

<https://doi.org/10.46344/JBINO.2025.v14i05.11>

GLOBAL PERSPECTIVES ON BREAST CANCER: A PUBLIC HEALTH CHALLENGE IN LOW- AND MIDDLE-INCOME COUNTRIES

*Emmanuel Ifeanyi Obeagu

Department of Biomedical and Laboratory Science, Africa University, Zimbabwe, E-mail: emmanuelobeagu@yahoo.com,
obeague@africau.edu, ORCID: 0000-0002-4538-0161

ABSTRACT

Breast cancer is the leading malignancy among women worldwide and a major contributor to cancer-related mortality. While survival has improved in high-income countries due to organized screening, timely treatment, and strong health systems, low- and middle-income countries (LMICs) continue to face rising incidence and disproportionately high mortality. Women in LMICs frequently present with advanced disease, reflecting barriers such as limited access to screening and diagnostics, financial constraints, sociocultural factors, and weak healthcare infrastructure. This narrative review examines the public health challenges of breast cancer in LMICs, emphasizing the roles of early detection, health education, health system strengthening, and policy interventions. By highlighting integrated strategies tailored to resource-limited settings, the review underscores the importance of coordinated efforts to reduce disparities, improve survival outcomes, and advance equitable breast cancer control globally.

Keywords: Breast cancer, Low- and middle-income countries, Public health, Early detection, Health systems

Introduction

Breast cancer is the most common malignancy among women globally and a leading cause of cancer-related mortality, accounting for approximately 2.3 million new cases and 685,000 deaths annually. While high-income countries (HICs) have experienced declines in mortality through organized screening, early detection, and advanced treatment, low- and middle-income countries (LMICs) continue to face rising incidence and disproportionately high mortality rates. In these settings, women often present with advanced-stage disease, reflecting systemic barriers to timely diagnosis and care [1-2]. Several interrelated factors contribute to the persistent disparity. Limited access to screening and diagnostic services, inadequate healthcare infrastructure, financial constraints, sociocultural beliefs, and low awareness all hinder early detection. Moreover, health system weaknesses—including shortages of trained oncology professionals, insufficient treatment facilities, and fragmented referral pathways—further exacerbate outcomes [3-4].

The global epidemiology of breast cancer underscores an urgent public health imperative: to reduce mortality and improve survival, LMICs require strategies that go beyond individual clinical care. Early detection through appropriate screening, public education to raise awareness, and supportive policy interventions to strengthen health systems are essential components of an effective response [5-6]. This narrative review provides a global perspective on breast cancer, focusing on the unique public

health challenges faced in LMICs. It examines the epidemiological patterns, barriers to early detection and treatment, and the potential of integrated strategies—combining screening, education, and policy—to reduce disparities and improve outcomes. By highlighting these issues, the review emphasizes the critical need for context-specific interventions that can strengthen health systems and enhance breast cancer control in resource-limited settings.

Epidemiology of Breast Cancer in LMICs

Breast cancer presents a complex epidemiological profile in low- and middle-income countries (LMICs), characterized by a rising incidence and disproportionately high mortality. Although historically considered a disease of high-income countries, shifts in demographics, urbanization, and lifestyle factors have driven significant increases in breast cancer cases across LMICs. Current estimates suggest that over half of new breast cancer diagnoses now occur in these regions, and mortality rates are considerably higher compared to high-income countries [7-8]. The patterns of disease in LMICs are distinct. Women often present at younger ages and with more advanced-stage tumors, which are associated with poorer prognoses. Factors contributing to this include limited access to organized screening programs, delayed health-seeking behaviors, and inadequate diagnostic infrastructure. Additionally, lifestyle and reproductive changes—such as delayed childbearing, reduced breastfeeding duration, rising obesity, and adoption of Westernized diets—are

increasingly recognized as drivers of breast cancer risk in these populations [9-10]. Socioeconomic disparities further shape the epidemiology. Urban populations may have slightly higher incidence due to better detection and exposure to lifestyle-related risk factors, whereas rural populations often experience higher mortality because of limited access to care. Health system limitations, such as shortages of trained oncologists, pathology services, and treatment facilities, compound these inequities and contribute to late-stage diagnoses [11-12].

