

# Dairy Farm Study: Analyzing the Rate of Calves Raising Practices and Their Health Effects

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## Abstract

The increased public awareness about farm animal welfare has highlighted the need for comprehensive methodologies to evaluate and improve animal welfare on dairy farms. This research investigates on calf raising procedures, which is an important part of dairy operations that have a substantial influence on calf wellbeing. The study aims to discover typical behaviors impacting the well-being of milk-fed calves by conducting questionnaires on 130 dairy farms around the region. This study aimed to evaluate the procedures of growing calves on dairy farms, by determining the prevalence of variables linked to subpar calves' wellbeing. It investigated the various aspects of calf raising techniques, including the execution of calving barriers, monitoring during calving, cleaning newborn's navels, dehorning approaches, milk feeding strategies, and weaning protocols. The main risk variables for minimal calf care were found to include insufficient surveillance during calving's, especially at night, and the fact that herds lacked calving barriers. Furthermore, the lack of cleaning of the navels of neonates in herds resulted in a delay that the identification and observation of calves. In herds, typical restricted milk feeding practices were used, and waste milk was given to unweaned calves without any safety measures. Other troubling aspects were the removal of extra teats and late dehorning without appropriate pain management. The herds, abrupt weaning was reported. This complete risk factor evaluation serves as the crucial initial stage in establishing an intervention strategy targeted at improving calf care on dairy farms.

**Keywords:** Calf Welfare, Dairy Farms, Risk Factor, Raising Practices

## INTRODUCTION

Optimizing the health and well-being of animals was a continuous issue for the dairy farming sector (1) which was an essential part of the worldwide agriculture business. One of the most important parts of managing a dairy farm was caring for the calves, a fragile group whose early experiences had a lasting impact on their general health and future production in the herd. Agriculture was focusing more and more on the complex (2) interactions between the health outcomes of calves and the strategies used during their development.

### The Background of Dairy Farming

The dairy sector (3) was a dynamic one that was always changing to satisfy the needs of the world population that was growing. The production of strong, healthy calves was essential to the sustainability and efficiency of dairy operations. Early in their lives, during a crucial developmental stage, calves the herd's next generation go through. The techniques and procedures used during that time can have significant impacts on the development of the immune system, growth, and general resistance to external stresses.

## **The Value of Practices in Calf Rearing**

For dairy producers, the welfare of calves was a strategic and moral requirement (4). A calf's early weeks of life have a crucial role in determining its biological and behavioral characteristics, which in turn affects and it performs in the herd over the long run. The complexities of raising calves extend beyond feeding; they include things like housing, socializing, and health care procedures (5). Therefore, to comprehend the overall effect of these treatments on calf health, thorough examination of the frequency which they are used.

## **Range of Health Impacts**

It was essential to comprehend the health implications of various calf-raising techniques to improve farm output and animal welfare. The short-term impacts(6) include growth patterns, activity levels, and anomalies in social and behavioral domains during the preweaning phase. Long-term results will be examined, such as behavioral differences, physiological reactions to unfamiliar surroundings, and production metrics like milk output and reproductive efficiency. A comprehensive understanding of the relationship between raising practices and the health progression of dairy calves will be possible by investigating these factors.

## **Research Gap**

The previous research has recognized the significance of early interactions for dairy calves, there was a significant deficiency in a thorough analysis of the prevalence of different raising techniques and the associated health consequences (7).By addressing the knowledge gap, the study will promote stronger, healthier dairy herds by offering insightful information that can guide optimal calf-raising procedures.

The purpose of research (8) evaluated the short- and long-term impacts on behavior, cognition, and performance of several dairy calf-rearing systems (individual, group, and dam-raised). While long-term results show behavioral and economic disparities favoring communal and dam-raised systems, short-term observations show reduced social abilities and hunger in housed calves. Potential farm heterogeneity and the need for study regarding certain causes and solutions are limitations.The purposes of the prospective cohort research (9) examined the effects of management, barn environment, and transportation on the health of calves on 43 Swiss veal farms. Larger herds had greater death rates, according to the findings, which showed some surprising correlations, such as decreased death on smaller farms with clean feeders. The significance of customized approaches for enhancing calf health and lowering the use of antibiotics in both big and small veal businesses was highlighted by the risk factors that have been identified. The observational design and one-year length of the study are limitations.In the study (10) 700 calves were examined for respiratory and diarrheal illnesses, and 29 Chilean farms' unweaned dairy calves' health was found to be impacted by certain management practices. Reliance on mother colostrum, stringent milk feeding, and a lack of euthanasia measures were the risky practices. Higher illness chances were connected with dirty settings and bigger herd numbers. The results highlight the necessity of focused interventions to enhance calf well-being in Chilean dairy production; nevertheless, one should take into some limitations, such as the observational design.

