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963 – Artificial intelligence in mammography for breast cancer detection: a systematic review

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Introduction: Breast cancer remains the most frequently diagnosed malignancy among women worldwide, and mammographic screening is essential for early detection and mortality reduction. However, diagnostic accuracy is limited by interobserver variability, workload, and fatigue. Artificial intelligence (AI), particularly deep learning models, has emerged as a tool to improve image interpretation.

Methods: This systematic literature review followed the PRISMA guidelines. The research question was structured using the PICO framework: population (women undergoing mammography), intervention (AI-based systems), comparison (radiologist interpretation without AI), and outcomes (cancer detection rate, sensitivity, specificity, and workflow efficiency). Searches were conducted in the PubMed and Cochrane Library databases in February 2026, considering English-language studies from the last five years. A total of 58 studies were identified, of which 49 remained after duplicate removal. After screening titles and abstracts, 18 studies were selected for full-text analysis, and 11 were included. Due to heterogeneity, results were synthesized narratively.

Results: AI demonstrated non-inferior or superior performance to that of radiologists, increasing cancer detection rates by up to 29% and improving sensitivity while maintaining specificity. In randomized and prospective studies, detection rates increased from 5.0 to 6.4 per 1,000 examinations, with stable recall and no significant rise in false-positive rates. AI also reduced interval cancer rates and improved detection of early-stage and subtle lesions. AI-assisted strategies improved the positive predictive value and showed complementary detection patterns to those of radiologists. Workflow efficiency was enhanced, with an approximately 44% reduction in workload and shorter times to additional imaging and biopsy. Combined AI–radiologist approaches outperformed standalone strategies.

Conclusion: AI in mammography is a safe and effective tool with diagnostic performance comparable to or, in some settings, superior to traditional methods. Its integration into screening workflows may enhance cancer detection and efficiency when used as a complementary tool for radiologists. However, heterogeneity, potential bias, and implementation challenges remain barriers to broader clinical adoption.

Ethics: Public data – Literature review.

Keywords: artificial intelligence; breast neoplasms; mammography; mammary diagnosis.