storing surplus colostrum, some of them are use refrigeration method. Since there is a variance in the concentration of immunoglobulin in the colostrum generated by cows, the bank of colostrum is a crucial option to maintaining high quality colostrum on the property (Weaver et al., 2000a).

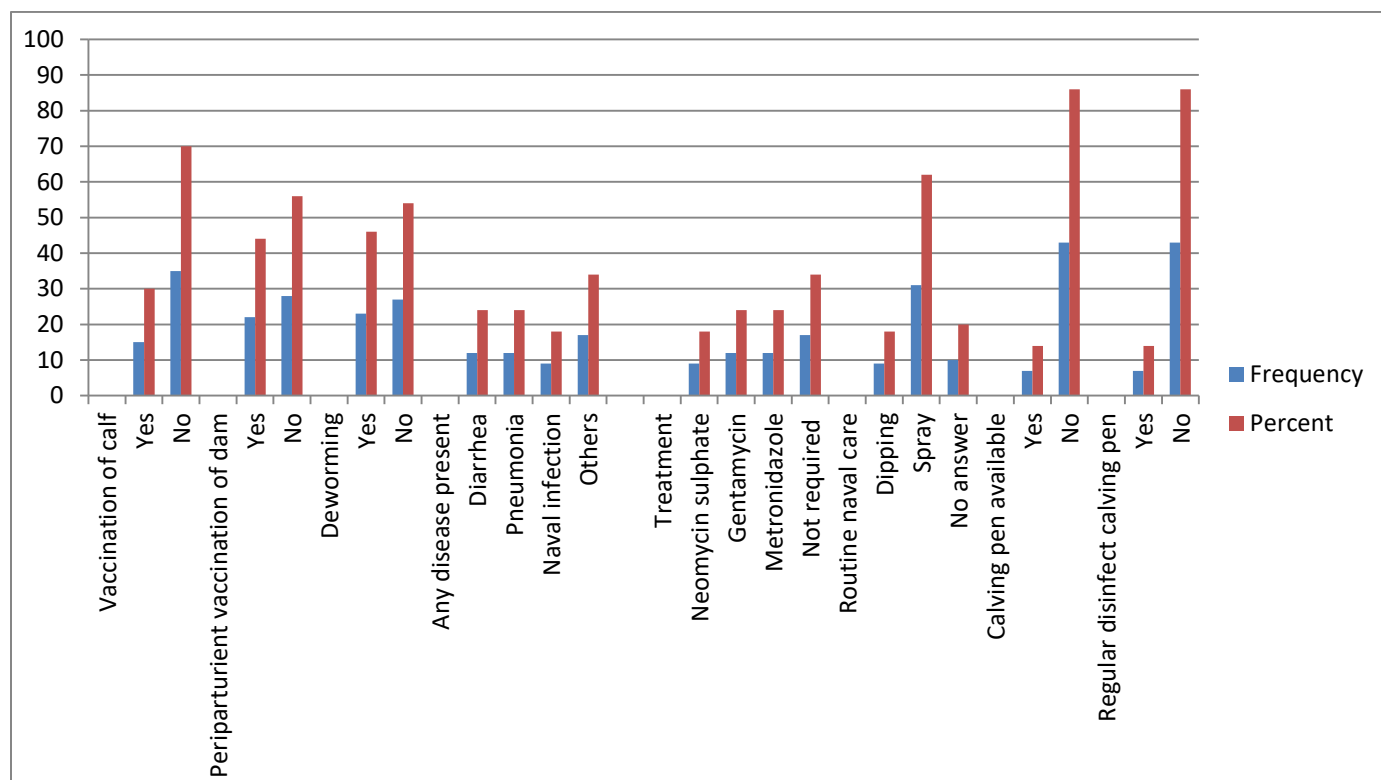
**Table 1:** Colostrum feeding management

