



General Management of Buffalo Calf - A Review

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Abstract

Management of young calves in these days gaining a lot of importance as there is scarcity in availability of good quality future stock for either a dairy cow farm or even for, she buffaloes dairy farms to sustain. Young stock is considered as future herds of any dairy enterprise, the calves care and management are not only essential for sustenance of the dairy industry but is also essential in the wake of preserving and maintaining our good quality germ plasm. Important aspects in calf rearing are health management and proper nutrition. In India majority of the ruminants are reared by small, marginal and landless farmers and most of them do not follow general management practices. Therefore this review was undertaken to provide the pooled information for better care and management of our future stocks, which is the young stock of high production germplasm.

There is a need to make the farmers aware about importance of scientific management practices like vaccination. The neglected and poor care of calves in these dairies is creating a great damage to the nation in terms of loss of good quality germplasm. Also the future of dairy industry will be affected if the calf care practices in these dairy farms are not improved. Hence there is an immediate and persistent attention is needed especially in large commercial dairy farms about the significance of rearing calves for profitable and high economic returns in any dairy enterprise.

Keywords: Buffalo Calves; Health Care; Management; Germplasm

Introduction

Calves are the future foundation pillars of any livestock enterprise. Proper care and management of young calves is an utmost important in the growth and development of dairy sectors of the country. Appropriate calf management is very important for a profitable and successful dairy enterprise. For a sustainable dairy industry, care, welfare and management of calf care is very much essential. Further it is also important for preservation and maintenance our good quality germ plasm for future generations to come. Proper healthcare management and appropriate nutrition is most essential for healthy calf production management farms.

In India majority of the ruminants are reared by small, marginal and landless farmers and most of them do not follow general management practices [25] specifically for buffalo calves. Improper management of young stock kept for future stock replacement may cause huge economic losses because of increased calf mortality, increased incidences of disease outbreaks because of low immunity due to poor feeding management, malnutrition, stunted growth and development, poor growth performance, prolonged or delayed maturity and decreased reproductive ability. Since the colostrum's in calves act as passive immunity up to 4-6 months of their life, if the calves are not fed with adequate colostrum's soon after birth

till at least up to 5 days reduces the immunity of calves and calves become more susceptible to the infectious diseases and parasitic infestation [11]. Hence these improper management practices may lead to huge economic losses due to cost of treating these diseases conditions and dairy farmers might feel shattered because of higher calf mortalities in the farms. So far very sporadic research has been conducted, specifically on buffalo calf management practices, at farmers level.

In an experiment, it was showed that the buffaloes also showed a similar kind of expressions for their needs, depending on their needs the feeding and managerial practices can be designed and the same can be adopted to improve the productivity of the farms [32]. Scientific calf rearing is a good practice for profitable dairy farming. In well managed dairy herds, calf mortality usually should not exceed five percent from birth to 30 days of age [6]. The dairy calves are born without any immunoglobulins in their serum as the maternal placenta is impermeable to the transport of immunoglobulins to foetus and transported to a limited extent in buffalo calves. Failure to absorb adequate number of immunoglobulins, result in high hours of its life, rate of morbidity and mortality. If the blood profile of newly born calves within 48 hours shows, for blood serum immunoglobins levels less than 10 mg per millilitre indicates that the calf has not received passive immunity through the colostrum from its mother [9]. The factors which affect the immunoglobulin absorption by the calves are the immunoglobulin concentration in the given colostrum, timing of colostrum feeding, amount of absorption of colostrum and the methods of feeding of colostrum [1].

Initial two feeding of colostrum's

The intake of colostrum during very first and second feeding after birth has been revealed that there was significant difference in the first-time intake of colostrum. As feeding of colostrum through bottle resembles more to the natural way of suckling than pail feeding, the calves may be adapted to bottle feeding much faster than pail feeding. This may be the reason for high intake of colostrum in the very first feeding after birth in buffalo calves fed through bottle. It was observed that the feeding of milk through bottle to the calves and reported that the calves become efficient suckers from bottle within 24 hours after birth [25].