Barriers to Early Detection and Diagnosis

Early detection of breast cancer is critical to improving survival, yet in low- and middle-income countries (LMICs), multiple barriers impede timely diagnosis. Women in these settings often present with advanced-stage disease, a reflection of intersecting structural, financial, and sociocultural challenges [13-14]. One of the most significant obstacles is the limited availability of screening services. Organized mammography programs, which have proven effective in high-income countries, are scarce in LMICs due to high costs, lack of equipment, and insufficient trained personnel. Rural areas are particularly disadvantaged, with diagnostic facilities concentrated in urban centers, leaving large portions of the population underserved. Even when screening is available, weak referral systems and fragmented healthcare infrastructure can delay follow-up and treatment, undermining the potential benefits of early detection [15-17].

Financial constraints also play a critical role. In many LMICs, out-of-pocket costs for screening, diagnostic procedures, and treatment are prohibitive, deterring women from seeking care. Health insurance coverage is often limited or nonexistent, and families may prioritize other urgent needs over preventive health services [18-19]. Sociocultural factors further compound these barriers. Stigma, fear of mastectomy, misconceptions about cancer, and limited awareness of breast health often prevent women from presenting early. In some communities, fatalistic beliefs or reliance on traditional healers delay engagement with formal health services. Additionally, gender norms and caregiving responsibilities can restrict women's mobility and access to care [20-21].

Health Education and Awareness

Health education is a pivotal strategy for addressing the delayed presentation of breast cancer in low- and middle-income countries (LMICs). While structural and financial barriers play a significant role, lack of knowledge and awareness about breast cancer symptoms, risk factors, and available services remains a major contributor to late-stage diagnosis. Education empowers women to recognize early warning signs, understand the importance of screening, and seek care promptly, thereby bridging the gap between available services and utilization [22-24]. Community-based education initiatives have proven particularly effective in LMICs, where formal health literacy may be limited. Grassroots programs, mobile outreach campaigns,

and survivor-led advocacy help disseminate culturally sensitive information, challenge stigma, and promote positive health behaviors. Breast self-examination (BSE) training and awareness of clinical breast examination (CBE) opportunities are often emphasized as cost-effective approaches to early detection in resource-limited settings [25].

Cultural considerations are critical to the success of these educational efforts. Programs that are tailored to local beliefs, delivered in native languages, and endorsed by community leaders achieve higher engagement and trust. Education that addresses fears, misconceptions, and fatalistic attitudes toward cancer can reduce barriers to care, encouraging women to participate in screening programs and pursue timely treatment [26]. Health education also strengthens communities by fostering dialogue, social support, and advocacy. As awareness spreads, women become informed participants in their own health, and communities collectively reinforce preventive behaviors and early detection practices. When combined with accessible screening services and supportive health policies, health education becomes a powerful tool in reducing breast cancer burden, improving early diagnosis, and ultimately enhancing survival outcomes in LMICs [27].

Treatment and Health System Challenges

Even when breast cancer is detected, effective treatment in low- and middle-income countries (LMICs) is often hindered by systemic health care limitations. Access to timely, high-quality treatment is constrained by shortages of oncology

specialists, inadequate surgical and radiotherapy facilities, and inconsistent availability of chemotherapy and essential medications. These deficiencies contribute to treatment delays, incomplete therapy, and suboptimal outcomes, exacerbating the already high mortality rates in these regions [28]. Financial barriers further limit access to care. With minimal health insurance coverage and high out-of-pocket costs, many women cannot afford the comprehensive treatment required for breast cancer, including surgery, chemotherapy, radiotherapy, and hormone therapy. Even when partial treatment is accessible, interruptions due to cost, travel, or lack of local infrastructure can compromise efficacy [29].