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
<b>First colostrum fed</b>		
Within 2 hours	21	42.0
Within 4 hours	8	16.0
Within 4 to 6 hours	11	22.0
Later than 6 hours	6	12.0
Not recorded	4	8.0
<b>Colostrum amount within first 12 hours</b>		
2 Liter	4	8.0
2 to 4 Liter	17	34.0
Unknown, calf drink from cow	29	58.0
<b>Extra colostrum during 12 to 24 hour</b>		
No colostrum	22	44.0
1 to 1.5 Liter	3	6.0
2 to 2.5 Liter	12	24.0
3 Liter	6	12.0
Ad lib	7	14.0
<b>Monitoring colostrum quality</b>		
Yes	15	30.0
No	35	70.0
<b>How monitor colostrum quality</b>		
Refractometer	5	10.0
Bye eye	10	20.0
No	35	70.0
<b>Colostrum stored</b>		
Refrigerated	14	28.0
Not stored	36	72.0
<b>Method of administration</b>		
Bottle teat	21	42.0
Suckling	1	2.0
By dam	28	56.0
<b>Have system of monitoring colostrum</b>		
Yes	5	10.0
No	45	90.0
<b>Check passive transfer of immunity</b>		
Yes	0	0.0
No	50	100.0
<b>How many times colostrum supply</b>		
1 time	27	54.0
2 times	19	38.0
3 times	4	8.0
<b>Presence of dam during colostrum feeding</b>		
Yes	29	58.0
No	21	42.0

### 3.3 Calf health management:

Figure 4 shows that most of the farmers not aware about the importance of vaccination, only (30%) calves were vaccinated and most of them (70%) were not vaccinated. The following vaccinations are most frequently administered at properties in the United States (Jason, 2007): Leptospirosis (63%), IBR/BVD (65%), and BRSV (60%) were the top three respiratory diseases in cattle. During the preweaning period, the most common ailments affecting calves are diarrhea (24%), pneumonia (24%) and naval infection (18%). In our study 44% farmers given periparturient vaccine to the cow, though 56% are not aware about this. A large body of research has shown that vaccination of pregnant cows and heifers in the final 3 to 6 weeks before calving results in higher concentrations of antigen-specific protective colostral antibodies and higher passive antibody titers in calves of vaccinated dams for some common pathogens, such as *Pasteurella haemolytica*, *Salmonella typhimurium*, *Escherichia spp* (Waltner-Toews et al., 1985)(Hodgins & Shewen, 1996). In case of deworming also most of the farmers are not concern about deworming. About (54%) are not deworming the calves.

Routine naval care are taken mainly by spraying (62%) and by dipping (18%). It is one of the most important practices for dairy farm. Failure to treat the navel can result in omphalitis, myiasis, hernias, infections, and pathogenic bacteria that can produce an ascending infection (Place et al., 1998). Most of the (86%) farms absent individual calving pen. Calving pen is so much essential to avoid any kind of accident during calving (Mee, 2008). Most commonly used drugs are neomycin sulphate, gentamycin and metronidazole.