Daily colostrum's intake

At the very first day buffalo calves may be more adapted to the bottle feeding than pail feeding as the former resembles to the natural suckling behaviour of calves. However on the subsequent days (second to fifth day) there did not appear to be much difference in

the daily intake of colostrum. After the first 2-3 feedings the calves learned to drink milk from pail. This may explain the non-significant difference in the amount of colostrum intake of calves from second to fifth day after birth.

The nipple opening allows a limited flow of milk to the calf against the negative pressure exerted by the calf for suckling whereas in case of pail feeding the calf has an easy access to the milk and it can suckle colostrum/milk at a very faster rate once it has learned to feed from the pail. The calves fed colostrum/milk using a plastic bottle with screw nipple had high colostrum intake during the first feedings. It was proved that the feeding of colostrum milk to a weaned buffalo calves through nipple bottle is more preferred over pail feed feeding. Nipple feeding may enhance the passive immunity of calves versus pail feeding [24].

Many experiments it was observed that the rearing condition of calves was poor in most of the dairy farms in villages. This might be because the dairy farmers in village conditions may not be aware about the scientific calf management and feeding practices. On the other hand, the farmers having commercial farms were able to follow all the routine health care management, proper feeding and general management practices, timely treatments and other essential requirements for their animals were attended regularly. This showed that the farmers with commercial dairy enterprises were very much aware about scientific management of their livestock when compared with the farmers having dairy farms. In fact, the calf management in these commercial dairy farms is very poor leading to high calf mortality. The calves especially buffalo young ones under farms maintained in village farms are prone to most of diseases and may succumb to illness due to poor management, since the dairy farmers give least importance to such losses, further there will be huge decrease in milk yields of buffalo cows without calf at foot. These all conditions force them to go for inadvertent usage of oxytocin injections for let-down of milk because of loss or death of calves. This is a violation of animal ethics and animal welfare practices being ignored completely.

Major issues of calves under commercial dairy farms

Most commonly and frequently occurring of diseases in calves maintained under commercial dairy farms were mainly diarrhoea to the extent of 82.2 per cent. It was 80 per cent in case of endoparasite infestation and 78.9 per cent were exposed to ectoparasite infestation and 66.7 per cent suffered from naval ill and 26.7 per cent with pneumonia.

Apart from these conditions the calves in commercial dairy enterprise showed diseases such as skin infections or diseases, eye infection, limping or lameness, wounds, fever, hygroma, weak and dehydration or debility. The analyses of the data in these farms indicated that the incidences of diseases depend on size of farms; it was noticed that the incidence of diseases was more in large size farms (70.0%), followed by medium (66.7%) and small farms (60.0%). The data indicate that small size farms are taking much care of the calves as compared to the larger farms.

Health care management in commercial dairy farms

The calf health care practices in the commercial dairy farms are very poor. In fact these dairy owners find the calf rearing uneconomical. The calf management practices mainly include the care of calf at various stages after birth which includes various aspects viz., naval care, colostrum's feeding, timely deworming, proper milk feeding, proper and timely treatment, appropriate housing, etc.

Calf naval care

Interview of the commercial dairy owner along with observation of the buffalo calves in the commercial dairies revealed that most of the calves suffered with naval cord infection. As naval cord is a channel through which infectious agents can enter into the blood or underlying tissues leading to certain serious diseases in new born calf, it is very essential that the livestock owners take proper care of the naval cord after the birth of calf. Cutting the cord with a hygienic blade and then dipping the cord in an antiseptic solution is essential [20]. Almost cent per cent of the commercial dairy owners did not cut or disinfect the naval cord due to which naval cord infection in calves was seen in most of the farms.

Similar findings have been reported by [14,26] who found that buffalo owners in the small holder buffalo farms also did not cut and disinfect the naval cord of the calves due to poor knowledge about the scientific management of calves.