The research (11) evaluated the effects of colostrum and calf care techniques on prior-to-weaning calf death rates in Irish dairy herds. The latter calving season saw a reduction in cleanliness habits despite typically acceptable colostrum IgG concentrations. The absence of a significant relationship between calf mortality and management practices suggested potential areas for improvement. The observational approach and the study's emphasis on particular herd traits are among its limitations.The article (12) examined the variables influencing pre-weaned calves' feeding habits to comprehend the reasoning behind calf-feeding procedures among dairy producers in England. Qualitative interviews with fourteen advisers and twenty-six farmers indicated a range of feeding practices influenced by perspectives on ease of management and calf welfare. Underfeeding worries and lack of clarity on

feeding recommendations highlight the necessity of industry-academia cooperation in developing standards of agreement that promote the health and well-being of calves. The limitation includes its narrow sample size and emphasis on England.

The narrative research (13) focused on welfare concerns to solve difficulties associated with producing excess milk calves in the United States and Canada. It found the issues ranging from inadequate care for newborns to transportation and administration in facilities that raise children. Acknowledging the unviability of the present system, remedies included enhancing calf care and nourishment and setting in place a coordinated, holistic strategy for a welfare-friendly and sustainable system. Potential biases in the body of current knowledge and the requirement for implementation techniques are among the limitations. To provide a nuanced assessment, the study (14) proposed four groups based on serum IgG concentrations to improve the standards for evaluating immunity that was passive in dairy calves. The colostrum management was to promote calf welfare and good health by lowering the risks related to mortality and morbidity. Achievable herd-level criteria were proposed. The use of serum IgG and possible logistical difficulties with the on-farm application are among the limitations. To determine, if the death rates were higher than what could be tolerated, the longitudinal research (15) conducted in southern Ethiopia sought to evaluate the rates of calf mortality and morbidity as well as risk variables. High rates were found, especially when associated with diarrhea. The improved calf management techniques, farmers should be more aware of the risk factors that have been identified. Geographical emphasis and possible reporting bias are among the limitations. The research (16) examined how providing differing amounts of milk (four vs. eight liters per day) affected the immunological response, growth, and metabolic traits of Holstein-Friesian dairy substitute calves up until they were weaned. The calves in the significant treatment group had better development, immune responses, and metabolic profiles, proving the advantages of a quicker preweaning diet. The short-term emphasis and limited sample size are among the limitations.

The "*KAbMon*" research (17) examined the usage and resistance to antibiotics in German farms that grow calves. It also examined correlations between different farm types such as pre-weaned calf farms and variables like treatment frequency. To reduce the risks of infectious illnesses and antibiotic resistance, it was important to enhance cleanliness, management techniques, and animal welfare conditions. Elevated resistance was identified, especially against *sulfa*, *tetracycline*, and *ampicillin*. The cross-sectional nature of the study and its emphasis on bacterial isolates are among its limitations. The objective of the systematic examination (18) evaluates the effects of dairy calf-raising management techniques on three welfare domains. 351 of the 1,783 examined publications whose contents were divided into nutrition and socialization met the inclusion criteria. The absence of well-defined milk replacer procedures and effective weaning care are among the gaps that have been identified, underscoring the necessity of research to enhance calf welfare. Potential omissions and different research techniques are among the limitations. The article (19) evaluated a powered-by-sunlight fan system can reduce summertime heat stress for dairy calves kept outside in hutches. Although hutch climate and calf responses were enhanced by active ventilation when compared to poorly ventilated circumstances, the benefits of active ventilation over passive airflow were not always evident, indicating technique would be adequate for reducing heat. The short length and context-specific results among its limitations. The study (20) focused on the lack of agreement in terminology and the dependability of data to overcome difficulties in calculating and disclosing calf deaths on dairy farms. There remain disparities in the research of mortality risk variables even in the face of shared practices for rearing calves. The evaluation acknowledged the limitations in existing knowledge and underlined the need for better monitoring techniques and uniform terminology.

