ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-515-x, Impact Factor: 9.23

American Academic publishers, volume 6, issue 01,2026

Journal: https://www.academicpublishers.org/journals/index.php/ijai

BREAST INFLAMMATION (MASTITIS): EVALUATION OF THE EFFECTIVENESS OF PREVENTIVE MEASURES

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Abstract. Breast inflammation (mastitis) is a common inflammatory disease, especially occurring during lactation, and it negatively affects both maternal health and the breastfeeding process. This study aimed to evaluate the main risk factors of mastitis, its development mechanisms, and the effectiveness of preventive measures. During the study, factors such as hygiene, proper breast emptying, lactation techniques, and early diagnosis were examined. According to the results, regular hygiene, adherence to correct breastfeeding techniques, and prevention of milk stasis significantly reduced the likelihood of mastitis development [1,7; 2,15]. When preventive measures were applied correctly, a decrease in disease recurrence was observed. In conclusion, a comprehensive approach to mastitis prevention was found to yield effective results.

Keywords: mastitis, breast inflammation, lactation, prevention, hygiene, breastfeeding technique.

Introduction

Mastitis is an inflammation of the breast gland that mainly occurs during the lactation period and has a significant impact on the health of breastfeeding women. According to the World Health Organization (WHO), mastitis is observed in 3–20% of women during lactation, and this rate may vary depending on region, hygiene level, and awareness of breastfeeding techniques [4; 6]. Clinical signs of mastitis include breast pain, swelling, redness, increased body temperature, and general weakness, all of which negatively affect the continuation of breastfeeding. In some cases, mastitis may progress to a purulent infection and require surgical intervention [3,22].

Several main etiological factors contribute to the development of mastitis:
• blockage of milk ducts (lactostasis);
• incorrect breastfeeding technique;
• non-compliance with hygiene rules;
• nipple cracks and entry of infection;
• weakened immunity [1,7; 2,15].

Some studies report that more than 70% of mastitis cases are associated specifically with incorrect breastfeeding techniques and incomplete emptying of milk [4,13]. Therefore, modern clinical practice prioritizes prevention over treatment of mastitis. Preventive measures include maintaining hygiene, applying proper breastfeeding techniques, preventing milk stasis, using compresses, and performing breast massage. Scientific sources indicate that these preventive measures can reduce the likelihood of mastitis development by 40–70% [7,19; 8,33]. In addition, timely consultative support and lactation training significantly reduce the risk of

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mastitis recurrence. Based on this, the main objective of the present study is to identify factors influencing the development of breast inflammation (mastitis), evaluate the effectiveness of preventive measures, and analyze a comprehensive approach aimed at mastitis prevention. The results of the study are of significant scientific and practical importance for maintaining the health of women during lactation, early prevention of mastitis, and improving clinical practice recommendations.

Methods

In this study, literature analysis, clinical observation, comparative analysis, and synthesis of expert opinions were used to evaluate scientific approaches to mastitis prevention. The study was conducted in the following stages:

Literature analysis

The analysis was based on more than 35 scientific articles, clinical guidelines, and textbooks published between 2010 and 2024. The main focus was on:

• Pathogenesis, etiology, and risk factors of mastitis [1,7; 3,22].
• International recommendations on lactation hygiene and breastfeeding techniques [4; 5; 6].
• Clinical studies evaluating the effectiveness of preventive measures [2,15; 7,19].

Literature sources were selected from PubMed, WHO Library, Scopus, and local medical publication databases.

Clinical observations

The study involved 52 women during the lactation period. Observations were conducted over 3 months.

Women's hygiene habits were studied. Breastfeeding techniques (infant positioning on the breast, mouth–breast angle, degree of milk emptying) were assessed. Signs such as milk duct blockage, breast pain, redness, and fever were monitored. During observation, women identified with mastitis-related symptoms were recommended early interventions, and their outcomes were recorded separately [4,13].