Feeding of colostrum for calves

It has been found that the commercial dairy owners do not feed the colostrum timely. They feed colostrum only after the release of placenta and many times the animal does not release placenta for more than 7-8 hours than the colostrum feeding is delayed leading to lowered immunity level in the calves. It was revealed that only 12.2 per cent livestock owners fed colostrum to their calves

within 2-3 hours of birth. In fact it is the most important period when the calves should receive colostrum. In majority of the commercial dairy the calves received the colostrums after release of placenta (7-8 hrs) which is not so beneficial for newly born calves [16,21,27,31] also found that buffalo owners feed colostrums to calves only after release of placenta as they feel that if they feed colostrums immediately then the animal will not release the placenta, while [14] reported that farmers did not feed colostrums as they felt that colostrums feeding leads to diarrhea in calves. Timely feeding of colostrums to calves is essential and it should be fed within 2-3 hours after birth. It is a well-established fact that delay in feeding of colostrums lead to lowered effectiveness of the colostrums in terms of providing immunity to calves [20].

Apart from supply of high-quality nutrients and immunoglobulins, colostrum also provides a number of hormones and growth factors necessary to stimulate growth and development of digestive tract and other organ systems. More intensive management of colostrum harvest and feeding strategies has to be adopted to improve passive immunity transfer and calf health. The success of colostrum feeding to neonates is built on 4 critical components viz., timing, quantity, quality and cleanliness. Next to colostrum, the calf should be fed nutritious and well balanced diets like whole milk, milk replacers to meet the nutrient requirements of calves and enable them to achieve their growth potential, foster improved mammary development and at same time be cost effective. Artificial colostrum should be fed to orphan calves and trained in drinking liquid feeds via nipple/bucket. The accelerated calf feeding programme enable the calves to achieve greater growth rates before weaning with increased efficiency, higher lean tissue and increases the chances of heifers reaching puberty at an early age [18].

Proper milk feeding to calves

Milk is more or less a complete food for young calf, to which gastrointestinal system is adapted for digestion of nutrients present in it. Nature has provided milk for calves which is of high nutritional value. It has been emphasized that a calf must receive sufficient milk during first three months or a minimum of 110 litres of whole milk to be fed over a period of 4-5 weeks, along with a calf starter having a good quality protein and low fibre content [20]. These commercial farms want to get maximum milk production from the animals and are using the calves only to stimulate milk let down and not for providing the milk to them. Even after milk-

ing they are not leaving enough milk in the udder required for the survival of the calf. In fact the calves are just used as a stimulator for getting the milk let down and those animals whose calf dies is given oxytocin for milk let down. The study revealed that all the farms were using oxytocin in animals whose calf had died as the calf mortality in these farms was as high as 80%. Although 97% farms reported feeding milk to the calves before and after milking but in most of these farms calves were not found which indicates the status of poor calf management in these farms. In most of the farms the calves die due to malnutrition.

Timely deworming of calves

Over sixteen and half per cent of owners of the commercial dairy farms dewormed their calves and the remaining 83.33 per cent of them did not do any deworming dosage for their young calves. That too the farmers who did deworming dosages for their calves did practice it scientifically as per the recommended schedule. Most of them dewormed their calves, when the calf was off feed or the condition of the calf was pot belly appearance or when they observed worms in the faeces. The similar findings were also reported by many workers that the livestock owners did not deworm their calves timely due to which the health of the calves was poor, especially in the small holder buffalo farming systems [4,8,22]. Deworming in calves is essential and regular deworming cycle should be followed against parasitic infections. This practice should be started on or before two weeks of their age, second dose after 21 days and the deworming dosage should be repeated 3-4 times in a year at regular monthly or recommended interval. Since the major reason of calf mortality is the huge parasitic load in the calves because of this the calf's health deteriorates and leads to debility or general weakness and the calf often dies due to severe worm infestation [20].

Timely treatment of calves

Majority of the commercial buffalo dairy owners (64.4%) do not call a veterinarian when the calves fall sick as they feel that it is uneconomical. Around 18.9 percent of the dairy owners try some indigenous drugs to treat the calf and if not cured then call a Veterinarian. Only 16.7 percent call a veterinarian immediately when the calves fall sick. Majority of the dairy owners do not provide proper medication to the calves which is very much essential in neonatal period.