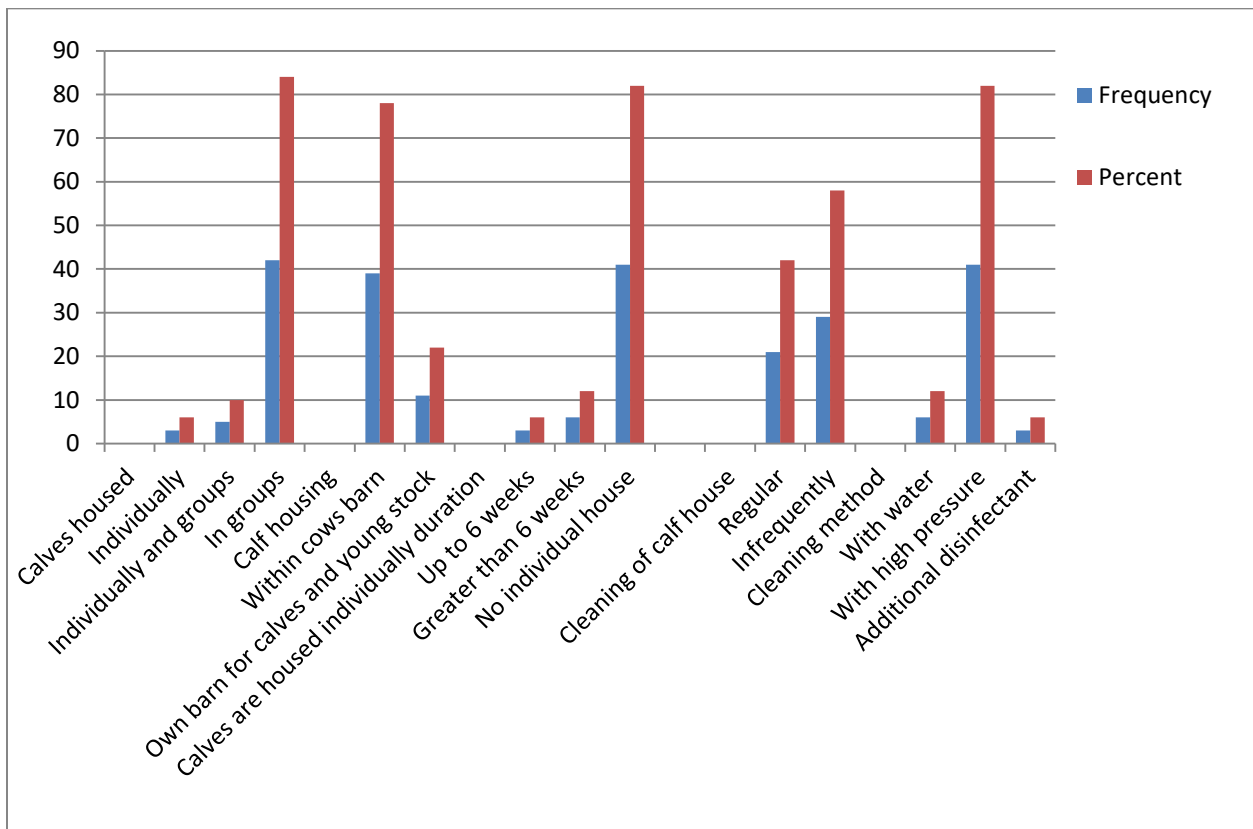
**Fig 4:** Calf health management practices in some selected dairy farms of Chattogram.

### 3.4 Calf housing management:

Figure 5 shows that most of the calves are housed in groups (84%) and few are housed individually. When calves are grown separately, there is less of a chance of diseases spreading and less rivalry for food (Veissier et al., 2010). However, animals raised in a group start to exhibit competitive, playful, and exploratory characteristics that will be useful after weaning (Jensen & Budde, 2006). Additionally, raised together animals exhibit increased behavioral flexibility, which is necessary for responses to environmental changes, such as when a group of unknown animals is present (Vieira et al., 2010). In case of calf housing most of the farmers (78%) keep calves within cows barn and some are own barn and young stock house (22%).



This will be due to lack of land or small herd size. Individual pens made it possible to regulate a wide range of environmental aspects, including cleanliness, ventilation, moisture, drafts, light, and pen congestion (Moore et al., 2012). Young calves must be kept in isolation to reduce their exposure to infections and their risk of illness and death (Iii et al., n.d.). Compared to individually housed calves, calves kept in the barn suffered some type of respiratory illness and diarrhea (Weaver et al., 2000b). Most of the farmers are unaware about farm hygiene so that most of them clean the calf house infrequently (58%) and most of them use high pressure water (82%).



**Fig 5:** Calf housing management practices in some selected dairy farms of Chattogram.

**Table 2:** Calf feeding management practices in some selected dairy farms of Chattogram.

<b>Variables</b>	<b>Frequency</b>	<b>Percent</b>
<b>Type of milk feed</b>		
Whole milk	50	100
<b>Quantity of milk fed daily</b>		
Restricted to 12 percent of the calves BW	10	20
Restricted to greater than 12 percent of the calves BW	2	4
Ad libitum	38	76
<b>Method of milk feeding</b>		
Bucket with artificial teat	3	6
Bucket without artificial teat	9	18
Suckling	38	76
<b>Feed waste milk to calves</b>		
Not at all	33	66
Only in exceptional case	17	34
<b>Weaning</b>		
Less than 8 weeks	1	2
12-13 weeks	12	24
Greater than 13 weeks	37	74
<b>Access to water</b>		
1-3 weeks	13	26
4-8 weeks	37	74
<b>Access to hay and green grass</b>		
4-8 weeks	20	40
Greater than 8 weeks	30	60
<b>Access to concentrate</b>		
4-8 weeks	5	10
Greater than 8 weeks	45	90

