Biological Forum
an International Journal 17(5): 103-110(2025)
ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Survey on Milk Fever (*Parturient paresis)* Disease Among Dairy Farmers of Palampur Tehsil and Constraints in Adopting Control Measure

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(Received: 01 March 2025; Revised: 05 April 2025; Accepted: 30 April 2025; Published online: 23 May 2025)
(Published by Research Trend)

ABSTRACT: The survey studies entitled "Survey on Milk fever (Parturient paresis) disease among dairy farmers of Palampur Tehsil and constraints in adopting control measure" was conducted during February 2024 to May 2024 in three panchayats (Saliana, Sungal and Padhiarkhar). The results on knowledge of milk fever (Parturient paresis) among dairy farmers concluded that dairy farmers generally had an uncertain or neutral attitude towards milk fever (Parturient paresis) disease. Between milk fever experienced and inexperienced dairy farmers, there wasn't a significant difference in the attitude. Attending seminars, group discussions and lecture classes on milk fever disease was positively correlated with attitude of dairy farmers towards the awareness of the disease. Awareness of symptoms, its transmission, first aid, prevention and control measures were generally found to be either medium or low. It is reported that 44.60% dairy farmers have high awareness about milk fever disease while, 28.46% and 26.92% of farmers have medium and low awareness of the disease. Media exposure, exposure to inter personal channels of communication, seminars and workshops attended had significant role in general awareness of milk fever. Majority of the dairy farmers used mobile phones as source of information (60.76% farmers), other sources are radio (53.84%), newspaper (50.76%) and Television (43.07%). Overall distribution of dairy farmers based on awareness of first aid and disease management was also studied and it is worth stating that majority of dairy farmer had high awareness of first aid and disease management *i.e.* 44.60% while 28.46% and 26.92 % of farmers have medium and low awareness about the disease management. Regarding constraints faced by farmers in adopting control measures, most felt constraints were unavailability of veterinary services during night time (63.33%) and milk fever disease treatment is costly (53.33%).

Keywords: Parturient paresis, dairy farmers, symptoms, constraints.

INTRODUCTION

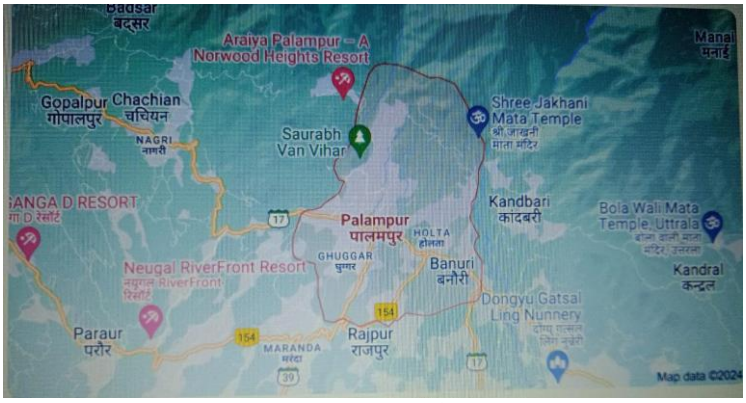
The livestock sector has significant role in national economy. The global cattle population is about 940 million in 2022 out of which cows are 1.5 billion. In Himachal Pradesh cattle population is 44.13 lakh, as per the 2019 Census with 18.28 lakh cows. The state economy heavily depends on the livestock industry. Particularly small and marginal farmers generates regular earnings and jobs from it. A number of diseases including mastitis, foot and mouth disease, anthrax, lumpy disease, bluetongue and brucellosis causes a significant loss in dairy farming industry. The production disease of cows are the incapability to cope with the metabolic demands of high production and continue to be a cause of economic loss to the diary industry **(**Mulligan and Doherty 2008**).** Milk fever (parturient paresis) is an important metabolic disorder of dairy cattle around the time of calving. Because of the high volume of milk produced during this time and subsequent demand for calcium, these cows often develop hypocalcaemia, or abnormally low levels of calcium in the blood nutritional imbalances, deficiencies, or erratic management of feeding programs for dairy cows can create large numbers and various types of health problems generally categorized as metabolic diseases. High producing dairy cows are the most susceptible to metabolic diseases during the per parturient period (Ibrahim and Kiramani 2021). It affects adult cows within 48-72 hours of parturition. It is characterized clinically by hypocalcaemia, general muscular weakness, circulatory collapse and depression. Milk fever also known as clinical hypocalcaemia is a critical disease of dairy animals during the peripartum period. It occurs in cows when calcium levels fall below the normal concentration. Normal serum calcium levels ranging from 2.1 to 2.5 mol/L and serum calcium levels between 1.4 and 2.0 mol/L is considered as subclinical hypocalcaemia (Radostitis *et al.,* 2010). Milk fever incidence increased with age and took a downward trend from 8 years of age onwards. Higher incidence of milk fever was reported within 3rd to 7th lactation. The incidence of milk fever was found to be higher with BCS. There was