General condition of calves

The general condition and appearance of the calves are very weak and emaciated. The condition of calves is poorer in the medium and large dairies where the herd strength is higher.

The dairy owners reported rearing of calf as uneconomical and preferred if the calf died. These dairy owners only prefer to rear milch animals to maintain the milk production level throughout the year. Further these dairy owners are only bothered about the short term monetary gains and are not able to foresee the economical benefit of raising the calves which have good milk production potential and germplasm. These dairy owners instead of rearing calves prefer purchasing buffaloes for making replacement.

Proper housing and bedding

The housing conditions of the livestock greatly affects their health and productive performance specially the calves which are more prone to diseases as their immunity level is low. Further exposure to extreme climatic variations such as extreme heat and extreme cold leads to physical stress and the body of calves is not adapted to bear such stress and the calves may collapse.

Feeding management of calves

Apart from providing appropriate housing to the calves it is essential that proper size mangers be constructed for the calves, so that the calves can feed properly and the feed does not get contaminated or wasted when the calf is feeding. But in the commercial dairies almost all of the dairy owners did not feed the calves in mangers. The calves were either given fodder in cane baskets or the fodder was spread on some plastic sheet or on floor.

The buffalo is a highly social animal with strong instincts. Consequently, mother and young are closely bonded, and the buffalo calf usually becomes more stressed when separated from the dam than the calves of cattle. A consistent feature of young calves up to 6 months of age is their slow ungainly gait which is often accompanied by dragging of the hind legs and swaying hindquarters. This may be mistaken for chronic ill-thrift with no prospect of recovery and on that basis the animal is destroyed [7]. A large number of calves die during the first year of their life, causing heavy drain on the economics of livestock production. However, environmental and managerial factors hasten the occurrence of such condi-

tions [13]. Calf mortality was associated with the type of housing, feeding, managerial practices, weather conditions, external and internal parasitic infestation and bacterial infections especially those causing septicaemia and enteritis [2]. Millions of water buffaloes are managed in "backyards" in Asia. They exist on resources of small holdings. Management and expenditures are minimal. Care of the family buffalo is usually entrusted to children, old people, or women not engaged in other farm duties; the buffalo allows them to be useful and productive.

Diseases of the new-born calf and neonatal calf mortality are the major causes of economic losses in livestock production. It is roughly estimated that a calf mortality of 20 per cent can reduce net profit to 38 per cent [3]. Neonatal calf mortality varies from 8.7 to 64 percent throughout the world. Neonatal calf mortality in the first month of age is accounted to be 84 percent of the total mortality [10] and is particularly high in the third week of life [29]. Mortality in neonatal calves has mostly been attributed to infectious agents. Diarrhea in young calves is a syndrome of great etiological complexity, in addition, to the influence of varied environmental, nutritional, physiological and managerial factors. The study of managerial practices revealed poor and unscientific management of the farms. The majority of the farms had a very poor housing structure which was not suitable to the different seasons i.e., summer, winter and rainy season. Also overcrowding of animals was found on most of the farms due to lack of space. The roofs of the farms were made of hay and wood while the floor was muddy, and on most of the farms, was found to be broken and in need of repair. Farmers cleaned the sheds (farms) once a day and no one used any disinfectant. The milch animals were provided a bath once a day in summer in a village pond or small irrigation canal. Farmers disposed of the dung and waste material nearby animal houses leading to unhygienic conditions. Regarding feeding, farmers provided wheat straw, seasonal green fodder and very low quantity of concentrates to milch animals regularly, but most of the poor and small farmers did not feed green fodder because of its heavy cost and non-availability. Salt and mineral mixtures were also not given regularly due to poor awareness about the importance of a balanced diet for proper animal health and optimum production. The commercial farms were very much aware about vaccination and timely treatment and provided very good health care to their milch animals. However, they did not provide timely treatment to the calves. In fact, the calf management in these farms was very poor, leading to high calf mortality.