### **3.5 Calf feeding management:**

Table 2 shows that 100% farms provide whole milk to the calves, do not supply any milk replacer to the calves. Most of the (76%) farms supply ad libitum milk to the calves by directly suckling from the mother when milking. Natural milk feeding makes it impossible to provide calves with known volumes of milk; as a result, in the majority of systems, the animal's nutritional needs are not met, which in turn reduces performance (dos Santos & Bittar, 2015). Very few (34%) farms feed waste milk to calves in case of exceptions. When calves are raised in groups and cross-fed, the availability of waste milk is linked to the potential for mastitis pathogen inoculation (Hill et al., 2007). And most of the (66%) farms do not give waste milk at all. It will be due to small herd size, the production milk is not so high. The weaning age of maximum (74%) farms is greater than 13 weeks. It may be due to supply ad libitum amount milk that's why the calves not interested to take others feed and the consequences is increasing weaning period. Previous research shows that weaning age of calf depend on the proper exposure of water, hay, green grass and concentrate (Quigley et al.,1990).

Access of water in most of the (74%) farms are 4-8 weeks, Water supply for neonates is crucial from the very beginning of life because it is closely tied to concentrate consumption (Kertz et al., 1981). And the access of hay and green grass is greater than 8 weeks (60%). According to studies, calves' roughage consumption during the milk-feeding phase is beneficial to the rumen's physical development (Hill et al., 2008). The most recent studies, however, have shown the significance of fiber (quantity, source, and size) in preserving rumen health and improving the performance of the calf during the liquid-feeding period (Bach & Gime, 2007; Castells et al., 2012). Also, the access of concentrate is greater than 8 weeks most of the farms (90%). In previous study we found that, in order to encourage rumen growth and help the newborn animal become accustomed to this part of the diet as quickly as possible, concentrate is supplied to calves' diets. This allows the animal to be weaned (Quigley et al.,1990).

## **Chapter 4: Conclusion**

The current survey has provided empirical data on the calf-rearing practices in Chattogram dairy herds and highlights the need for greater awareness of industry standards for calf husbandry among dairy farmers. The survey identified several areas of calf rearing that require improvement, including proper protocols of colostrum feeding. The majority of the dairy farmers in Chattogram give colostrum to their calves, but the majorities are unaware of the proper protocols of colostrum feeding. And also most them not aware about the vaccination and deworming of calves at right time and routine naval care of calves. Most of the farmers have no idea about the importance of housed calves individually and regularly clean the house of calf. The majority of the farmers are also unaware about the providing access to fresh water from birth, providing access to hay and green grass and concentrate as early as possible, weaning based on concentrate consumption. Further education on calf husbandry and management, including the current industry recommendations, can be provided to dairy producers by practicing veterinarians and also through training programs that are being offered by the educational arm of the peak dairy industry body.

## **Limitations and Recommendation**

We were unable to conduct a study with a bigger sample size to make a conclusion with confidence due to time and financial constraints. In future larger scale of study incorporating more upazillas and districts might help to understand the calf management practices in rural dairy farming systems in Bangladesh. The findings of this study will also assist farmers in identifying the problem in dairy calves management and ensuring proper management.