The part of the paper follows an identical format as the rest: In part 2, the Methods are discussed in detail. Part 3 discusses the results, and the conclusion and recommendations for additional research are covered in Part 4.

## MATERIALS AND METHODS

This section covers the analysis of the prevalence of practices used in calves raising and the implications for their health.

### Dataset

The study was 130 dairy farms, distributed around the nation, to determine the procedures for producing calves and heifers. These farms were selected based on factors like size and milk production to be typical of Indian farms. Native breeds comprise the bulk of cows and their daily milk production is only about 2 kg per head. The majority of milk is produced by cow, which make up one-third of all cows and yield about 5 kg of milk per head each day. The majority of the food that cattle eat is crop residue and byproducts, even if they graze on natural pastures, which increases their nutrition. A qualified agent, who served as the regular farm advisor, conducted an interview with the farm manager as part of the on-farm survey. The agent used a standard questionnaire. Table (1) displays the farms' dimensions and milk output.

**Table (1).** Farms' dimensions and milk output

(Source: Author)

Parameter	Sample
Number of farms	130
Size of herd	50
Production of milk by herds (per year)	7,659

### Questionnaire Development

The questionnaire was divided into sections pertaining to each of the seven areas of managerial strategies that could have an impact on the wellbeing of the calf: newborn care, weaning, painful procedures, calf feeding and management. The questions received qualitative nominal and qualitative ordinal responses.

### Statistical Analysis

When a questionnaire was misinterpreted, the response was removed and each one was reviewed separately for anomalous results. The percentage of farms that responded in a specific way and the values of the Herd count, Smallest Value, Lower quartile, Median, third quartile and Highest Value were calculated as descriptive statistics.

## RESULTS AND DISCUSSION

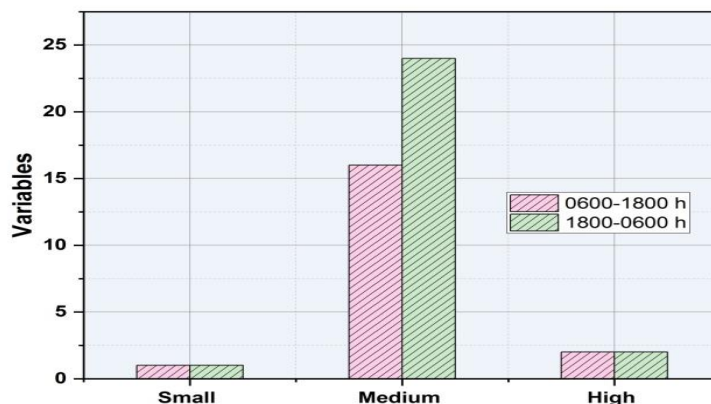
The conditions surrounding the labor and delivery process set the health of the newborn calves at high risk. Specialized facilities, such as calving pens, are necessary for proper calving because they reduce stress and promote the comfort and hygiene of the cow and the calves. The several herds studied did not use calving enclosures; instead, the heifers gave birth in tie-stalls. The procedure impedes the cow's capacity to choose comfortable delivery positions by limiting its range of motion, which is especially important for heifers. The possibility of calves born in dung gutters behind tie-stalls raises issues regarding hygiene. The limited utilization of group calving pens by a small number of respondents implies that practices are not as prevalent on farms lacking specifically designated calving

zones. Herds that utilized individual calving pens experienced fewer incidences of respiratory issues, diarrhea, and Salmonella infections those who used group setups. The bulk of herd owners kept ailing animals in calving enclosures, perhaps serving as a channel for the transmission of illness.

