Human Eyes and Artificial Minds: Breast Cancer Detection in Mammography — A Systematic Review

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Abstract

Background: Breast cancer is the most commonly diagnosed cancer for both sexes combined and the leading cause of death in women. Mortality has continued to decline since 1989, largely due to earlier detection achieved through mammography screening. This review aimed to evaluate the impact of AI-assisted breast radiologist (BR) on early breast cancer detection using mammograms, compared to unassisted interpretation. *Methods*: A search was conducted on PubMed, Google Scholar and Mendeley for articles in the last 5 years using the keywords: "breast cancer", "mammography" and "artificial intelligence". The main inclusion criteria analyzed in this article are workload, detection and recall rates, and area under curve (AUC) for malignant architectural distortion (MAD). Articles published before 2020, involving alternative imaging methods and overlapping studies were excluded. PRISMA guidelines were used for data abstractization. *Results*: The results were assessed in 18 studies selected by abstract. Hernström et al (2025) evaluated that using AI-supported screening results in 44.2% reduction in the screen-reading workload. Chang et al (2025) mentioned that the cancer detection rates of breast radiologist with AI-based-computer-aided detection (CAD) was significantly higher by 13.8% compared to BRs without AI-CAD (95% CI=4.13-5.89, $p<0.001$), while no significant change in recall rates was observed. Furthermore, Wan et al (2022) reported that the AUC values for MAD were 0.733 (95%CI=0.673-0.792) for general radiologist (Reader First-1) and 0.875 (95%CI=0.830-0.919) for breast radiologist (Reader Second-1), compared to 0.880 (95%CI=0.793-0.968) AI+Reader First-1 and 0.893 (95%CI=0.809-0.976) AI+Reader Second-1. In conclusion, AI-assisted mammography combined with human reading offers a safe and feasible alternative. Further studies are necessary to ensure its successful integration into routine screening programs.

Keywords: Breast cancer; Mammography; Artificial Intelligence.