## References

- Samad M, Hossain K, Islam M, Saha S (2004). Concurrent infection of gastro-intestinal parasites and bacteria associated with diarrhoea in calves. *Bangladesh J. Vet. Med.* 2(1): 49-54.
- Bach, A., & Gime, A. (2007). *Effects of Physical Form of a Starter for Dairy Replacement Calves on Feed Intake and Performance.* 3028–3033. <https://doi.org/10.3168/jds.2006-761>
- Bielmann, V., Gillan, J., Perkins, N. R., Skidmore, A. L., Godden, S., & Leslie, K. E. (2010). An evaluation of Brix refractometry instruments for measurement of colostrum quality in dairy cattle. *Journal of Dairy Science*, 93(8), 3713–3721. <https://doi.org/10.3168/jds.2009-2943>
- Md. Mukter Hossain<sup>1\*</sup>, Abu Hena Mustafa Kamal<sup>1</sup>, AKM Anisur Rahman Castells, L., Bach, A., Araujo, G., Montoro, C., & Terré, M. (2012). Effect of different forage sources on performance and feeding behavior of Holstein calves. *Journal of Dairy Science*, 95(1), 286–293. <https://doi.org/10.3168/jds.2011-4405>
- Chowdhury, S., Barua, S. R., Rakib, T. M., Mahbubur, M., Ferdushy, R. T., Hossain, M. A., Islam, M. S., & Masuduzzaman, M. (2017). Survey of calf management and hygiene practices adopted in commercial dairy farms in Chittagong, Bangladesh. *Advances in Animal and Veterinary Sciences*, 5(1), 14–22. <https://doi.org/10.14737/journal.aavs/2017/5.1.14.22>
- Conneely, M., Berry, D. P., Sayers, R., Murphy, J. P., Lorenz, I., Doherty, M. L., & Kennedy, E. (2013). Factors associated with the concentration of immunoglobulin G in the colostrum of dairy cows. *Animal*, 7(11), 1824–1832. <https://doi.org/10.1017/S1751731113001444>
- Constable, P. D., Morin, D. E., Nelson, S. V., Reid, D., Nagy, D. W., & Dahl, G. E. (2010). Effect of colostrum volume, interval between calving and first milking, and photoperiod on colostrum IgG concentrations in dairy cows. *Journal of the American Veterinary Medical Association*, 237(4), 420–428. <https://doi.org/10.2460/javma.237.4.420>

- Debnath, N. C., Sil, B. K., Selim, S. A., Prodhan, M. A. M., & Howlader, M. M. R. (1990). A retrospective study of calf mortality and morbidity on smallholder traditional farms in Bangladesh. *Preventive Veterinary Medicine*, 9(1), 1–7. [https://doi.org/10.1016/0167-5877\(90\)90037-I](https://doi.org/10.1016/0167-5877(90)90037-I)
- Desjardins-Morrisette, M., van Niekerk, J. K., Haines, D., Sugino, T., Oba, M., & Steele, M. A. (2018). The effect of tube versus bottle feeding colostrum on immunoglobulin G absorption, abomasal emptying, and plasma hormone concentrations in newborn calves. *Journal of Dairy Science*, 101(5), 4168–4179. <https://doi.org/10.3168/jds.2017-13904>
- dos Santos, G., & Bittar, C. M. M. (2015). A survey of dairy calf management practices in some producing regions in Brazil. *Revista Brasileira de Zootecnia*, 44(10), 361–370. <https://doi.org/10.1590/S1806-92902015001000004>
- Edwards, S. A., & Broom, D. M. (1979). The period between birth and first suckling in dairy calves. In *Research in Veterinary Science* (Vol. 26, Issue 2, pp. 255–256). [https://doi.org/10.1016/s0034-5288\(18\)32930-8](https://doi.org/10.1016/s0034-5288(18)32930-8)
- Fischer, A. J., Malmuthuge, N., Guan, L. L., & Steele, M. A. (2018). Short communication: The effect of heat treatment of bovine colostrum on the concentration of oligosaccharides in colostrum and in the intestine of neonatal male Holstein calves. *Journal of Dairy Science*, 101(1), 401–407. <https://doi.org/10.3168/jds.2017-13533>
- Godden, S. M., Haines, D. M., Konkol, K., & Peterson, J. (2009). Improving passive transfer of immunoglobulins in calves. II: Interaction between feeding method and volume of colostrum fed. *Journal of Dairy Science*, 92(4), 1758–1764. <https://doi.org/10.3168/jds.2008-1847>
- Godden, S. M., Lombard, J. E., & Woolums, A. R. (2019). Colostrum Management for Dairy Calves. *Veterinary Clinics of North America - Food Animal Practice*, 35(3), 535–556. <https://doi.org/10.1016/j.cvfa.2019.07.005>
- Hena, A., & Kamal, M. (2013). Retrospective study of calf mortality on Central Cattle Breeding and. *Eurasian J Vet Sci, October*, 121–125.

