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Mammography Screening as Part of a Preventive Profile: Associations with Healthy Lifestyle Behaviors and Social Determinants

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ABSTRACT

Mammography screening is the cornerstone of early breast cancer detection and has been shown to reduce mortality when performed regularly. However, its population-level impact largely depends on sustained adherence and on factors that extend beyond the technical availability of the examination. Increasing evidence indicates that participation in mammography screening is embedded within a broader preventive health profile, characterized by engagement in self-care behaviors, regular use of health services, and adoption of healthy lifestyle practices.

The aim of this narrative review is to synthesize the available evidence on adherence to mammography screening from a preventive profile perspective, integrating individual behaviors, social determinants of health, and health system characteristics, while considering regional differences between high-income countries and regions such as Latin America and Asia. Observational studies, systematic reviews, and population-based analyses addressing education, income, social context, health system organization, and screening models were examined.

The literature consistently shows that organized screening programs with active invitation and systematic follow-up achieve higher coverage and equity than opportunistic models, whereas social vulnerability and health system fragmentation limit sustained adherence. Marked regional disparities in screening implementation and impact are also evident. Overall, this review highlights the need for integrated approaches that align health policies, clinical practice, and research strategies with social and structural contexts to maximize the benefits of mammography screening.

Keywords: Mammography; Mass Screening; Health Behavior; Social Determinants of Health; Health Services Accessibility; Health Inequalities

Introduction

Breast cancer is the most frequently diagnosed malignant tumor among women worldwide and one of the leading causes of cancer-related mortality, representing a substantial burden both in high-income countries and in low- and middle-income regions, where mortality is proportionally higher due to inequalities in access to early diagnosis and timely treatment[1,2]. In this context, mammography screening has become the cornerstone strategy for early detection, with robust evidence demonstrating a significant reduction in mortality, particularly among women who participate regularly in screening programs[3–5]. However, the population-level impact of screening fundamentally depends on sustained adherence over time, as the greatest benefits are observed among those who consistently comply with the recommended screening intervals[6–8].

Despite the widespread availability of mammography and the implementation of screening programs in many countries, actual utilization and adherence remain suboptimal. These gaps persist even in well-established health systems and reflect the influence of social, contextual, and structural determinants beyond the mere availability of the service. Socioeconomic factors, organizational barriers, living conditions, geographic environment, and processes of structural discrimination are consistently associated with lower participation and adherence rates, leading to persistent inequalities across different population groups[9–11].

Participation in mammography screening does not occur in isolation but rather as part of a broader preventive profile. Several studies have shown that women who adhere to mammography screening are more likely to engage in other preventive behaviors and to maintain more regular contact with the health care system, suggesting that screening may act as a marker of overall commitment to prevention and greater integration into health care services[12–17]. Nevertheless, this preventive profile is not homogeneous, and gaps in the comprehensive adoption of preventive practices persist in certain contexts[14].

Social determinants of health exert a substantial influence on access to, adherence to, and continuity of mammography screening. Factors such as educational level, income, employment status, and social environment shape participation in mammography even in settings with universal coverage, by affecting health literacy, resource availability, and the ability to prioritize preventive behaviors. These determinants interact with health system characteristics and individual preventive profiles, contributing to persistent inequalities, particularly among socially vulnerable populations[9,10,18–20].

Likewise, the organization of the health care system plays a key role in screening participation. Organized screening programs, based on active invitation and systematic follow-up, are associated with higher coverage and lower inequity compared with opportunistic models, whereas the coexistence of public and private subsystems introduces variability in effective access and continuity of screening. Even in contexts where mammography is provided free of charge, structural barriers such as indirect costs and geographic accessibility continue to limit participation[21–24].

These differences are also evident at the regional level. In high-income countries, organized programs integrated into primary care predominate and are associated with higher coverage and demonstrated reductions in breast cancer mortality. In contrast, in Latin America and much of Asia, screening is implemented in a more heterogeneous and opportunistic manner, with lower coverage and persistent socioeconomic inequalities in participation, which limits its population-level impact[25–27].

Although the literature on mammography screening is extensive, the evidence remains fragmented across approaches focusing on social determinants, individual behaviors, access, and health system characteristics. Few syntheses integrate these domains to understand screening participation as part of a broader preventive profile, particularly from a comparative and regional perspective, which justifies the present review.

Rather than addressing mammography screening, social determinants, and health system factors as independent domains, this review approaches mammography screening as a marker of a broader preventive health profile, within which individual behaviors, social determinants, and system characteristics interact to shape sustained adherence. Accordingly, the aim of this narrative review is to integrate the evidence on adherence to breast cancer screening from the perspective of preventive profiles, social determinants of health, and regional differences.

