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Scaling Nurse-Led Breast Cancer Early Detection: Impact of Task-Sharing and Simulation-Based Training on Referral Quality in Primary Care

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Background

Breast cancer early detection is a cornerstone of cancer control in Low- and Middle-Income Countries (LMICs), where late-stage presentation remains a significant burden. While Primary Care Units (PCUs) provide a platform for large-scale screening, health system barriers—including workforce shortages, variable clinical competencies, and referral inefficiencies—often impede service delivery.

Objectives

This study assessed whether task-sharing and simulation-based training could maintain service quality and referral appropriateness during national scale-up in Egypt. Specifically, it analyzes the impact of provider training and service readiness on patient pathways while identifying critical system bottlenecks and adaptive strategies for large-scale implementation.

Methods

An implementation research approach was utilized to evaluate the national rollout of early detection services, which expanded to reach approximately 3,700 PCUs. During the initial phases of the presidential initiative for women health, a critical system bottleneck was identified: the inconsistent availability of physicians to perform Clinical Breast Examinations (CBE), largely driven by high turnover rates and chronic short-staffing. To ensure service continuity and equitable access, a task-sharing strategy was adopted, authorizing and training PCU nurses to serve as primary screeners within the diagnostic pathway.

Training served as the central implementation pillar, integrating theoretical instruction with rigorous hands-on, simulation-based practice. To address initial constraints in training capacity, simulation resources were expanded from four to fourteen high-fidelity breast simulators, facilitating standardized skill acquisition for a larger provider pool. The curriculum emphasized CBE techniques, suspicious finding recognition, referral criteria, and communication. Service readiness was evaluated through trained personnel and functional referral mechanisms, while patient pathways were mapped from initial screening to advanced diagnostics to identify and resolve implementation gaps.

Results

Integration of early detection services into PCU settings proved feasible at a national scale. During the initial implementation phase (2019–2020), training focused heavily on the existing workforce, including 4,149 PCU doctors (average of 41.25 training hours) and 794 PCU nurses (average of 8.75 training hours). As the program transitioned to a nurse-led task-sharing model in 2023–2024, the focus shifted significantly to nursing staff; 4,158 PCU nurses were trained with a substantial increase in intensity (average of 95 training hours), while 113 PCU doctors received training (average of 15 training hours). During the first two years of implementation, the referral rate for advanced diagnostics was 8.5%. Following the expansion of simulation-based training for nurses, this proportion decreased to 4.5% over the most recent two years. This reduction indicated improved referral appropriateness and greater clinical alignment between screening findings and diagnostic outcomes. Persistent bottlenecks included high provider workloads and logistical delays accessing specialized diagnostics.

Conclusion

Early breast cancer detection can be effectively scaled within PCU settings through sustained capacity building, task-sharing, and clearly defined patient pathways. The transition to a nurse-led, simulation-based training model successfully optimized workforce capacity and improved referral quality without compromising service standards. This implementation research underscores the importance of identifying bottlenecks and utilizing adaptive strategies—such as task-sharing—to ensure sustainability of early detection programs in LMIC contexts. These findings offer transferable implementation strategies for strengthening early detection pathways in resource-limited primary care systems.