Diagnostic criteria

The following criteria were used to assess the probability of mastitis:
Local breast pain and swelling;
Increased temperature (≥38°C);
Incomplete milk emptying;
Errors in lactation technique.
These criteria were based on WHO and Clinical Lactation Guidelines recommendations [6,28].

Analysis of preventive interventions

The effectiveness of the following preventive measures was compared in the study:

1. Adherence to breast hygiene rules;
2. Emptying the breast after each feeding;
3. Application of warm compresses;

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4. Breast massage;

5. Training on prevention of milk stasis;

6. Sessions with trainers on correct breastfeeding techniques [7,19; 8,33].
Each intervention was explained individually to participants, and results were recorded at two-week intervals.

Statistical analysis
Observation results were processed using the following statistical methods: frequency analysis (percent/frequency); chi-square test to determine the relationship between risk factors and mastitis; simple proportional analysis to evaluate intervention effectiveness. Data were processed using Microsoft Excel 2021.

Expert evaluation: A group of experts consisting of 3 experienced gynecologists and 2 lactation specialists analyzed the obtained results. Their recommendations were included in the mastitis prevention section.

Results: Observations conducted on 52 lactating women, literature analysis, and results obtained regarding the effectiveness of preventive interventions were summarized as follows.

Prevalence of mastitis
During the observation period, one or more mastitis-related symptoms were observed in **14 participants (26.9%)** out of 52.
Among them, 9 women (64.2%) had milk duct blockage;
7 women (50%) had local breast redness;
6 women (42.8%) had elevated body temperature.
These results correspond with the 20–30% prevalence rates reported in the literature [4,11; 3,22].

Identification of risk factors
Analysis identified the most influential factors contributing to mastitis:
Incorrect breastfeeding technique — 67% (incorrect positioning observed in 35 women) [1,9].
Incomplete milk emptying — 58% (signs of milk stasis present in 30 women).
Insufficient attention to breast hygiene — 44% (23 women) [2,15].
According to chi-square analysis, a statistically significant relationship was found between incorrect breastfeeding technique and mastitis development ($\chi^2 = 6.14$; $p < 0.05$).

Effectiveness of interventions: Among the 6 preventive interventions applied in the study, the most effective were:
Teaching correct breastfeeding technique; Before intervention, incorrect positioning accounted for 67%, while after training this indicator decreased to **29%**, representing a 38% improvement [4,13].
Hygiene training sessions
Before intervention, women with insufficient hygiene accounted for 44%; after intervention, this decreased to **18%**. Mastitis cases were observed 35–40% less frequently among women who adhered to hygiene practices [2,15].

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Prevention of milk stasis (massage, warm compresses)
This intervention was applied to 24 participants: within 2 weeks, milk stasis cases decreased from **45% to 12%** [7,19]. Statistical calculations showed that this intervention significantly reduced the likelihood of mastitis ($p < 0.05$).
Effectiveness of early detection: Among 14 women with early mastitis symptoms:
• 11 women (78%) experienced symptom relief within 48–72 hours;
• 3 women (22%) had persistent inflammation, but progression to severe forms was prevented.
These results indicate the effectiveness of early detection and are consistent with the literature [6,28; 8,33].
Overall final results: The study led to the following main conclusions:
• Teaching correct breastfeeding techniques proved to be the most effective factor in mastitis prevention.
• Mastitis frequency significantly decreased among women with improved hygiene habits.
• Warm compresses and massage played an important role in preventing milk stasis.
• In women who received comprehensive prevention (hygiene + technique + massage), mastitis cases decreased by more than 70%.

Discussion
The results of this study confirm that incorrect breastfeeding technique, milk stasis, and insufficient hygiene compliance are the main risk factors in mastitis development. The obtained data align with previously published scientific findings and demonstrate that breast inflammation during lactation is closely associated with these factors [1,7; 3,22].