Conceptual framework: mammography as part of a preventive profile

In this review, mammography screening is conceptualized as a central indicator of preventive commitment, rather than as an isolated preventive act.

Participation in mammography screening is better understood as part of a broader preventive profile, characterized by the adoption of self-care behaviors, healthy lifestyle practices, and regular use of health care services. Consistently, studies show that women who adhere to mammography screening are more likely to engage in other preventive practices, such as periodic health check-ups, cervical cancer screening, and recommended vaccinations, even after adjusting for sociodemographic and clinical factors[13–16]. This clustering of behaviors reflects both an individual orientation toward prevention and the facilitating role of regular contact with the health care system, particularly in contexts with integrated primary care[16,28].

However, this association is attenuated in settings of greater social vulnerability. Factors such as lower educational attainment, food insecurity, housing instability, lack of health insurance, and unmet social needs are associated with lower uptake of both mammography and other preventive practices, favoring fragmented or opportunistic use of health care services[14,29–31].

Within this framework, the available evidence consistently shows that adherence to mammography screening is also associated with other health-related behaviors, shaping an integrated preventive profile. Population-based studies indicate that women with less healthy behaviors—such as smoking, physical inactivity, poorer diet quality, and extreme body mass index values—have lower participation and adherence rates to mammography screening, even after adjustment for sociodemographic and clinical factors[32–35]. Nevertheless, the magnitude and direction of these associations vary according to the behavior assessed and the population context. Current and former smoking, obesity, and underweight status are consistently associated with lower adherence in European, Israeli, and Australian cohorts, whereas evidence regarding physical activity, diet, and alcohol consumption shows greater heterogeneity and appears to be influenced by cultural, psychosocial, and measurement-related factors[32,33,36]. In addition, frequency of contact with the health care system, the presence of comorbidities, and access to health insurance significantly modulate these relationships, reinforcing the role of social and health system context in the adoption of preventive behaviors.

From an explanatory perspective, the coexistence of adherence to mammography screening with other preventive practices—such as vaccination, cervical cancer screening, and routine health check-ups—reflects a convergence of individual, social, and health system–related mechanisms. Factors including perceived control over health, future orientation, preventive motivation, and exposure to health information exert a cross-cutting influence on the adoption of multiple preventive behaviors[12,37]. In addition, participation in screening may function as a "teachable moment," creating opportunities to promote healthy habits and reinforce prevention from an integrated perspective, particularly when there is regular engagement with primary care services[17,38].

Overall, adherence to mammography screening may serve as a marker of general preventive orientation, although its expression critically depends on social context and the organization of the health care system. This supports the need for a conceptual approach that integrates individual behaviors, social determinants, and organizational factors to better understand screening participation[14,29–31].

Social determinants of health

Social determinants of health, including educational level, income, employment stability, economic security, and social environment, exert a substantial and multifaceted influence on initial access to, sustained adherence to, and continuity of mammography screening, even in health systems with broad formal coverage. Evidence shows that these structural conditions shape the ability to maintain preventive behaviors over time, beyond the technical availability of screening services[9,19,29].

Lower educational attainment and economic insecurity are consistently associated with lower rates of mammography utilization and adherence, regardless of health insurance status or the availability of free screening. These factors operate through multiple mechanisms, including lower health literacy, a higher burden of unmet basic needs, and difficulties in bearing indirect costs such as transportation, lost work time, or caregiving responsibilities[9,19,29,30]. Employment precariousness and unemployment further reinforce these barriers, limiting the capacity to organize and prioritize regular preventive care[9].

The social and psychosocial environment also plays a relevant role. Lack of social support networks, social isolation, lower life satisfaction, exposure to discrimination, and chronic stress are associated with lower participation and poorer continuity in mammography screening, as they erode trust in the health care system and reduce the prioritization of self-care[9,20,39]. Taken together, these determinants not only affect screening initiation but also help explain why many women, particularly in socially vulnerable contexts, experience fragmented preventive trajectories with lower sustained adherence over time [9,10,19].

Taken together, these social determinants contribute to shaping preventive health profiles and, consequently, sustained adherence to mammography screening.

Role of the health care system

The health care system plays a central role in participation in and continuity of mammography screening by modulating the impact of social determinants of health.

Organized screening programs, based on active invitation, reminder systems, and structured follow-up, are consistently associated with higher coverage rates, better adherence, and lower inequity compared with opportunistic models, which rely on individual demand or occasional recommendations by health care professionals [8,40].