- Hill, T. M., Li, H. G. B., Aldrich, J. M., & Schlotterbeck, R. L. (2007). Effects of Feeding Rate of Milk Replacers and Bedding Material for Calves in a Cold, Naturally Ventilated Nursery. *The Professional Animal Scientist*, 23(6), 656–664. [https://doi.org/10.15232/S1080-7446\(15\)31037-8](https://doi.org/10.15232/S1080-7446(15)31037-8)
- Hill, T. M., Li, H. G. B., Aldrich, J. M., & Schlotterbeck, R. L. (2008). Effects of the Amount of Chopped Hay or Cottonseed Hulls in a Textured Calf Starter on Young Calf Performance. *Journal of Dairy Science*, 91(7), 2684–2693. <https://doi.org/10.3168/jds.2007-0935>
- Hodgins, D. C., & Shewen, P. E. (1996). Preparturient vaccination to enhance passive immunity to the capsular polysaccharide of *Pasteurella haemolytica* A1. *Veterinary Immunology and Immunopathology*, 50(1–2), 67–77. [https://doi.org/10.1016/0165-2427\(95\)05493-6](https://doi.org/10.1016/0165-2427(95)05493-6)
- Li, J. D. Q., Smith, Z. P., & Heitmann, R. N. (n.d.). Changes in Plasma Volatile Fatty Acids in Response to Weaning and Feed Intake in Young Calves. *Journal of Dairy Science*, 74(1), 258–263. [https://doi.org/10.3168/jds.S0022-0302\(91\)78168-X](https://doi.org/10.3168/jds.S0022-0302(91)78168-X)
- Jason, L. (2007). Dairy 2007. *Dairy, October*, Part I.
- Jensen, M. B., & Budde, M. (2006). The Effects of Milk Feeding Method and Group Size on Feeding Behavior and Cross-Sucking in Group-Housed Dairy Calves. *Journal of Dairy Science*, 89(12), 4778–4783. [https://doi.org/10.3168/jds.S0022-0302\(06\)72527-9](https://doi.org/10.3168/jds.S0022-0302(06)72527-9)
- Kertz, A. F., Reutzel, L. F., & Mahoney, J. H. (1981). Ad Libitum Water Intake by Neonatal Calves and Its Relationship to Calf Starter Intake, Weight Gain, Feces Score, and Season. *Journal of Dairy Science*, 67(12), 2964–2969. [https://doi.org/10.3168/jds.S0022-0302\(84\)81660-4](https://doi.org/10.3168/jds.S0022-0302(84)81660-4)
- McGuirk, S. M., & Collins, M. (2004). Managing the production, storage, and delivery of colostrum. *Veterinary Clinics of North America - Food Animal Practice*, 20(3 SPEC. ISS.), 593–603. <https://doi.org/10.1016/j.cvfa.2004.06.005>
- Mee, J. F. (2008). *Newborn Dairy Calf Management*. 24, 1–17. <https://doi.org/10.1016/j.cvfa.2007.10.002>
- Moore, D. A., Heaton, K., Poisson, S., & Sischo, W. M. (2012). Dairy Calf Housing and Environment : Dairy Calf Housing and Environment : The Science Behind Housing and On-Farm. *Washington State University Extension*, 1–56.

