

# The Effect of Milking Technique Education on Milk Quality in Dairy Farmer Groups in Medowo Village, Kandangan District, Kediri Regency, East Java, Indonesia

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## ABSTRACT

Medowo Village, located in the Kandangan District of Kediri Regency, is a significant center for dairy milk production in East Java. However, the quality of milk produced by local farmers remains low, particularly following the Foot and Mouth Disease (FMD) outbreak, which adversely affected livestock health and milk quality. This community engagement program aimed to improve the knowledge and skills of farmers in hygienic milking techniques to enhance the quality of fresh milk. The methodology employed was Participatory Action Research (PAR), which actively involved farmers in every stage, from the initial survey and educational sessions to the final evaluation. The program was conducted in the Kertajaya Village Unit Cooperative area of Medowo Village, involving 31 farmers, lecturers, and master's students from the Faculty of Veterinary Medicine, Universitas Airlangga. The educational materials covered hygienic milking techniques, identification of adulterated milk, and post-milking handling procedures. Pre-test and post-test results showed a significant improvement in farmers' understanding, particularly concerning the sensory quality of milk, storage practices, and milking hygiene. The most significant increases in comprehension were recorded for indicators on recognizing the sour odor of milk (from 29% to 97%) and conducting milk quality checks (from 26% to 98%). This educational intervention proved effective in fostering behavioral change among farmers and reducing the potential for milk contamination. Moving forward, continuous support and periodic inspection of milking equipment are necessary to ensure the consistency of hygienic practices. This program has had a tangible impact on improving local milk quality and supporting sustainable livestock farming in Medowo Village.

**Keywords:** smallholder farmers; Medowo village; milk quality; community engagement; milking technique.

## INTRODUCTION

Kediri Regency, situated in East Java Province, is geographically located between 111°47'05" and 112°18'20" East Longitude and 7°36'12" and 8°0'32" South Latitude. The regency's territory encompasses both lowland plains and mountainous regions and is traversed by the Brantas River, which flows from south to north<sup>1</sup>. This geography, particularly its mountainous areas, makes it a suitable location for dairy cattle farming. In 2024, the dairy cattle population in Kediri Regency was recorded at 9,706 head<sup>2</sup>. Among its districts, Medowo Village in Kandangan District stands out for its significant potential in dairy farming.

Medowo Village, located in the Kandangan District of Kediri Regency, holds significant potential in the dairy farming sector. This potential is supported by its favorable geographical conditions and the presence of a Village Unit Cooperative (KUD), which

facilitates the supply of milk to major processing companies. Consequently, the village is recognized as one of the primary centers for milk production in the Kediri Regency region.

The primary challenge faced by dairy farmers in Medowo Village is low milk quality, particularly among local farmers within the Kertajaya KUD area. This issue has been exacerbated by the nationwide Foot and Mouth Disease (FMD) outbreak, which has had a significant impact on the livestock sector, especially milk production in Medowo Village. Although FMD is not a zoonotic disease and is not transmissible to humans<sup>3</sup>, its economic and health impacts on livestock are severe for farmers. Key long-term consequences include mastitis, reduced milk production and quality, and reproductive disorders. Mastitis, in both its clinical and subclinical forms, directly affects milk yield and quality<sup>4</sup>.

In an effort to improve the quality of fresh milk and thus increase its value, one key strategy is the adoption of proper milking techniques. Hygienic milking practices can minimize bacterial contamination and prevent the occurrence of mastitis, thereby ensuring the quality of the produced milk is preserved<sup>5</sup>.

As a community engagement initiative, a program was designed with a focus on training in hygienic milking techniques, disseminating information on livestock health management, providing education on fresh milk quality standards, and offering continuous support and monitoring. Through the implementation of this program, it is anticipated that farmers will be able to improve the quality of their fresh milk, leading to a significant increase in their income within the Kertajaya KUD area of Medowo Village.