Frequent monitoring of cows approaching calving is crucial to help with challenging births, lower perinatal deaths, and guarantee the calf gets lactate within six hours of delivery. Usually, between the morning and evening milkings, and between evening and morning milkings, producers would visit cows, that they anticipated would give birth four times. While some farms monitored calving using devices, there's a chance that calves were born outside of designated calving enclosures due to nighttime events and insufficient surveillance. Data from 129 to 130 herds were surveyed on a range of cattle management issues, such as the length of time calves should be left in the day after calving, when to identify the animals after birth, when to dehorn them, and how long it should take to remove the teats. Diverse behaviors among herds were reflected in the vast range of values. Table (2) and Figure (1) depicts the differences in the management of cattle among Herds. These metrics give thorough a picture of the management techniques used in the cow herds under assessment, shedding light on the variations and practices among various farms.

**Table (2).** Differences in the Management of Cattle among Herds (Source: Author)

Variables	Herd count	Smallest Value	Lower quartile	Median	Third quartile	Highest Value
Daytime duration(0600-1800 h)	129	0	9	16	6	2
Daytime duration(1800-0600 h)	130	0	24	24	12	2
Identification timeline after the birth	130	2	2	6	14	52
Dehorning timing after the birth	130	0.5	8.6	9.2	9.6	32.6
Months to teat removal after the birth	100	0.6	8.4	9.5	15.4	24



**Figure (1).** Management of Cattle among Herds

(Source: Author)

### Pain Control Gaps in Cattle Procedures

An enormous amount of public concern is raised by painful treatments like dehorning, and the Indian Dairy Code of Practice requires the use of pain medication during such operations. Studies show how painful dehorning and disbudding are, and how important it is to use a combination of local anesthetics and long-acting analgesics to reduce pain during and after surgery. Dehorning occurs after three months on average, at 6.4 weeks, and usually involves the use of a hot iron. Before three weeks, chemical paste is advised for disbudding since it enables less traumatic techniques. Because anesthetic or analgesic usage is minimal, most studied farms execute these procedures at older ages without consistently using pain management.

### Challenges and Practices in Calf Feeding

The study emphasizes the advantages of giving calves more milk than the usual body weight each day. Better mammary development, an earlier age at first calving, and higher milk output during the first lactation are all linked to this improved feeding strategy. The majority of the herds in the study followed a traditional milk feeding schedule, giving their cows an average of 4 L of milk in two meals in the first week, 5.5 L in the penultimate week preceding weaning, and 3 L in the last week of milk feeding. A significant number of farms managed antibiotics to cows' milk and unpasteurized waste milk, raising the possibility of infectious disease transfer to people and animals. They show that pasteurization is effective in getting treatment of harmful germs, even if it was not used in this instance. Many farmers preferred whole milk to milk replacer, citing benefits including simplicity, using leftover milk, surpassing quotas, and encouraging greater growth. Larger milk quantities have been shown to provide benefits, yet most farms continue to use old, limited milk-feeding methods. The calves were given access to concentrate and hay at a median age of 7 days and 3 days, correspondingly and both were given ad libitum. The access to water usually guaranteed during the first period, the delayed fodder availability can affect starter consumption and gastrointestinal growth.

The important factors from a study of cattle herds regarding management techniques and calf feeding are summarized in Table (3). 115 herds produced a median of 4 liters of early milk during their initial week of life, ranging from 1.75 to 10 liters. During the first week, feedings occurred two or three times a day. A median of 5.5 liters of milk was produced during the initial to the last week, with daily feedings following a similar pattern. The final week of the milk meal saw a variety of amounts and daily feeding periods from 0 to 8.6 liters. The median age at water beginning occurred 2.5 days postpartum, whereas the median age concentrate initiation happened 7 days. The amount of feed supplementation varied between 0.25 and 5 kg, and newborn hay became available at an average of 3 days postpartum. The amount of forage supplied ranged from 0.1 to 5 kg. This data highlights differences in early food, milk feeding patterns, and the implementation of supplemental feeds and forage over the calf-raising period, offering insights into the variety of feeding strategies among studied herds.