- Morin, D. E., McCoy, G. C., & Hurley, W. L. (1997). Effects of Quality, Quantity, and Timing of Colostrum Feeding and Addition of a Dried Colostrum Supplement on Immunoglobulin G1 Absorption in Holstein Bull Calves. *Journal of Dairy Science*, *80*(4), 747–753. [https://doi.org/10.3168/jds.S0022-0302\(97\)75994-0](https://doi.org/10.3168/jds.S0022-0302(97)75994-0)
- Place, N. T., Heinrichs, A. J., & Erb, H. N. (1998). The Effects of Disease, Management, and Nutrition on Average Daily Gain of Dairy Heifers from Birth to Four Months. *Journal of Dairy Science*, *81*(4), 1004–1009. [https://doi.org/10.3168/jds.S0022-0302\(98\)75661-9](https://doi.org/10.3168/jds.S0022-0302(98)75661-9)
- Robison, J. D., Stott, G. H., & DeNise, S. K. (1988). Effects of Passive Immunity on Growth and Survival in the Dairy Heifer. *Journal of Dairy Science*, *71*(5), 1283–1287. [https://doi.org/10.3168/jds.S0022-0302\(88\)79684-8](https://doi.org/10.3168/jds.S0022-0302(88)79684-8)
- Urie, N. J., Lombard, J. E., Shivley, C. B., Koprak, C. A., Adams, A. E., Earleywine, T. J., Olson, J. D., & Garry, F. B. (2018). Prewaned heifer management on US dairy operations: Part V. Factors associated with morbidity and mortality in preweaned dairy heifer calves. *Journal of Dairy Science*, *101*(10), 9229–9244. <https://doi.org/10.3168/jds.2017-14019>
- Vasseur, E., Borderas, F., Cue, R. I., Lefebvre, D., Pellerin, D., Rushen, J., Wade, K. M., & de Passillé, A. M. (2010). A survey of dairy calf management practices in Canada that affect animal welfare. *Journal of Dairy Science*, *93*(3), 1307–1316. <https://doi.org/10.3168/jds.2009-2429>
- Veissier, I., Passille, A. M. B. De, Rushen, J., & Pradel, P. (2010). *Does nutritive and non-nutritive sucking reduce other oral behaviors and stimulate rest in calves ? I Does nutritive and non-nutritive sucking reduce other oral behaviors and stimulate rest in calves ? I . Veissier , A . M . de Passillé , G . Després , J . May 2014.* <https://doi.org/10.1093/ansci/80.10.2574>
- Vieira, A. D. P., Keyserlingk, M. A. G. Von, & Weary, D. M. (2010). Effects of pair versus single housing on performance and behavior of dairy calves before and after weaning from milk. *Journal of Dairy Science*, *93*(7), 3079–3085. <https://doi.org/10.3168/jds.2009-2516>
- Waltner-Toews, D., Martin, S. W., Meek, A. H., McMillan, I., & Crouch, C. F. (1985). A field trial to evaluate the efficacy of a combined rotavirus-coronavirus/Escherichia coli vaccine in dairy cattle. *Canadian Journal of Comparative Medicine*, *49*(1), 1–9.



- Weaver, D. M., Tyler, J. W., VanMetre, D. C., Hostetler, D. E., & Barrington, G. M. (2000a). Passive transfer of colostral immunoglobulins in calves. *Journal of Veterinary Internal Medicine*, 14(6), 569–577. [https://doi.org/10.1892/0891-6640\(2000\)014<0569:ptocii>2.3.co;2](https://doi.org/10.1892/0891-6640(2000)014<0569:ptocii>2.3.co;2)
- Weaver, D. M., Tyler, J. W., VanMetre, D. C., Hostetler, D. E., & Barrington, G. M. (2000b). Passive transfer of colostral immunoglobulins in calves. *Journal of Veterinary Internal Medicine / American College of Veterinary Internal Medicine*, 14(6), 569–577. <https://doi.org/10.1111/j.1939-1676.2000.tb02278.x>

## Acknowledgement

Author is ever grateful and indebted to the Almighty without whose grace he would not have ever been able to complete the research work and this clinical report successfully. The author wishes to owe his deep sense of gratitude and thanks to **Dr. Monoar Sayeed Pallab**, Professor, Dept. of Medicine and Surgery, Faculty of Veterinary Medicine, Chattogram Veterinary and Animal Sciences University for the skillful supervision to make this report with her knowledge, perceptiveness, inspiring scholastic guidance and encouragement. The author wishes to give special thanks to **Prof. Dr. Mohammad Alamgir Hossain**, Dean of FVM and **Prof. Dr. AKM Saifuddin**, Director, External Affairs for the provision of this unique internship program and research exposure. The author would also like to express his sincere gratitude and thank to **Professor Dr. Gautam Buddha Das**, honorable vice chancellor of Chattogram Veterinary and Animal Sciences University. The author also like to thank all the participants who have given data and helped in data collection.

**The Author**

## **Biography**

I am Klinton Barua, son of Sabul Barua and Baby Barua was born on 15th February, 1998. I have passed Secondary School Certificate examination from Adhunagar High School, Chattogram in 2014 (GPA-5.00) followed by Higher Secondary Certificate examination from BAF Saheen College, Chattogram (GPA-4.72). I am now enrolled in year-long internship programme for completion of Doctor of Veterinary Medicine (DVM) degree in Chattogram Veterinary and Animal Sciences University (CVASU), Chattogram, Bangladesh.