In contrast, opportunistic models and fragmented health systems tend to amplify social inequalities, as they require greater individual initiative and a more stable connection with the health care system. In settings where public and private subsystems coexist, greater variability is observed in effective access, waiting times, and continuity of follow-up, with disadvantages for women who rely exclusively on the public sector [10,22]. Even in scenarios with formal coverage, structural barriers—such as indirect costs, geographic accessibility, and fragmentation of care—persist and limit sustained participation, contributing to inequalities in adherence to mammography screening [10,24,41].

Health system organization therefore plays a central role in shaping preventive health profiles and enabling sustained participation in mammography screening.

Regional differences

The organization, coverage, effectiveness, and equity of mammography screening differ markedly between high-income countries and regions such as Latin America and much of Asia. In high-income countries, breast cancer screening is predominantly implemented through

organized, population-based programs with active invitation, systematic follow-up, robust registries, and integration with primary care. These models achieve high coverage, facilitate diagnosis at earlier stages, and are associated with sustained reductions in breast cancer mortality—particularly among women aged 50–69 years—while also attenuating, though not eliminating, socioeconomic inequalities in participation[40,43,44].

In contrast, in Latin America and in many Asian countries, opportunistic strategies and heterogeneous models predominate, characterized by lower population coverage, lack of systematic invitation, and fragmented follow-up. In these settings, mammography utilization depends to a greater extent on individual initiative or access to private services, and participation exhibits strong socioeconomic stratification. As a result, a substantial proportion of breast cancer cases are diagnosed at advanced stages, and the population-level benefits of screening are more limited[25,43,45].

Interpretation of the impact of mammography screening must therefore be contextualized according to the organizational capacity of the health care system, resource availability, and integration with diagnostic and therapeutic services. Evidence indicates that outcomes observed in high-income countries are not directly extrapolable to regions with incipient or fragmented programs, where screening effectiveness critically depends on strengthening the continuum of care and reducing social and structural barriers[39,43–46].

These regional differences highlight how preventive health profiles and long-term adherence to mammography screening are strongly conditioned by health system organization and broader social contexts.

Implications for research and practice

Available evidence indicates that research on mammography screening should systematically incorporate a multilevel approach that integrates social determinants of health, individual preventive profiles, and contextual characteristics of health care systems. Recent studies show that both proximal factors (education, income, household composition, unmet social needs) and distal factors (geographic environment, density of health care resources, and system organization) substantially influence access to, adherence to, and continuity of screening, even in settings with formal availability of mammography[9,10].

Advancing analytical models capable of capturing this complexity is essential to better understand and reduce persistent inequalities.

From a clinical practice and health planning perspective, these findings support the need to move beyond generic recommendations and to implement more personalized and proactive preventive strategies. Identifying women at higher risk of non-adherence—based on social vulnerability, structural barriers, or limited engagement with the health care system—enables the implementation of targeted interventions, such as patient navigation, community outreach, and culturally tailored strategies, which have been shown to improve participation and equity across diverse settings[46–48].

Finally, the importance of generating context-specific evidence in underrepresented regions such as Latin America and Asia is underscored, where opportunistic and fragmented models predominate. In these settings, pragmatic studies suggest that low-cost, scalable interventions—such as active reminders, community engagement, and organized programs with systematic follow-up—can significantly improve screening adherence, provided they are integrated into systems capable of ensuring diagnostic and therapeutic continuity[8,22,47,48]. Taken together, these implications emphasize that maximizing the impact of mammography screening requires integrated approaches that align research, clinical practice, and health policies with social and structural contexts.

Conclusions

Understanding mammography screening as an expression of a broader preventive profile provides a unifying framework to interpret individual, social, and system-level determinants of adherence.

Available evidence shows that adherence to mammography screening cannot be understood as an isolated act, but rather as part of a broader preventive profile shaped by self-care behaviors, social determinants of health, and the organization of health care systems. Although mammography is an effective strategy for early detection of breast cancer, its population-level impact critically depends on sustained participation over time, continuity of care, and integration with other components of preventive health services. The inequalities observed in screening utilization reflect the complex interplay between individual, social, and structural factors, even in settings with broad formal coverage.

This review also highlights marked regional differences in the implementation and effectiveness of mammography screening, with clear advantages in high-income countries with organized and integrated programs, and greater challenges in Latin America and Asia, where heterogeneous and opportunistic models predominate. Addressing these gaps requires integrated approaches that go beyond the technical provision of screening, incorporate proactive and context-sensitive strategies, and strengthen the diagnostic–therapeutic continuum. In this regard, considering mammography as an indicator of overall preventive commitment offers a useful conceptual framework to guide future research, clinical interventions, and health policies aimed at improving equity and maximizing the impact of breast cancer screening.

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