**Table (3).** Calf Nutrition and Management Practices

(Source: Author)

Variables	Herd count	Smallest Value	Lower quartile	Median	Third quartile	Highest Value
Early milk volume(First Week), L	130	1.75	4	4	5.6	10
Daily feedings(First Week)	129	2	2	2	2	3



Progressive milk volume(First to Last Week), L	130	2	4	5.5	6.8	10
Progressive milk volume(First to Last Week)	129	2	2	2	2	3
Last week's feeding quantity	128	0	2	3	4	8.6
Last week's daily feedings	127	0	2	2	2	3
Water initiation age	125	2	2	4.5	8	90
Concentrate initiation age	126	2	6	8	12.6	120
Feed supplement quantity	50	0.35	2	2	4	7
Neonatal hay availability time	124	0.8	2	6	9	90
Forage supply quantity	88	0.2	0.6	0.8	2	7

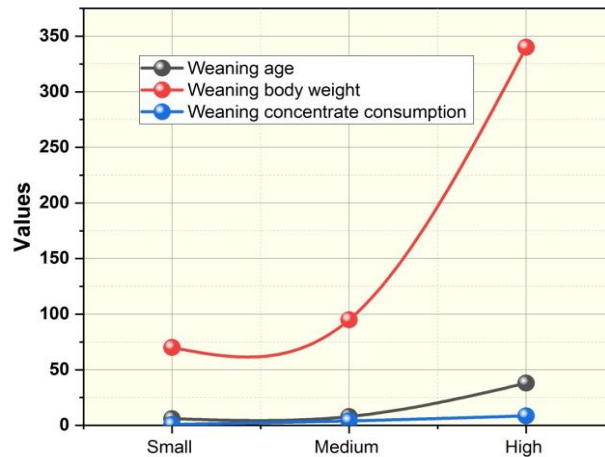
### Weaning Practices in Dairy Calf Management

Young heifers experience a significant change during weaning, which can be stressful for the cattle and difficult for farmers. Depending on how much solid food the calf is eating, the procedure should be done gradually. Calves raised on commercial dairy farms are usually weaned at ages about six months, which is significantly younger than in the wild. To avoid reduced dietary intake, weight loss, and frequent vocalizations of discomfort, appropriate weaning management is crucial (Table (4) and Figure (2)). While 66.7% of farms use age as the main factor for weaning, 43.9% utilized the concentrate intake. 89.6% of farms use gradual weaning, which entails gradually lowering milk or substituting quantities. But 16.5% choose for a sudden weaning. With a median height of 82 kg and an average concentrated consumption of 2 kg, the usual weaned age is 7 weeks. Interestingly, several organic herds showed higher values (age = 28 weeks; body weight = 220 kg; consumption of concentrate = 4.5 kg). The median weaned age in this research is 8.2 weeks, which is younger than the norm in the United States. In general, age is a important factor than concentrate consumption, even though most producers use progressive weaning.

**Table (4).** Weaning Metrics in Calf Management

(Source: Author)

Variables	Herd count	Smallest Value	Lower quartile	Median	Third quartile	Highest Value
Weaning age	130	6	9	8	12	40
Weaning body weight	123	70	93	95	105	340
Weaning concentrate consumption	125	0.8	2.6	4	4.8	8.6



**Figure (2).** Metrics for Weaning in Calf Management

(Source: Author)

## CONCLUSION

With an emphasis on calf-raising practices, they address the urgent need for improved approaches in evaluating and improving the health of animals on dairy farms. By distributing questionnaires to 130 dairy farmers in the area to identify common practices that affect the health of calves given milk. The assessment included calving barriers, observation during calvings, navel washing, dehorning methods, milk feeding plans, and weaning procedures, among other calf-raising practices. The findings highlighted important risk factors for poor calf care, including a lack of calving barriers and insufficient surveillance during calving, especially at night. Furthermore, in certain herds, calf identification was delayed due to inadequate navel cleaning. Restricted milk feeding techniques, giving unweaned calves waste milk without any safety precautions, removing excess teats, and dehorning calves too late without providing enough pain relief were all brought up. In certain herds, abrupt weaning techniques have been documented. The risk factor analysis was an essential first step in developing intervention methods to enhance the care of calves on dairy farms. But it's important to recognize the limits, such the possibility of response bias in data that people self-report. To improve farm animal welfare and encourage procedures in the dairy sector, future research should concentrate on setting these findings' recommendations into practice and evaluating their effectiveness.

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