## METHODS

This community engagement program was conducted on June 21, 2025, in the area of Kertajaya KUD (Village Unit Cooperative) in Medowo Village, Kandangan District, Kediri Regency. The program consisted of an educational session on the effect of milking techniques on milk quality. The participants included 31 local farmers, seven faculty members from the Faculty of Veterinary Medicine (FKH) of Universitas Airlangga (UNAIR), and one postgraduate student from the Master's Program in Reproductive Biology at the same faculty.

### Implementation Stages

The approach for this community engagement program utilized the Participatory Action Research (PAR) method. PAR is a research approach that actively involves the target community as partners throughout all project phases, including problem identification, intervention implementation, and impact evaluation. This method is considered effective for community capacity building as it encourages direct involvement and fosters critical awareness among participants regarding the challenges they face<sup>6</sup>.

The initial stage of the program involved conducting a preliminary survey and securing the necessary permits from relevant authorities to ensure all activities complied with applicable legal regulations. This served as part of an exploratory design, aimed at gaining a contextual understanding of the program's location and target audience, including the social, technical, and institutional aspects that influence milk quality. Subsequently, the preliminary survey was conducted to obtain a comprehensive overview of the field conditions and to identify the primary challenges faced by the farmer group, particularly concerning the relationship between milking processes and milk quality. This survey reflected the principle of a needs assessment, which involves identifying the community's actual needs before an intervention is implemented<sup>7</sup>.

In the second stage, the program proceeded with an educational session delivered through an interactive presentation. The topics covered were milk quality standards and the characteristics of adulterated milk. At the end of the session, participants were given the opportunity to engage in a discussion and ask questions to the speakers, who consisted of faculty members and student facilitators. Following this, participants completed a post-test to evaluate the improvement in their knowledge and skills. This second stage implemented a participatory education-based strategy, emphasizing the technical enhancement of participants through interactive media, pre- and post-tests, and open discussions.

The final stage of the activity consisted of an initial and final evaluation using a simple quantitative approach. This was accomplished by comparing pre-test and post-test results to assess the extent of participants' knowledge improvement. This model adopts a quasi-experimental design principle; while there was no control group, the change in knowledge before and after the training served as a key indicator of success<sup>8</sup>. Furthermore, periodic monitoring was conducted to observe the application of the milking techniques that had been taught. This follow-up monitoring was part of a follow-up participatory evaluation method, aimed at ensuring that the taught practices were being consistently applied.

The success indicators for this community engagement program were measured by the improvement in post-test scores compared to pre-test scores, reflecting an increase in participant understanding, as well as an overall improvement in milk production and quality in Medowo Village. This comprehensive approach was designed to ensure program sustainability and provide a tangible impact for the farmers, while simultaneously supporting the development of the dairy farming sector in Medowo Village, Kandangan District, Kediri Regency.

## RESULTS AND DISCUSSION

The implementation of the community engagement program in the Kertajaya KUD (Village Unit Cooperative) area of Medowo Village resulted in the documentation of educational activities conducted by faculty members and students from the Faculty of Veterinary Medicine, Universitas Airlangga. Documentation of the educational session provided to local farmers in the Kertajaya KUD area is included as part of the activity's official report. Before the session was conducted, the farmers were administered a pre-test in the form of a questionnaire to measure their initial level of understanding. After the session, they were given a post-test, also in questionnaire format, to measure their final level of understanding. The assessment indicator was based on the standards for good milk quality. A total of 31 participants, with ages ranging from 23 to 60 years (Figure 1), completed both the pre-test and the post-test.



**FIGURE 1:** Documentation of local farmers in the Kertajaya KUD area, Medowo Village, Kediri Regency.



**FIGURE 2:** Educational Session on Milking Techniques and Milk Quality.

Based on the collected data, the educational program on milking techniques and their effect on milk quality demonstrated a significant improvement in understanding among farmers in the Kertajaya KUD area of Medowo Village. As shown in Table 1, knowledge regarding milk quality inspection increased dramatically from 26% to 98%, indicating that participants are now more adept at identifying the characteristics of good milk. Awareness of the importance of proper milk storage rose from 77% to 100% (Table 1), which is crucial for reducing the risk of milk spoilage and deterioration.