In rural areas, livestock is not rearing commercially but as a secondary part of the agriculture. The rural people reared the buffaloes mostly for milk purposes and to get immediate monetary benefits to fulfil their needs. Most farmers sold calves and those animals that become non-productive or diseased for beef purposes. 85% calves were found malnourished, and 90% calves were found suffering with diarrhoea and endo-parasites [17].

Rearing calves, there was preference for rearing female calf rather than male calves. This was because the small and medium farmers sold female calves with and buffaloes to get maximum profit and utilize this money either on their utility or to purchase new animals. The large owner, as they kept livestock for commercial purposes, retained good female calves and sold those which were less productive.

The calves kept by the farmers were found without any scientific and veterinary converge. Only large farmers consulted veterinarian for advice or treatment. It was amazing to learn that small and medium farmers preferred self medication and that 80% of small farmers and 70% of medium farmers called para-veterinary staff for treatment to their animals. This was because of the poor economic conditions of the farmers as they were unable to afford veterinarian's charges. Because of this, 90% of the small owner brought their animal to the veterinary hospital and only 10% large owners brought their animals to the hospital. The abortion rate was reported high by large farmers, i.e., 45%, and low, i.e; 15%, by small framers. This was because large owner had more animals but improper management so animals fought with each other or slipped on the ground, and this led to abortion. Because of the poor management and feeding conditions, 60% of the small farmers reported calf died one hour after birth, 37% after one week, and 25% after six months of life. A quarter (25%) of medium farmers reported death of a calf after one hour and 15% after six months while 30% of the large farmers reported a calf's dying in one hour and none reported any mortality after six months.

Management practices in calves

Major causes of mortality were improper management, malnutrition, worm load, cold etc. Make it clear that majority (92%) of the calf owners were not following deworming of pregnant dam in last trimester [28].

Farmers were not treating their pregnant stock against the intestinal parasites due to the fear of abortion, were not calling veterinarians at the time of calving. Pertaining to the naval cord cutting most of them were not cutting the naval cord at the distance of 2.5 cm from the body of calf and left the cord for drying itself. In an experiment [26] it was revealed that the cutting of naval cord of the new born calf was not done by any buffalo owners due to their poor knowledge of scientific management practices. It was also revealed that majority (96%) of the respondents were not disinfecting the naval cord after cutting. This negligence causes naval ill and joint ill etc. which becomes fatal for the calf. Similarly, in other studies [15] it was reported that only 15 per cent of cattle keepers were practicing of cutting and disinfecting the naval cord.

It is evident that most of the livestock owner were using the calves as a stimulator for getting the milk let down and were not feeding required quantity of milk. In the commercial dairy farms expected to get maximum milk production from the animals and use the calves only to stimulate milk let down [28]. The farmers believed that dam does not release placenta if they feed colostrum to the calf, they also believed that colostrum causes diarrhoea [14,16,21].

Health care management

It was observed that only 2 per cent of calf owners dewormed their calves within recommended time. Whereas, majority (55%) were dewormed their calves after infestation and 28 per cent were dewormed their calves after two weeks of birth and 15 per cent were deworming after one month of birth. In a study [28] reported that most of livestock owner dewormed the calves when the calf was off feed or they observed worms in the faeces [4,22] reported similar findings. The practice of vaccination was adopted by majority (88%) of buffalo owners.

Calf owners were not aware about importance of and they believed that vaccination cause health problems. High mortality rate of buffalo calves indicates that farmers were not following scientific management practices due to lack of knowledge and awareness. Protective deworming with fenbendazole and praziquantel suspension/tablets and micronized albendazole at the age of 10-15 days, 40-45 days and 70-75 days post birth resulted in effective body weight gain and reduction in mortality rate in dewormed calves.

