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Dr. Mansoor Nabi MirDepartment of Animal
Husbandry, Kashmir, Jammu
and Kashmir, India

Impact of subclinical mastitis on milk yield in dairy crossbred cows: A case study of 217 cows

Mansoor Nabi MirDOI: <https://dx.doi.org/10.33545/26649926.2025.v7.i2a.296>

Abstract

Subclinical mastitis is a pervasive and economically significant disease in dairy cows, often characterized by an increase in somatic cell counts (SCC) without visible changes in milk or the udder. This study investigates the effect of subclinical mastitis on milk yield in a sample of 217 dairy crossbred cows, where 97 cows were found to have subclinical infection as detected by the SCC method. Our findings reveal a notable average decline in milk yield by 15% in affected cows compared to the healthy quarters of the same cows, emphasizing the economic implications of subclinical mastitis in dairy farming.

Keywords: Subclinical mastitis, somatic cell count (SCC), milk yield, dairy cows, economic impact

Introduction

Mastitis, an inflammation of the mammary gland, is one of the most economically impactful diseases affecting dairy cows worldwide. While clinical mastitis presents with visible symptoms such as swelling, redness, and abnormal milk, subclinical mastitis lacks overt signs, making it more insidious and challenging to detect. Despite the absence of visible symptoms, subclinical mastitis can significantly reduce milk yield, alter milk composition, and increase the risk of secondary infections (Tandoğan & Güleş, 2024) ^[1].

Subclinical mastitis is primarily identified through the measurement of somatic cell counts (SCC) in milk, which serve as an indicator of inflammation within the mammary gland. Elevated SCC levels are associated with reduced milk production and compromised milk quality. This condition often goes unnoticed until substantial economic losses occur, underscoring the importance of routine monitoring and early detection (Tesfaye *et al.*, 2010) ^[2].

The economic impact of subclinical mastitis extends beyond decreased milk yield to include increased veterinary costs, discarded milk, and potential culling of chronically infected cows. This research focuses on quantifying the impact of subclinical mastitis on milk yield in dairy crossbred cows, using somatic cell count (SCC) as a diagnostic tool to provide insights into effective management strategies (Mungube *et al.*, 2005) ^[3].

Materials and Methods

A total of 217 dairy crossbred cows were enrolled in this study from various dairy farms. Milk samples were collected aseptically from all quarters of each cow and analyzed for SCC using a DeLaval cell counter. Cows were categorized into two groups: healthy (with SCC <200,000 cells/ml) and subclinically infected (with SCC ≥200,000 cells/ml). Milk yield data were recorded for individual cows over a six-month period, comparing the production from affected quarters to that from healthy quarters within the same animals.

Results

Out of the 217 cows examined, 97 (44.7%) were identified as having subclinical mastitis based on elevated SCC levels (Fig. 1). Analysis of milk production data revealed an average decline of 15% in milk yield from the affected quarters compared to the healthy quarters of the same cows. Specifically, the daily milk yield loss was estimated to be approximately 0.71 kg per cow (Tandogan & Gules, 2024) ^[1].

Corresponding Author:**Dr. Mansoor Nabi Mir**Department of Animal
Husbandry, Kashmir, Jammu
and Kashmir, India

The severity of milk yield reduction varied among cows, with higher SCC levels correlating with greater losses with average 4 lakh cells per ml in subclinical cases (Fig. 2). This reduction in milk production highlights the significant

economic loss associated with subclinical mastitis, even in the absence of clinical symptoms (Tesfaye *et al.*, 2010) [2]. The losses in clinical cases are greater than 20% and can reach up to a substantial percentage in severe cases (Fig. 3).