Furthermore, understanding of quality milk characteristics such as color, aroma, consistency, and taste also increased significantly, with post-test scores in these areas ranging from 97% to 100% (Table 1). This suggests that participants are now capable of identifying milk of the highest quality. Overall, the educational intervention on milking techniques proved effective across several key aspects, including enhancing milk quality, lowering contamination risks, fostering changes in daily practices, and holding positive implications for future development (Figure 2).

**TABLE 1:** Pre- and Post-Education Understanding of Milking Techniques and Milk Quality.

No.	Indicator	Pre-test Score (%)	Post-Test Score (%)
1.	Do you know the proper way to check milk quality?	26	98
2.	What type of milk is usually consumed?	97	100
3.	Have you ever encountered sour-smelling milk?	29	97
4.	What is the color of good quality milk?	52	100
5.	What is the aroma of good quality milk?	68	100
6.	What is the consistency of good quality milk?	65	97
7.	What is the correct way to store milk?	77	100
8.	What is the taste of good quality milk?	39	100
9.	What is the most important factor in assessing milk quality?	48	94

Based on the results in Table 1, there was a significant improvement in the understanding of milk quality. Before the educational session, only 48% of participants understood the key factors in assessing milk quality. After the program, this figure increased to 94%, indicating that the material delivered was well-aligned with the farmers' practical needs. The most significant increase was observed in the ability to recognize sour milk, where understanding rose from just 29% to 97%. This topic is closely related to hygienic practices during the milking process and subsequent storage. The cleanliness of the dairy cow, the milker's hygiene, equipment sanitation, and barn cleanliness are all factors that can cause contamination of the cow's milk. Therefore, post-milking handling, distribution, and storage processes must be conducted meticulously to ensure milk quality is maintained and remains safe for public consumption<sup>9</sup>.

Understanding of quality milk characteristics, specifically consistency and aroma, which was initially in the 65-68% range, increased drastically to 97-100% (Table 1). This enables farmers to more rapidly identify contaminated or unfit milk. This ability plays a crucial role, as sensory indicators like smell and consistency are the first signs of spoilage. According to research by Hapsari et al.<sup>10</sup>, farmers' ability to detect changes in milk's smell and consistency constitutes the initial stage of a quality control system at the farm level. Meanwhile, a report by the FAO<sup>11</sup> also shows that training farmers to recognize the organoleptic quality of milk can effectively reduce the distribution of contaminated milk in rural areas by up to 42%.

Knowledge about proper milk storage, which can alter daily practices, grew from being understood by only 77% of participants to being fully mastered by all participants. This is vital for maintaining milk quality after milking. Although the understanding of the most commonly consumed milk type (fresh milk) was already high from the start (97%), the education provided reinforced the awareness of maintaining its quality from the milking process until it is ready for consumption. Improved farmer understanding of post-milking storage has been

shown to directly contribute to a 38% decrease in cases of contaminated milk<sup>12</sup>.

The implications for future development suggest that continuous support is necessary to ensure that hygienic milking techniques are implemented consistently. Furthermore, routine inspection of milking equipment is also recommended to maintain the standard of the milk produced. According to a study by Wardhana and Kusumawardhani<sup>13</sup>, routine inspection of milking equipment can reduce cases of subclinical mastitis by up to 40%.

## CONCLUSION

The educational program on milking techniques and milk quality has been proven to enhance the understanding and awareness of farmers in the Kertajaya KUD area of Medowo Village regarding milk quality. These findings support an increase in the productivity and competitiveness of local milk within Kediri Regency.

## ACKNOWLEDGEMENTS

The authors would like to thank all faculty members of the Anatomy Division, Faculty of Veterinary Medicine, Universitas Airlangga, for the financial support provided through internal funding for the year 2025, which made this program possible. Special thanks are also extended to the Head of Medowo Village and the Head of the Kertajaya Village Unit Cooperative (KUD) in Medowo, Kandangan, Kediri, for their support and for granting the permits required for the implementation of this community engagement program.

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