International J. of Ext. Educ. Vol. XXI : 25-30, 2025 ISSN : 2319-7188

Drudgery Mitigation and Ergonomic Benefits of Revolving Milking Stool for Dairy Women in Fazilka District

Rupender Kaur[1], Arvind Kumar Ahlawat[2], Preeti Mamgai[3],Rajesh Kumar[4] and Amit Nath[5]

1. SMS Home Science, KVK, Fazilka(Regional Station, ICAR-CIPHET Abohar)
2. Head KVK, Fazilka(Regional Station, ICAR-CIPHET Abohar)
3. Principal Scientis, ICAR-ATARI,Zone-1, Ludhiana
4. ACTO, Regional Station, ICAR-CIPHET Abohar
5. Head, Regional Station, ICAR-CIPHET Abohar

ABSTRACT

Women engaged in dairy farming activities they have to maintain their own posture to perform the task as per convenient. Which create so many physiological disorders due to high drudgery in this task. High drudgery leads to muscular pain, stress and inefficiency for work. But the use of revolving milking stool with stand provided by ICAR-CIWA Bhuweneshwarhas been used for conducting OFT to reduce drudgery among dairy women during milking activity in village of Bhahawalbasi fromAbohar Block, district Fazilka. The observations and experiences of respondents were collected through questionnaire and field visits for its ease in operation. The data were recorded before and after activity and found that reduction in muscular pain, Pulse Pressure (bpm) was 85-106 which was reduced with difference of 6-14 (79-92 bpm), Oxygen Level was reduced about 7-10 (mmhg) from 89-998 to 79-91, reduction about 1-3 minutes were noted in time of milking for per animal. The drudgery was calculated based on difficulty faced in work, body posture difficulty, handling difficulty, time spent on activity and frequency of operations through the combination of methods and found that this tool is very useful to reduce the drudgery level and improve the work efficiency.

Key words: *Physiological disorders, Drudgery, Improved tool, Work efficiency*

INTRODUCTION

Women have historically played a pivotal role in livestock rearing and dairy farming activities in India, making the dairy sector largely female-dominated (Bajpai & Kushwaha, 2020; Rajpurohit & Sareen, 2022) [2]. Despite their significant contributions, women engaged in dairy farming often remain unrecognized and undervalued (Padmaja et al., 2020) [33]. Moreover, women invest considerably more time and effort in dairy-related tasks compared to men (Hansen et al., 2020) [20]. This disparity underscores the urgent need to acknowledge and promote women's active participation in the dairy sector, not only for their economic empowerment but also for advancing gender equality and social justice.

Dairy farming serves as a vital livelihood source for millions of rural women, particularly those from economically weaker sections of society. Approximately 70% of dairy farmers in India are classified as landless or small and marginal farmers, typically owning only one or two cattle. Many landless families depend entirely or partially on livestock to sustain their livelihoods (Das et al., 2020; Mukesh et al., 2022) [13, 31]. Rural women are responsible for 80–90% of animal husbandry operations, reflecting their extensive involvement in this sector (Awan et al., 2021; Subathra et al., 2020) [1, 48].

Women actively perform diverse tasks in dairy farming, including animal feeding, livestock care, cattle shed maintenance, waste disposal, milk processing, and managing produce for family consumption (Ravichandran et al., 2021) [42]. Women from affluent farming households are predominantly engaged in milking and processing milk products. In contrast, women from landless and smallholder families are involved in nearly all aspects of animal husbandry (Pattnaik& Lahiri-Dutt, 2020).

However, milking activities often expose women to high levels of physical strain and discomfort. Over 90% of women reported pain in fingers, upper legs, and lower legs, with severity ratings of 3.66, 3.49, and 3.48 respectively. Furthermore, more than 70% of women experienced postural discomfort in the lower back, upper back, and legs during various dairy activities. Cleaning cattle sheds (3.66) and fodder collection (3.53) were identified as tasks with the highest physiological workload (Chitagubbi et al., 2016).

A major challenge is that most dairy tools and technologies are not ergonomically designed to suit women, thereby increasing drudgery during tasks such as milking. Considering these issues, the present study was conducted to evaluate the drudgery levels of women engaged in milking, using both traditional methods and an ergonomically improved revolving milking stool and stand developed by ICAR-CIWA, Bhubaneswar.

METHODOLOGY

Although the share of livestock in the Net State Domestic Product (NSDP) has declined, its rate of decline is less steep compared to the agricultural sector. Milk remains the primary product of the livestock sector, contributing nearly 80% of its total value. In Fazilka district of Punjab, dairy farming continues to be a subsidiary occupation for rural women.

The present study was conducted in Bhahawalbasi village of Abohar region, Fazilka district, under On-Farm Testing (OFT) during 2022–23, to assess the drudgery level of dairy women during milking. Initially, farm women from the adopted village (Bhahawalbasi) were provided training on drudgery-reducing tools and techniques. Based on the training outcomes and the requirement of the study, three respondents aged 35–55 years were selected using random sampling.