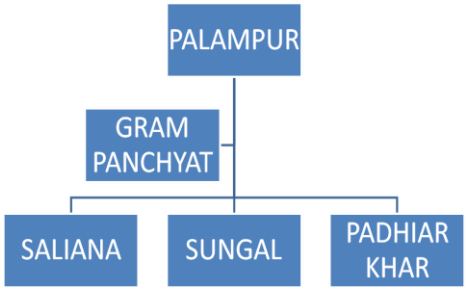
a significant decrease ($p<0.05$) in Hb and PCV along with lymphopenia, eosinopenia and neutrophilia in milk fever positive cows. As regards to biochemical parameters, there was a significant change observed in the value of total protein, cholesterol, triglyceride, calcium, phosphorus, chloride and sulphate in milk fever positive cows. Significant increase was recorded in the concentration of magnesium and sodium in milk positive cows (Shraga and Avigdor 2022). Milk fever continues to be a major cause of loss in terms of productivity also causing mortality. It causes significant financial losses especially for small-scale farmers who constitute majority of the nation's dairy business. The financial losses include medical costs, medication costs, veterinary fees, lost productivity and in extreme circumstances the animal's death (Horst *et al.,* 1990). Milk fever also increases the risk of other production diseases. Cows with milk fever have higher risks of reproductive disorders *i.e.,* 2.6 times for dystocia, 2.4 times for ketosis and 2.3 times for left displaced abomasum. Higher risk factor of metritis and retained placenta can be linked with dystocia (Correa *et al*., 1993). Although treatment with intravenous infusion of calcium salt solutions cure most clinical cases still such cows are later more susceptible to other metabolic and infectious diseases (Curtis *et al*., 1984). In many countries prevention of parturient hypocalcaemia is therefore given a high priority. It has been proposed that a specific control programme is relevant when its incidence increases above 10% among high-risk cows *i.e.* cows entering third or later lactations (Radostits *et al*., 2010).

MATERIALS AND METHODS

The present investigation was conducted during from (1st February to 30th May 2024) to study the effect of milk fever *(Parturient paresis)* in dairy cows. The study was carried out based on survey on milk fever disease by department of Zoology, Sri Sai University Palampur in three panchayats (Saliana, Sungal and Padhiarkhar) of Palampur tehsil, district Kangra. Milk fever disease in cattle involves systematic data collection and analysis to understand its prevalence, risk factors, and impact on affected cattle population. Here's a methodology outline for conducting such survey.

Study area. The study area has an altitude of 1472-2350 m with average rainfall of 1570 mm (62.1) inch per year and the annual temperature 16.8ºC. The latitude of Palampur is 32.11 and the longitude is 76.53.