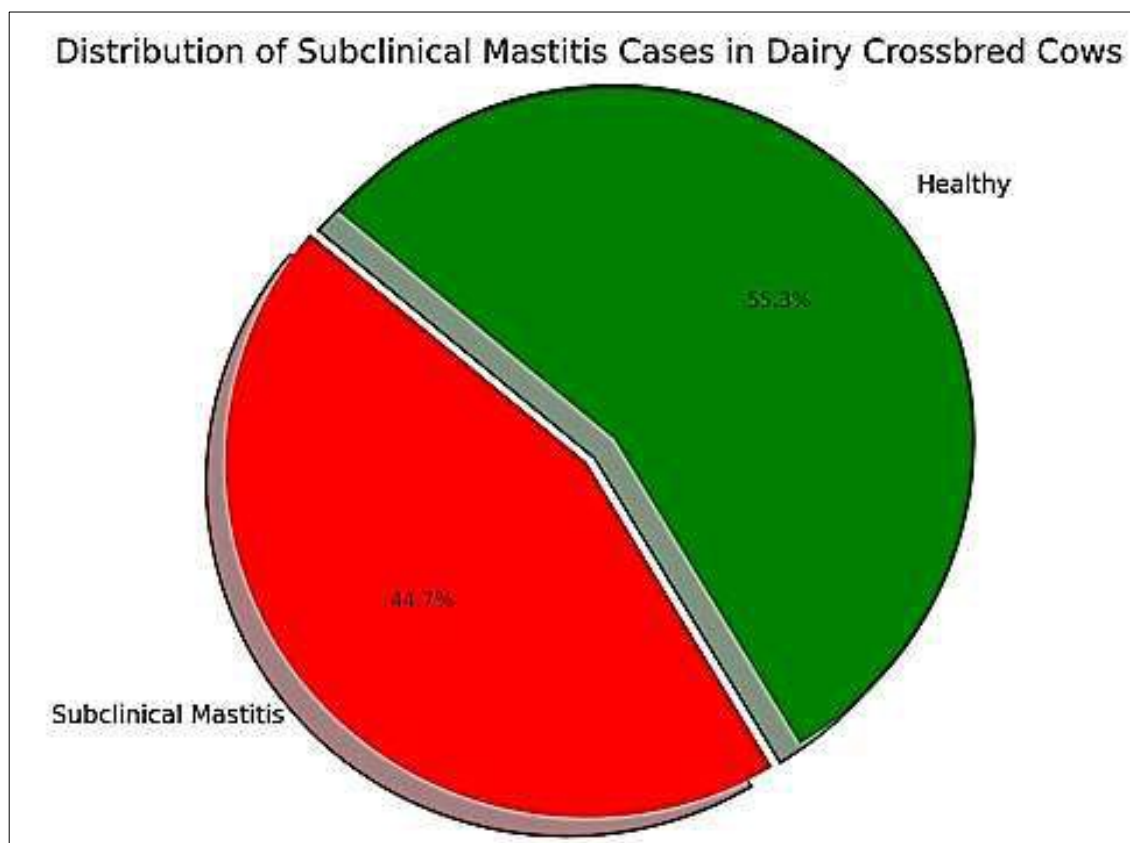
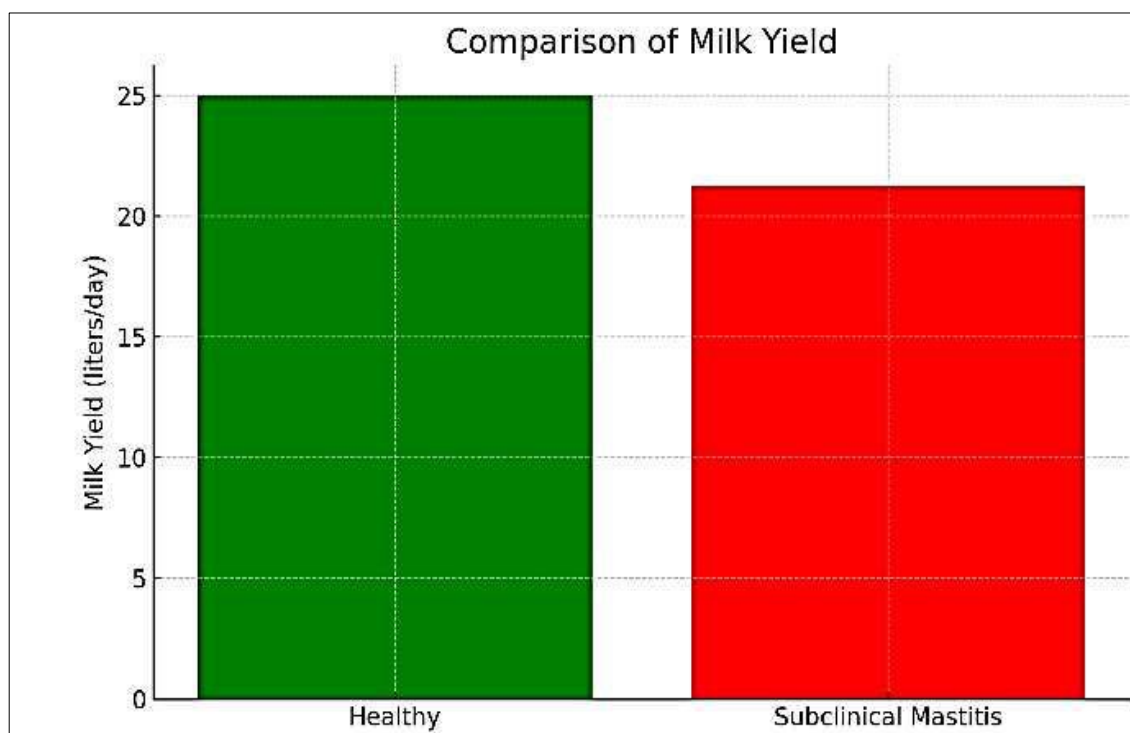