Incorrect breastfeeding technique as the primary risk factor: The study revealed that incorrect breastfeeding technique was the strongest risk factor for mastitis, observed in 67% of participants. This figure corresponds to the 55–70% range reported in clinical observations across various countries [4,13]. Incorrect infant positioning on the breast leads to incomplete milk emptying, resulting in milk duct blockage and initiation of inflammation. Teaching breastfeeding techniques as an intervention clearly demonstrated a significant reduction in mastitis risk.

Insufficient hygiene measures and their consequences: Non-compliance with hygiene was observed in 44% of participants, consistent with reported literature [2,15]. Inadequate attention to breast hygiene creates favorable conditions for bacterial infection. The study confirmed the preventive value of hygiene, with mastitis reduction reaching 35–40% after hygiene improvement.

Clinical significance of preventing milk stasis: Methods such as massage, warm compresses, and regular breast emptying were effective in reducing milk stasis. Scientific evidence indicating that milk stasis represents an initial stage of mastitis fully corresponds with these observations [7,19]. The reduction of milk stasis from 45% to 12% further confirms the clinical importance of this intervention.

Impact of early detection on mastitis severity: Study results confirmed that early diagnosis is a crucial factor in preventing mastitis progression: 78% of early-detected cases showed symptom reduction within 48–72 hours, with no cases progressing to severe forms.
These indicators align with scientific sources emphasizing the high effectiveness of early detection [6,28; 8,33].

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Superiority of a comprehensive approach: Research shows that although individual preventive measures are effective, comprehensive prevention—combining hygiene, correct breastfeeding technique, massage, and prevention of milk stasis—produces the best results. A reduction of 70% or more in mastitis cases among women applying comprehensive measures demonstrates the advantage of this approach. Similar results have been reported in numerous international studies [4; 7; 8].

Study limitations: The study has certain limitations that should be considered when interpreting results: limited sample size (52 participants); clinical monitoring conducted only for 3 months; data limited to women during the lactation period. Future studies are recommended to increase sample size, extend monitoring duration, and compare mastitis risk across different age groups.

Scientific and practical significance: The results of this study provide several practical approaches important for improving mastitis prevention effectiveness. Additionally, the findings highlight the need to organize lactation training programs in local polyclinics.

Conclusion: The results of this study demonstrate that mastitis is widespread among women during the lactation period, with incorrect breastfeeding technique, milk duct blockage, and insufficient hygiene compliance being the main contributing factors. The interventions applied during the study confirmed high effectiveness in mastitis prevention. First, teaching correct breastfeeding techniques is one of the most important preventive measures. A significant reduction in breastfeeding errors (from 67% to 29%) after practical training demonstrates the high effectiveness of lactation training and confirms the necessity of regular educational and consultative support for mothers. Second, adherence to breast hygiene reduced mastitis risk by 35–40%, emphasizing the practical importance of hygiene measures. These results align with scientific sources confirming the preventive value of hygiene [2,15]. Third, prevention of milk stasis (massage, warm compresses, complete breast emptying) was found to be highly effective in the early stages of mastitis. The reduction of milk stasis cases from 45% to 12% further confirms the clinical significance of this intervention [7,19]. The study showed that a comprehensive preventive approach (hygiene + correct breastfeeding technique + massage + prevention of milk stasis) is the most effective method for reducing mastitis risk, leading to a reduction of more than 70% in mastitis cases among participants. In addition, early diagnosis was reaffirmed as a critical factor in preventing progression to severe mastitis forms, with early-detected symptoms resolved within 48–72 hours, confirming clinical effectiveness [6,28].
Overall, the study recommends prioritizing the following key measures for mastitis prevention:
• Teaching correct breastfeeding techniques and conducting regular training;
• Strict adherence to breast hygiene;
• Application of physiological measures to prevent milk stasis;
• Organizing regular consultations for mothers;
• Early identification of symptoms and prompt response.
The results of this study highlight the importance of developing lactation counseling services, educating women, and widely implementing mastitis prevention strategies within the healthcare system. Future research expanding participant numbers, extending monitoring duration, and conducting comparative analyses across different regions will enable deeper scientific conclusions.

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