Palampur: Palampur is a hill station and a municipal corporation situated in the kangra district of Himachal Pradesh. It is surrounded by pine forests and Dhauladhar ranges with numerous streams flowing from the mountains to the plains. It has good connectivity with adjacent villages and town through well developed systems of roads. Farming and cattle rearing is the main production activity in Palampur. Seventy five percent of the people in locality are dependent on farming and cattle rearing for their livelihood.

Gram panchayat's: Salaina: Saliana village is located in Palampur Tehsil of Kangra district in H.P. Palampur is the sub district headquater of Saliana village. The total geographical area of village is 56.82 hectares. Saliana has a total population of 890 people out of which 150 people rear cattle.

Sungal : Sungal is a village in Panchrukhi Tehsil in Kangra district with total population of 599 out of which 100 people are dependent on cattle for their live hood .

Padhiarkhar : It is located in the Palampur tehsil and is 43 km away from the district headquarter, its total population is 286 out of which 100 people has demonstrated cattle .

So there were approximetly 350 famers in both the panchayats and we have surveyed 130 farmers out of which 60 have experienced milk fever (Parturient paresis) in their lifetime 70 have not experienced the disease in their cattle but had no idea about the symptoms and disease management practices taken for the control the disease .

Study design: semi-structured questionnaire was prepared in order to procure data.

Selection

Measuring Tool

I. Personal variables

Schedule developed

1. Age
2. Experience in dairy farming
3. Literacy/ Educational status
4. Herd size
5. Breed

II. Communication exposure

1. Media exposure
2. Interpersonal channels
3. Seminars /workshops attended

III Milk fever Disease

1. Awareness of the symptoms
2. Cattle with milk fever disease
3. Awareness about first aid and disease management
4. Standard treatment for the control of milk fever
5. Constraints in disease management

RESULT

1. PERSONAL VARIABLE

(a) AGE

Distribution of dairy farmers based on age

Table 1: Percentage of farmers based on age (n=130).

Sr. No.	Category	Frequency (f)	Percentage (%)
1.	Young (18 -30)	22	16.92
2.	Middle (31 -45)	60	46.15
3.	Old 46 -70)	40	30.76
4.	Very old (70-75)	8	6.15

Data in Table 1 indicated that the distribution of age groups is as follows; 46.15% in the middle age group, 30.76% in the old age group, 16.92% in young age group and 6.15% are in very old age group.

(b) Experience in dairying farming. Distribution of dairy farmers based on experience in dairying

Table 2: Percentage of farmers based on experience (n=130).

Sr. No.	Category	Frequency (f)	Percentage (%)
1.	Low (5-15) years	54	41.53
2.	Medium (20-35) years	49	37.69
3.	High (40-55) years	27	20.76

Data in Table 2 depicted that 41.53% of farmers have very low experience in dairy farming *i.e.,* 5-15 years while, 37.69% farmers have medium experience of 25 to 35 years. Fourty to fifty-five years of experience was found only in 20.76% of farmers in dairy farming in all the three panchayats of Palampur Tehsil.

(c) Literacy/ Education status. Qualification status of respondents from present study

Table 3: Percentage of farmers based on educational qualification (n=130)

Sr. No.	Education	Frequency (f)	Percentage (%)
1.	Illiterate	4	3.07
2.	Primary	30	23.07
3.	Middle/ high school	70	53.84
4.	Senior secondary	15	11.53
5.	Graduate	8	6.15
6.	Post graduate	3	2.3

Data in Table 3 showed that majority (53.84%) of the dairy farmers got schooling up to middle and high school. The other levels of education of dairy farmers were primary school (23.07%), senior secondary (11.53%), and graduate (6.15%) and post graduate (2.30%) while, people who have got no educational exposure were found to be 3.07 percent.

(d) Herd size. Distribution of dairy farmers based on herd size

Table 4: Percentage of farmers based herd size (n=130).