Data were collected before and after the introduction of the revolving milking stool and stand to evaluate their effectiveness. An interview schedule was used to gather information on the respondents' general profile, ergonomics, physical workload, postural discomfort, physiological workload, body pain, and musculoskeletal disorders. Various validated scales and ergonomic assessment tools were employed to analyze the impact of the improved tool compared to traditional milking methods.

Study Area and Sample

- **Location:** Bhahawalbasi village, Abohar Block, Fazilka District
- **Respondents:** 3 women aged 35–55
- **Design:** Pre-post comparison using traditional vs. improved milking method
- **Tool:** Revolving Milking Stool with Stand (Triangle-shaped base with 3 wheels and rotating bucket holder)

Data Collection

- **Tools:** Questionnaire, observational checklists, REBA tool, body maps
- **Parameters:** Pulse pressure, oxygen level, milking time, body posture, musculoskeletal pain

The ergonomic assessment of traditional milking method was done and compared with the use of revolving milking stool with stand. This stool had been designed in tringle shape having 3 wheels for movement with revolving bucket holder.

RESULTS AND DISCUSSION

Table 1
Physiological parameters of the respondents

Parameters	Traditional Method (T_1)	Revolving Milking Stool (T_2)	Difference
Pulse Pressure (bpm)	85-106	79-92	6-14
Oxygen Level (mmhg)	79-91	89-98	7-10
Milking Time in minutes	10-14	9-11	1-3
Posture assumed for milking	Very Difficult	Very Easy	Reduce drudgery

Women were asked to do milking activity by putting their feet in flat position. They were not able to exert pressure while milking and with body stress. So, due to this workload increased and the milk output was decreased. Revolving stool was provided to the respondents to facilitate milking process and reduce perceived exertion. "This stool was introduced to the women and were asked to use it. The improved too; accepted by the dairy women due to very comfort in work posture from squatting to sitting. Provision of wheels makes the movement easy, and it reduces the musculoskeletal problems while performing the milking activity. Pulse Pressure (bpm) was 85-106 which was reduced with difference of 6-14 (79-92bpm), Oxygen consumption was increased about 7-10 (mmhg) from79-91 to 89-998, reduction about 1-4 minutes were noted in time of milking for per animal.

Data presents the significant reduction in energy, physiological parameters, time taken and body angles when the activity was carried out by using drudgery reducing tool i.e., revolving stool with bucket stand for milking activity.

Table 2
Intensity of pain perceived by respondents in different body parts.

Body parts	Perceived Pain									
	Traditional Method (T_1)					Revolving Milking Stool(T_2)				
	5	4	3	2	1	5	4	3	2	1
Upper leg	3								2	1
Lower leg	3								2	1
Upper back	2	1							1	2
Lower back	3									3
Knee	3									3
Feet		3								3

The data were collected for Musculo skeletal problems during milking Incidence of Musculo skeletal problems while performing milking with the help of 5-point scale as very severe, severe, moderate, mild and very mild through body map suggested by Corlette and Bishop, 1978, which reported hundred percent reductions of pain in low back, and ankle/feet and fifty per cent pain reduction in upper leg/thigh by using improved tool (table 2). They were felt comfort while working with improved tool as compared with the severity/ intensity of pain in traditional practices, which made the working comfortable.

Table 3
Drudgery experience Score sheet

S. No.	Item	Score/ rating		
1.	Work demand time	Particular	Traditional Method (T_1)	Revolving Milking Stool (T_2)
		Very demanding	67	
		Demanding Moderate	33	
		Less demanding		100
		Very less demanding		
2.	Feeling of exhaustion psychophysical	Very exhausted	100	
		Exhausted		
		Moderately exhausted		
		Less exhausted		100
		Very less exhausted		

3.	**Posture assumed in work**	Very difficult	33	
		Difficult	67	
		Moderately difficult		
		Less difficult		100
		Very less difficult		
4.	**Perception on manual loads operative**	0-5 kg		
		5-10 Kg		100
		10-15 Kg		
		15-20 Kg	100	
		More than 20 Kg		
5.	Material of vessel used for milking.	Steel		33
		Aluminum	67	
6.	Posture adopted for milking.	Squatting	100	
		Sitting		100

Data of Table 3 depicts that majority of the respondents moderate to very demanding time in traditional work, feeling psychological exhaustion with difficult posture of milking, the 15-20 kg manual load operatives, they used aluminium vessels for milking at squatting positions which reduces by using revolving milking stool as a improved method of milking.

Table 4
Rating of perceived exertion

Perceived exertion	**1**	**2**	**3**	**4**	**5**
	Very light exertion	Light exertion	Moderately heavy exertion	Heavy exertion	Very heavy exertion
Traditional Method				4	
Revolving Milking Stool (T_2)	1				

The data presented in the table indicate that the perceived exertion for milking activity was assessed using a 5-point scale: very light, light, moderately light, heavy, and very heavy (Varghese et al., 1994). It is evident from Table 10 that a higher proportion of respondents categorized the traditional milking method as heavy work. In contrast, when the drudgery-reducing tool was employed, the majority of participants rated the milking activity as light. This clearly demonstrates the positive impact of the improved technology in alleviating drudgery among dairy women, while also resulting in a significant increase in output.