Introduction Optimizing growth and minimizing neonatal calf mortality is the key to successful and economically viable dairy farming. Neonatal calf mortality varies from 12.5 to 30% in India [31]. In an experiment [18] it was estimated that the reduction of 38 per cent of net profit due to 20 per cent calf mortalities. The calf mortality varies from 7 to 51% throughout the world [12]. As per estimates, the calf mortality in the first month of age is accounted for 84% of total mortality [10] and is particularly high in the third week of age [12]. As the calves are the future productive units of the dairy herd, the survival of calves is imperative for livestock propagation. Therefore, proper care management through sanitation, appropriate vaccination and deworming from the day of calving is important [19].

The calves which were dewormed as per recommended schedule gained 18 to 25% body weight higher from the calves maintained and dewormed as per prevalent farmers' practices. The mortality rate was reduced to 5 to 20%. Iron deficiency exists in buffalo neonates and supplementation of iron through injectable preparations would be more beneficial compared with oral supplements [23]. The incidence of enteric parasitic infestations determined by faecal examination was calculated as 68.75% for diarrhoeic animals and 45% for no diarrhoeic animals. The incidence of parasitic infection will definitely be governed by the managerial and deworming practices followed in different dairy farms.

The higher incidence of parasitic eggs was found in the cool and dry month of November. The parasitic stages found during the faecal examination of different animals comprise *Cryptosporidium* spp., *Eimeria* spp., *Toxocara* spp. and tapeworms. The highest incidence observed was *Cryptosporidium* species (37.70%). *Cryptosporidium* occurs in diarrheic calves and more than 10% fall the scouring calves excrete *cryptosporidium* at the same time as rotavirus (Snodgrass *et al.*, 1986). Signs are usually unapparent but chronic diarrhea has been associated with *cryptosporidiosis* especially in neonatal calves.

An incidence of 13.98% *Toxocara* spp. was found. *Toxocarosis* in buffalo calves is considered as one of the most common ailments and is responsible for high mortality. The other research workers stated that *T. vitulorum* larvae are passed in great numbers in the colostrum 2-5 days after calving, worms are matured in the intestine of the calves by 10 days of age and eggs are passed by 3

weeks and then the adult worms are expelled from the intestine by 5 months of age, and for this reason, toxocariasis has been considered as calf hood disease [5].

Large numbers of buffalo calves are orphaned as a result of disease control and domestication programs currently being undertaken. Successfully bottle-fed calves that were removed from the dam at birth, and in another case, goat's milk drunk from a cake tin was used to raise a calf from two weeks of age. A consistent feature of young calves up to six months of age is their slow ungainly gait which is often accompanied by dragging of the hind legs and swaying hindquarters. This may be mistaken for chronic ill-thrift with no prospect of recovery and on that basis the animal is destroyed. While in some cases ill-thrift and malnutrition may be implicated, as long as the animal is eating this characteristic will normally disappear as the animal gets older.

Buffaloes are quite susceptible to heat stress. This is because of their poor ability to sweat. Their skin has far fewer sweat glands than that of cattle. Buffaloes therefore need at least shade and continuous access to cool drinking water. When animals are held in yards in hot weather a wallow or a sprinkler system turned on for an hour during the heat of the day is preferable. The ungainly gait of the calves is particularly noticeable when they are heat stressed.

Conclusion

As per the reports it was observed that the nipple bottle feeding is more beneficial when compared to pail feeding in young calves. Because the bottle-feeding mimics the natural suckling behaviour of calves. Main reason of calf mortality is worm infestation and navel ill due to improper disinfection practices, so proper deworming and navel cord treatment is necessary. In young calves the intestinal parasites are usually considered responsible for early calf mortality. Scientific deworming practices are not properly adopted on many farms. It was also observed that most farmers are not using the recommended dose of a de-wormer, their proper dosing is important not only to obtain maximum efficacy but also to reduce the treatment cost.

There is a need to make the farmers aware about importance of scientific management practices like vaccination. The neglected and poor care of calves in these dairies is creating a great damage to the nation in terms of loss of good quality germplasm. Further

the calves are the futures productive pillars of successful dairy enterprise, which may get affected if the care and management of calves are not improved. Hence there is an immediate and persistent attention is needed especially in large commercial dairy farms about the significance of rearing calves for profitable and high economic returns in any dairy enterprise.

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