Sr. No.	Category	Frequency (f)	Percentage (%)
1.	Low (1) animal	44	33.84
2.	Medium (2-3) animal	50	38.46
3.	High (4-5) animal	36	27.69

Data in Table 4 showed that cattle herd size was medium in the case of 38.46% respondents whereas, it was low and high in the case of 33.84% and 27.69% of respondents, respectively.

The income from dairying, experience in dairying, herd size and media exposure were significant in explaining variations in overall awareness of prevention and control. However, only herd size and media exposure were significantly correlated with the overall awareness of prevention and control measures of milk fever. These observations are in agreement with that of (Saliu *et al.,* 2008) who reported that more the number of cattle kept, more was the likelihood. The knowledge of probability was more in persons who had more experience in dairy farming (Abbate *et al.,* 2006).

(e) Breed. Distribution of cattle based on breed

Table 5: Percentage of cow based on breed (n=85).

Breed	Number of cow	Percentage (%)
Ordinary	15	17.64
Sahiwal	14	16.47
Gir	10	11.76
Jersey	30	35.29
Sindhi	16	18.82

Data in Table 5 showed that the Jersey breed cattle in local domestic animals are 35.29 percent while Sindhi, Ordinary, Sahiwal and Gir are 18.82%, 17.64%, 16.47% and 11.76%, respectively.

Jersey and Holstein cattle make up the greater proportion (80%) of all the commercial dairy herds in the world. The Holstein-Friesian breed is by far the most popular breed followed by the Jersey breed (Weigel and Barlass 2003; Porter and Tebbit 2007)
Jersey cows have been widely selected for their high butter fat and Holstein-Friesland cows for large volumes of milk (Anderson *et al.,* 2007; Khan *et al.,* 2015; Schultz *et al.,* 1999).

2. Communication variables

(a) Media exposure. Distribution of farmers based on media exposure

Table 6: Percentage of farmers based on media exposure (n=130).

Sr. No.	Media exposure	Frequency(f)	Percentage (%)
1.	Newspaper	66	50.76
2.	Radio	70	53.84
3.	Television	56	43.07
4.	Mobile phone	79	60.76

Data in Table 6 demonstrated that majority of the 76 dairy farmers used Mobile phone as information source (60.76%). The other media from which dairy farmers got information in the descending order were radio (53.84 %), newspaper (50.76%) and Television (43.07%).

(b) Interpersonal channels. Distribution of dairy farmers based on interpersonal channels as the source of information.

Table 7: Percentage of farmers based on interpersonal channels as the source of information (n=130).

Sr. No.	Interpersonal channel	Frequency (f)	Percentage (%)
1.	Friends	34	26.15
2.	Neighbours	40	30.76
3.	Veterinary hospital	76	58.46
4.	Milk society worker	66	50.76
5.	Livestock group discussion	19	14.61

Data in Table 7 indicated that majority of the respondents (58.46%) got idea about *Parturient paresis* from veterinary hospitals followed by milk society workers (50.76%), neighbours (30.76%), friends (26.15%) and livestock group discussion (14.61%)

(c) Seminars/ workshops attended. Distribution of dairy farmers based on the seminars, Workshops and classes attended.

Table 8: Percentage of farmers based on seminars (n=130).

Sr. No.	Information source	Frequency (f)	Percentage (%)
1.	Seminar	76	58.46
2.	Workshops	67	51.53
3.	Class lecture	87	66.92
4.	No source of information	41	31.53

Data in Table 8 showed that 66.92 percent of the dairy farmers attended lecture classes on *parturient paresis* (milk fever). Seminars were attended by 58.46 percent and work shop by 51.53 percent dairy farmers and no source of information 31.53 percent, respectively.
Media plays a paramount role in imparting animal husbandry information thereby creating awareness among cattle owners. Newspaper, radio and television are very much popular in the state of Himachal Pradesh. Moreover, the higher literacy of people has facilitated access to even print media. Considering the findings of the study regarding information on milk fever a large majority of the respondents got it from print media as newspaper and electronic mass media as radio and television as well as that a large majority was interested in getting information from print and electronic media *viz.*, newspaper, radio and television (Olaniyi *et al.,* 2018).