Table 5
Risk Level while performing milking activity by farm women (n=3). REBA action sheet

Risk level	**Traditional Method (T_1)**	**Revolving Milking Stool (T_2)**
Negligible (1)		
Low (2-3)		100 %
Medium (4-7)		
High (8-10)	67 %	
Very high (11-15)	33%	

Data presented in Table regarding the risk level of women while performing milking was assessed through Rapid Entire Body Assessment (REBA) developed by Hignett and Mc Atamney, (2000) in traditional and by improved method. It was clear from the table that maximum respondents (67%) had high risk in the traditional milking method whereas 33 per cent of the respondents had very high risk in performing the activity in traditional method.

Furthermore, it was noted that the use of the drudgery-reducing milking tool resulted in all respondents being categorized under the low-risk group (100%).

Table 6
Satisfaction level of respondents regarding revolving milking stool and stand

Revolving milking stool and stand.	Satisfaction Level			Would like to adopt	
	Fully Satisfied	Partially Satisfied	Not Satisfied	Yes	No
	100%	-	-	100%	

The data in the table revealed that the respondents were highly satisfied with the technology and expressed willingness to adopt it in the future with minor modifications. The drudgery-reducing tool (revolving milking stool and stand) was widely accepted by all farm women involved in milking, as it significantly minimized the severity of body pain.

CONCLUSION

The use of the revolving milking stool considerably minimized physical strain while enhancing work posture, oxygen intake, and overall productivity. This drudgery-reducing innovation turned a physically demanding activity into a more comfortable and efficient task, achieving 100% satisfaction among respondents along with their readiness for adoption. Additionally, a noticeable improvement was observed in the awareness and knowledge levels of farm women. Hence, there is a pressing need to promote such drudgery-reducing technologies among rural women through Krishi Vigyan Kendras (KVKs) and allied departments to improve work efficiency, physical comfort, and overall health of women engaged in dairy operations.

RECOMMENDATIONS

- Conduct targeted awareness programs through KVKs and self-help groups (SHGs).
- Undertake further field trials in varied agro-climatic zones.
- Modify and refine the design (height, wheel size, etc.) based on user feedback for better adaptability.

Paper received on 17/03/2025
Accepted on 25/07/2025

REFERENCES

Awan ZA, Akhtar K, Khan LA, Imran AU. Women's participation and their constraints in livestock management activities: A case study of district Bahawalpur in Punjab, Pakistan. Int. J Vet Sci. Res. 2021;7(2):083-087.

Bajpai A, Kushwaha A. Suitable Use of Technologies in Dairy Enterprises for Women Empowerment. Agriculture & Food E-Newsletter; c2020. Available from:

CHITAGUBBI G, SALUNKE R, MORAB A and MUGALKHOD S, 2016. Characterization of drudgery of women in dairy production system. International Journal of Farm Sciences 6(3): 180-192.

Corlett, N.; Wilson, J. and Menerica, I. (1983). The Ergonomics of Working. Appl. Ergonomics, 3(6): 45 50.

Das A, Raju R, Patnaik NM. Present scenario and role of livestock sector in rural economy of India: A review. Int. J Livestock Res. 2020;10(11):23-30

Hansen BG, Bugge CT, Skibrek PK. Automatic milking systems and farmer wellbeing–exploring the effects of automation and digitalization in dairy farming. J Rural Stud. 2020;80:469-480.

Hignett, S. and McAtamney, L. (2000) Rapid Entire Body Assessment (REBA), Appl. Ergonomics, 31: 201-205.

Mukesh M, Gujar G, Sodhi M. Livestock sector: An integral component for country's food and social security. In: Advances in Animal Experimentation and Modeling. Elsevier; c2022. p. 341–351.

Pattnaik I, Lahiri -Dutt K. Do women like to farm? Evidence of growing burdens of farming on women in rural India. J Peasant Stud. 2022;49(3):629 –651. https://doi.org/10.1080/03066150.2020.1867540

Ravichandran T, Farnworth CR, Galiè A. Empowering women in dairy cooperatives in Bihar and Telangana, India: A gender and caste analysis. J Gender, Agric. Food Saf. 2021;6(1):27 –42.

Shraddha Pandey, Prof. Dr. Sanjay Mishra, Dr. Akhil Kumar Jha and Dr. Hari Om Pandey. Women in Indian dairy farming business: Significance, challenges, and way forward ISSN: 2456-2912 VET 2024; SP-9(1): 701-708 © 2024 VE International Journal of Veterinary Sciences and Animal Husbandry 2024; SP-9(1): 701-708

Varghese, M.A.; Saha, P.N. and Atreya, N. (1994). A rapid appraisalof occupational workload from a modified scale perceived exertion, Ergonomics, 37: 485-495.