Bangladesh is a developing country in South Asia where livestock plays a very important role in our economy as well as the food chain. I expect to be a future researcher of life science to address the present challenges we have in this field.

## **Annex 1:**

Title: Questionnaire for calf management system in intensive dairy farm in Chattogram

1.Farmer Name :if willing to give

2.Address :

3.Mob.no:if willing to give

4.Education of farm owner :

- Primary
- Secondary
- Higher Secondary
- None
- Do not want to disclose

5.Education of employed person who involve with day-to-day farm activity :

- Primary
- Secondary
- Higher Secondary
- None
- Do not want to disclose

6.Farming method

- Intensive
- Extensive

7.Which breed do you mainly have on your farm?

- HF
- Local
- Others

8.Herd size?

- <5
- 5-10
- 11-50
- >50

9. When you usually fed first colostrum?

- Within 2h post natal
- Within 4h post natal
- Within 4-6h post natal
- Later than 6h post natal
- Not recorded, calf drinks from cow
- We don't give colostrum to calf
- Others

10. The colostrum amount within the first 12h usually

- 2L
- 2-4L
- >4L
- Unknown, calf drinks from cow

11. Volume of extra colostrum given during 12-24h

- 1-1.5L
- 2-2.5L
- 3L
- 4L
- Ad lib
- No colostrum fed

12. Do you monitor colostrum quality?

- Yes
- No

13. How do you monitor colostrum quality?

- Colostrometer
- Refractometer
- By eye
- Others

14. How is colostrum stored after milking?

- Frozen
- Refrigerated
- Stored without refrigeration
- Not stored

15.Method of administration of colostrum

- Bucket
- Bottle teat
- Suckling
- Combination of both
- Esophageal tube
- By dam
- Not recorded

16.Do you have system of monitoring colostrum ingested at first feeding

- Yes
- No

17.Do you check adequate passive transfer of immunity in calves?

- Yes
- No

18.How do you check passive immunity in calf?

- Direct measuring antibody level in blood
- Indirect measuring antibody level in blood

19.How many times colostrum supply?

- 1
- 2
- 3
- 4

20. Age of calf( if collect blood for serum sample)

21.Preparturient vaccination of dam?

- Yes
- No

22.Provide adequate supportive care to newborn?

- Warming &drying calves born in during cold weather
- Providing supplemental heat, blanket and deep straw bedding.
- Pain management

23. Presence of the dam during colostrum feeding?

- Yes
- No

**Health management :**

24. Vaccination of calf?

- Yes
- No

25. Deworming?

- Yes (when and which anthelmintics)
- No

26. Any disease present?

- Diarrhea
- Pneumonia
- Naval infection
- Joint problem
- Calf mortality (How many calves and how many died in a 1-year period)
- Others

27. Treatment?

28. Routine naval care?

- Dipping
- Spray
- Stripping out
- Combination
- No answer

29. Calving pen available?

- Yes
- No

30. Regularly disinfect calving pen?

- Yes
- No

### **Calf housing :**

31. Calves housed?

- Individually
- Individually and groups
- In groups
- No answer

32. Calf housing?

- Within cows' barn
- Own barn for calves and young stock
- Outdoors
- In and outdoors

33. Calves are housed individually duration?

- 1-2 weeks
- Up to 6 wks
- >6 wks

34. Cleaning of calf house?

- Regular
- Infrequently
- Not at all

35. Cleaning method?

- Only dry
- With water
- With high pressure
- Additional disinfectant

### **Feeding :**

36. Type of milk feed?

- Whole milk
- Milk replacer

37.Quantity of milk fed daily?

- Restricted to 12% of the calves BW
- Restricted to >12% of the calves BW
- Ad libitum

38.Method of milking feeding?

- Bucket with artificial teat
- Bucket without artificial teat
- Automatic milk feeder

39.Feeding waste milk to calves?

- Not at all
- Yes, to all calves
- Only males
- Only in exceptional case.

40.Weaning?

- <8 week
- 8-9 week
- 10-11 week
- 12-13week
- >13week

41. Access to water? how much?

- 1-3 week
- 4-8 week
- >8 week

42.Access to hay and green grass?

- 1-3 week
- 4-8 week
- >8 week



43. Access to concentrate?

- 1-3 weeks
- 4-8 weeks
- >8 week