3. Milk fever Disease. (a) Awareness of symptoms
Distribution of dairy farmers based on awareness of symptoms

Table 9: Percentage based on awareness of symptoms (n=130).

Sr. No.	Symptoms	Frequency (f)	Percentage (%)
1.	Sternal recumbency with lateral kink in neck	30	23.07
2.	Cold ears and dry nose	20	15.38
3.	In coordination with walking	32	24.61
4.	General Muscular weakness	25	19.23
5.	Lateral recumbency with bloat flaccidity of limbs and atony of skeletal muscles	40	30.76
6.	Cow with dilated pupil	35	26.92
7.	Other symptoms (Please Specify)	15	11.53

Data in Table 9 revealed that majority of the dairy farmers were aware about the symptoms of milk fever and it is found that Lateral recumbency with bloat flaccidity of limbs and atony of skeletal muscles (30.76%) is a very common symptom of milk fever which is known to most of the dairy farmers followed by cow with dilated pupil (26.92 %), in coordination with walking in cattle (24.61%), sternal recumbency with lateral kink in neck (23.07%), general muscular weakness (19.23%), cold ears and dry nose (15.38%) . Around 11.53% of the dairy farmers specified some other symptoms of the diseased cattle which were not included in the above given symptoms.

(b) Overall distribution of experienced dairy farmers based on awareness of milk fever disease symptoms

Table 10: Percentage of farmers based on awareness of milk fever disease symptoms (n= 60).

Sr. No.	Category	Frequency(f)	Percentage (%)
1	Low (5-10)	21	35
2	Medium (11-12)	15	25
3	High (13-15)	24	40

Data in Table 10 revealed that 40.00 % of the dairy farmers had high awareness about milk fever symptoms, 35.00% of the dairy farmers had medium awareness and 25.00% had low awareness about the symptoms of disease, respectively.

(c) Distribution of inexperienced dairy farmers based on awareness of milk fever disease

Table 11: Percentage of farmers based on awareness of milk fever disease (n=70).

Sr. No.	Category	Frequency (f)	Percentage (%)
1	Low (5-10)	28	40
2	Medium (11-12)	20	28.57
3	High (13-15)	22	31.42

Data of Table 11 demonstrated that majority of the milk fever inexperienced dairy farmers (40%) had low awareness about hypocalcemia 31.42 percent had high awareness and 28.57 had medium awareness about *parturient paresis* (milk fever) disease.

The incidence of milk fever is higher in dairy cows than beef cows and increases with age and yield (Horst *et al.,* 1990) while, incidence is low in organic cows (Weller and Copper 1996). It is generally a sporadic disease but on individual farms the incidence may rarely reach 25-30% in susceptible cows (Houe *et al.,* 2001). Good preventive effects can be obtained by feeding a low-Ca diet in prepartum period of 14 days or more (Goings *et al.,* 1974; Green *et al.,* 1981).

(d) Distribution of cow with milk fever disease

Table 12: Percentage of cow's with milk fever disease (n=85).

Location	Panchayat's	Total number of cows	Number of affected cows	Percentage (%)
	Saliana	25	6	24
Palampur	Sungal	40	5	12.5
	Padhiarkhar	20	2	10

Data in Table 12 revealed that total number of cows in Saliana, Sungal and Padhiarkhar were 25, 40 and 20, respectively with 6, 5 and 2 number of affected cows having 24 %, 12.5% and 10% of total disease infection rate.