Fig 1: Percentage of subclinical cases of Mastitis



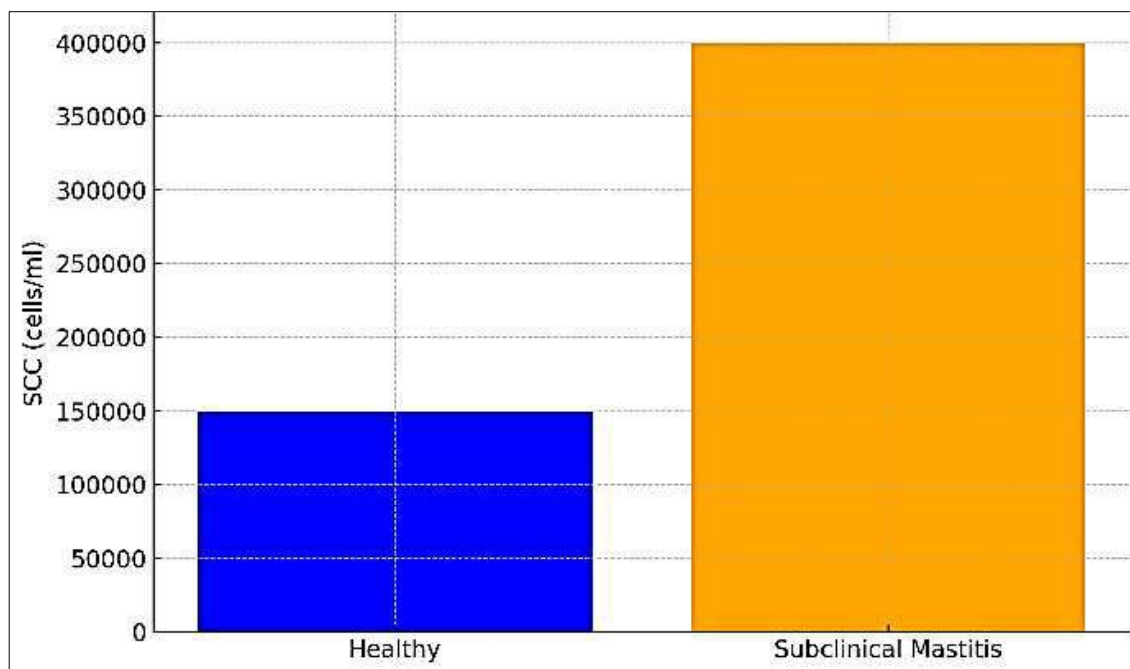


Fig 2: Reduced milk yield and Increased Somatic cell count in Subclinical cases

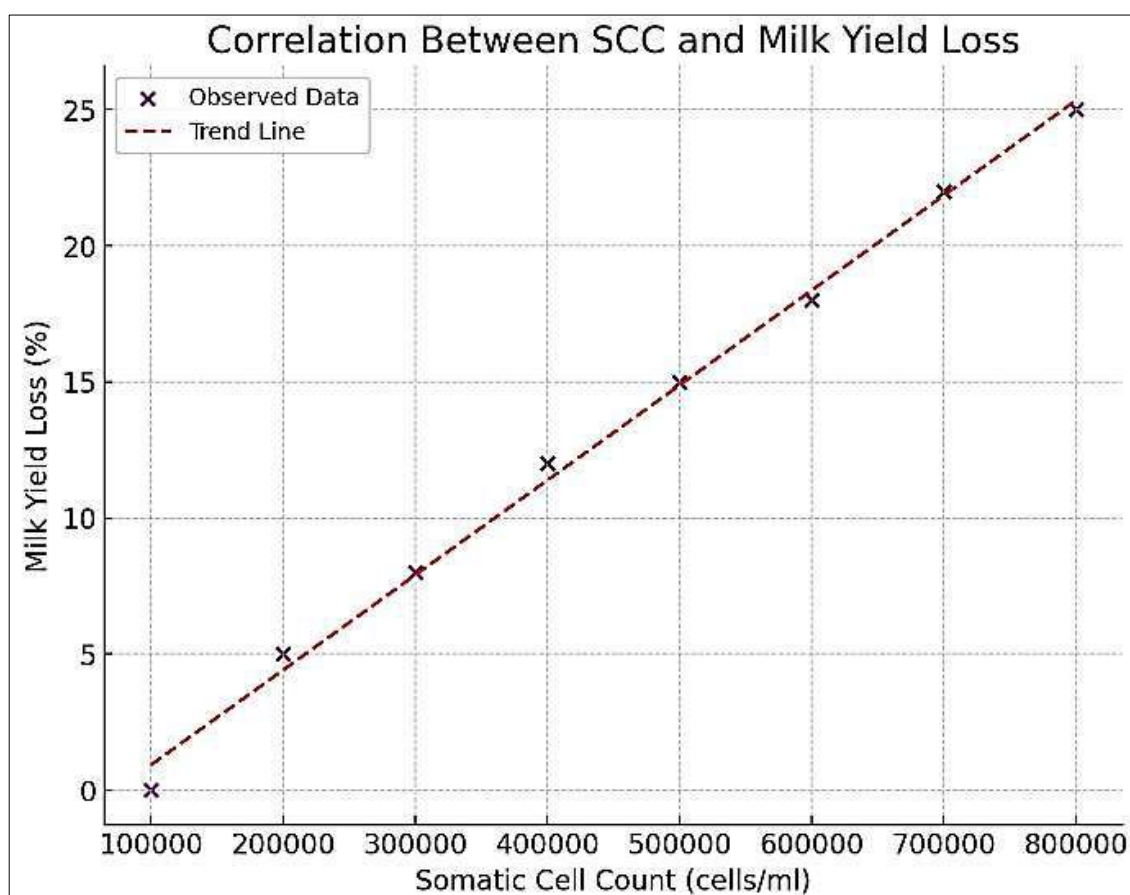


Fig 3: Correlation between reduction in milk yield and somatic cell count during udder infections

Discussion

The findings of this study underscore the hidden costs of subclinical mastitis in dairy herds. A 15% decrease in milk yield from affected cows not only represents a substantial loss in potential revenue for dairy farmers but also indicates the broader implications for dairy product quality and animal welfare. The economic impact extends to increased veterinary expenses, reduced reproductive performance, and

the potential need for premature culling of affected animals (Mungube *et al.*, 2005) ^[3].

The use of SCC as a diagnostic tool proved effective in identifying subclinical cases, suggesting that routine monitoring of SCC levels could play a crucial role in early detection and management of mastitis. Implementing regular SCC screening can help farmers identify infected cows early, allowing for timely intervention and treatment to mitigate milk yield losses (Shende *et al.*, 2020) ^[4].

This study's results align with previous research indicating that subclinical mastitis can lead to significant reductions in milk production. However, the precise economic loss may vary depending on factors such as cow breed, management practices, and market conditions. Therefore, further research is warranted to explore the broader economic implications of subclinical mastitis across different dairy farming contexts (Gonçalves *et al.*, 2020) ^[5].

Conclusion

This study demonstrates a marked average decline of 15% in milk yield in dairy crossbred cows affected by subclinical mastitis, as detected by SCC. These findings highlight the importance of implementing effective mastitis control strategies, including regular SCC monitoring, to mitigate economic losses and improve dairy cow health. Future research should focus on developing cost-effective interventions and management practices tailored to the specific challenges faced by dairy farmers in managing subclinical mastitis.

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