The metabolic diseases or disorders are caused by imbalance of nutrient (proteins, minerals and water) fault in metabolism and excess loss of minerals through faeces, urine, milk and foetus. Nutritional imbalances affecting livestock occur because of the supply or use of feed does not meet nutritional demands for maintenance, growth, production and reproduction (Montero *et al.,* 2017). Cattle have the ability to compensate for deficits in energy through the mobilization of body fat. However, an excess mobilization of fat leads to metabolic disease and reproductive problems (Bezerra *et al.,* 2023). Hypocalcaemia may lead to reduced feed intake, poor rumen and intestine motility, increased risk for displaced abomasum, reduced milk yield and increased susceptibility to infectious diseases (Goff, 2008; Seifi *et al.,* 2011).

Milk fever in cows leads to four times higher risk of having retained placenta and 2.3 times higher risk of left displaced abomasum. Incidence of retained placenta results into higher risk of ketosis (16.4 times) (Curtis, *et al.,* 1985; Correa *et al.,* 1993).

4. Awareness about first aid and disease management

(a) Awareness items regarding awareness of first aid and disease management about Milk fever disease.

Table 13: Percentage of farmers based on awareness of first aid and disease management (n= 130).

Sr. No.	Awareness of first aid and disease management	Frequency (f)	Percentage (%)
1.	Knowledge of dairy farmers about vaccination against milk fever	35	26.29
2.	Calcium is given orally for treating milk fever infection	59	45.38
3.	Knowledge of dairy farmers about milk fever treatment drugs	62	47.69
4.	Antibiotics are given for treatment milk fever disease	45	34.61
5.	There is no specific treatment of milk fever disease	30	23.07

Data from Table 13 showed that majority of the dairy farmers had Knowledge about milk fever treatment drugs (47.69%), some farmers give calcium orally for treating milk fever infection (45.38%), antibiotics are also preferred by farmers for disease treatment (34.61%), knowledge of dairy farmers about vaccination against milk fever is 26.29% and a few (23.07%) farmers have no idea about any specific treatment.

(b) Overall distribution of dairy farmers based on awareness of first aid and disease management about *parturient paresis* (milk fever)

Table 14: Percentage of farmers based on awareness of first aid and disease management about *parturient paresis* (milk fever) (n=130).

Sr. No	Category	Frequency(f)	Percentage (%)
1	Low (1-2)	35	26.92
2	Medium (3-4)	37	28.46
3	High (5- 7)	58	44.60

Data in Table 14 reported that 44.60% farmers have high awareness about milk fever disease while 28.46% and 26.92 % farmers have medium and low awareness about the disease.

In this regard it is worth stating here that majority of the dairy farmers had high awareness of first aid and disease management. Content analysis of the knowledge items pertaining to first aid and disease management showed that only a few of the dairy farmers knew that there was no specific treatment for milk fever disease (Olaniyi *et al.,* 2018; Jorgensen *et al*., 1974).

(c) Standard treatments for the control of milk fever. Distribution of dairy farmer based on their knowledge about standard treatment for the control of milk fever.

Table 15: Percentage of dairy farmer based on their knowledge about standard treatments for the control of milk fever (n=60).

Sr. No.	Treatment given to cows	Frequency(f)	Percentage (%)
1.	Calcium borogluconate	31	51.66
2.	Magnesium phosphorus	26	43.33
3.	Laxobig	35	58.33
4.	Dextrose	45	75.00
5.	Calcium gluconate	41	68.33

Data in Table 15 showed that most of the dairy farmer (75.00%) use dextrose as treatment of milk fever disease (*Parturient paresis)* while, 68.33%, 58.33%, 51.66 % and 43.33% of dairy farmer use Calcium gluconate, Laxobig, Calcium boro-gluconate and Magnesium phosphorus treatment of dairy cow.

Manipulation of dietary Ca and P is known to have dramatic effects on the incidence of milk fever (Jorgensen, 1974). A survey study showed that more than 50% of lactations are affected with at least one periparturient disease (Van Saun, 1991). One of the first published reports suggested administering large oral doses of vitamin D3 during the few weeks prior to parturition (Hibbs and Pounden 1955). Hypomagnesaemia affects Ca metabolism in two ways firstly by reducing PTH secretion in response to hypocalcaemia (Littledike *et al.,* 1983; Kronqvist *et al.,* 2012) and secondly by reducing tissue sensitivity to PTH (Rude, 1998; Carriappa *et al.*, 2021).

5. Constraints in disease management. Constraints of Milk fever disease management

Table 16: Percentage of Constraints of Milk fever disease management (n=120).

Sr. No.	Constraints in adopting control measures	Frequency (f)	Percentage (%)
1.	Milk fever disease treatment is costly	32	53.33
2.	Unavailability of veterinary services during night time	38	63.33
3.	Much time has to be spent for nursing milk fever affected animal	33	55.00
4.	Reduction in the value of milk fever disease affected animals	27	45.00
5.	Belief that milks of the affected animal should not be used and leads to decreased income	25	41.66
6.	Lack of space for isolating of affected animals	18	30.00

It is worth mentioning the constraints in disease management felt by milk fever experienced dairy farmers. Data in Table 16 demonstrated that the most felt constraint was unavailability of veterinary services during night (63.33%), much time has to be spent for nursing milk fever affected animals (55.00%), milk fever treatment is costly (53.33%), reduction in the value of milk fever affected animals (45.00%), belief that milk of the affected animals should not be used, decreases income (41.66%) and lack of space for isolation of the affected animal (30.00%).

This finding is somewhat similar to those of many other researchers for instance. Mavi *et al.* (2006) reported that 54.29% of the respondents felt the unavailability of veterinary services during night time as one of the major constraints. Other constraints being high cost of veterinary medicine (51.43%) and veterinaria's fee (41.43%) (Saliu *et al*., 2008).

Fig. 1. General muscular weakness, cold ears and dry nose, lateral recombency with bload flaccidity of limbs and atony of skeletal muscles in cattle.

CONCLUSIONS

The study "Survey on Milk Fever (*Parturient Paresis*) among dairy Farmers of Palampur Tehsil" conducted from January to May 2024 assessed awareness and control measures for milk fever among 130 dairy farmers from three panchayats in Kangra district, Himachal Pradesh. Of these, 60 had experienced milk fever, while 70 had not. Findings showed that educational interventions like seminars, improved attitudes but formal education had no effect on knowledge. Major information sources included mobile phones (60.76%), radio (53.84%), newspaper (50.76%) and TV (43.07%). Interpersonal channels, particularly veterinary hospitals, were also crucial. Awareness of symptoms was generally medium to low, with experienced farmers better informed. Treatment knowledge varied, with dextrose (75.00%) being most common. Major constraints included lack of night time veterinary services (63.33%), high treatment costs (53.33%) and reduced milk value (45.00%). Enhanced awareness and knowledge these constraints are essential for effective disease management.

Author's contribution. All the authors jointly designed the experiment. Dr. Sapna Devi designed the experiment, analysed the data and drafted the manuscript with input from all authors. Dr. Sapna Devi (Major advisor) collaborated closely in the whole process from data observation to data analysis and manuscript interpretation and analysis. She also read and modified manuscript paper writing according to journal format. All authors read and approved the final manuscript.

FUTURE SCOPE

Because milk fever survey studies creat awareness among dairy farmer's to observe their cattle after parturition for evidence of milk fever. Further study should be conducted on the epidemiology and economic impacts of milk fever in dairy industry.

Acknowledgement. We would like to acknowledge kind cooperation of Sri Sai University, Palampur, India, 176081 to support this research. We are also appreciating department of Zoology, SSU, Palampur to provide necessary facilities to complete the project.

Conflict of Interest. None.

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How to cite this article: Sapna Devi, Shivangi Sharma, Manshi, Damini Sharma and Shivani (2025). Survey on Milk Fever (*Parturient paresis)* Disease Among Dairy Farmers of Palampur Tehsil and Constraints in Adopting Control Measure. *Biological Forum, 17*(5): 103-110.