Geographic disparities compound these challenges. Specialized oncology services are typically concentrated in urban centers, leaving rural populations underserved. Women in remote areas face long travel distances, transportation costs, and logistical obstacles that delay or prevent treatment, often resulting in disease progression before care is received [30]. Additionally, the limited capacity for pathology and diagnostic services restricts accurate staging and tumor characterization, which are essential for selecting appropriate therapies. The shortage of trained healthcare personnel—including oncologists, radiologists, pathologists, and oncology nurses—further hampers the delivery of comprehensive care [31]. Addressing these challenges requires a multifaceted approach. Strengthening health systems through investment in infrastructure, workforce training, and decentralized treatment

services is essential. Policies that expand financial protection, such as subsidized care or universal health coverage, can reduce economic barriers. Integration of community-based education and early detection programs with treatment services ensures continuity of care, linking women from screening and diagnosis to effective therapy [32].

Policy and Global Health Perspectives

Policy interventions are essential to address the systemic barriers that limit effective breast cancer control in low- and middle-income countries (LMICs). While awareness campaigns, screening programs, and treatment initiatives are critical, their impact is often constrained without supportive policies that ensure accessibility, equity, and sustainability. National cancer control plans (NCCPs) provide a strategic framework for integrating prevention, early detection, diagnosis, treatment, and palliative care into cohesive health systems [33]. In many LMICs, policy gaps contribute to fragmented services, underfunded programs, and unequal access to care. Prioritizing breast cancer within national health agendas, allocating dedicated resources, and implementing legislation to reduce out-of-pocket costs are crucial steps in mitigating these disparities. Policies that support the decentralization of oncology services, expansion of diagnostic infrastructure, and training of specialized health personnel strengthen the system's capacity to deliver timely and effective care [34].

Global partnerships and advocacy also play a pivotal role in shaping policy landscapes. International organizations

such as the World Health Organization (WHO), the Union for International Cancer Control (UICC), and regional cancer networks provide technical guidance, facilitate knowledge exchange, and mobilize resources to support LMICs in implementing evidence-based interventions. Initiatives like WHO's Global Breast Cancer Initiative aim to reduce mortality by promoting early detection, access to treatment, and health system strengthening in resource-limited settings [35]. Moreover, policy approaches that address broader determinants of health—such as lifestyle factors, environmental exposures, and health literacy—complement clinical interventions. Tobacco control, obesity prevention, and promotion of physical activity, when integrated into national health policies, contribute to reducing the population-level risk of breast cancer.

Integrating Strategies for LMICs

Addressing the burden of breast cancer in low- and middle-income countries (LMICs) requires a comprehensive approach that integrates screening, education, treatment, and policy into a coordinated public health strategy. While each intervention is valuable on its own, their combined implementation produces a synergistic effect that can significantly reduce late-stage presentation, improve survival, and strengthen health systems [31]. Screening programs are most effective when coupled with community education. Awareness campaigns increase participation in clinical breast examinations (CBE) and mammography, counteract myths and stigma, and

motivate women to seek timely care. At the same time, supportive policies ensure that screening services are accessible, affordable, and linked to diagnostic and treatment facilities. Without such integration, screening alone may fail to reach underserved populations or translate into improved outcomes [32].

Education also reinforces policy objectives by fostering public demand for quality care and accountability. Informed communities advocate for accessible services, challenge inequities, and participate actively in health programs. Policies that embed education into schools, workplaces, and media platforms sustain awareness and normalize preventive behaviors over time [33]. Treatment capacity must also be integrated into this framework. Linking early detection programs with timely access to surgery, chemotherapy, and radiotherapy ensures that diagnosis leads to effective care. Coordination between community health workers, referral networks, and treatment facilities minimizes delays and strengthens continuity of care [34]. Successful examples from LMICs demonstrate the effectiveness of integrated strategies. Community-based education combined with affordable CBE screening, supported by government investment in treatment infrastructure, has improved early detection and survival in regions of India and sub-Saharan Africa. International partnerships further enhance capacity by providing technical assistance, training, and resources tailored to local contexts [35].

Conclusion

Breast cancer poses a growing public health challenge in low- and middle-income countries (LMICs), where rising incidence, late-stage presentation, and limited health system capacity contribute to disproportionately high mortality. The multifaceted nature of the problem requires integrated strategies that combine early detection, community education, accessible treatment, and supportive policy frameworks. Screening enables timely identification of disease, education empowers women and communities to seek care, treatment capacity ensures effective management, and policy interventions provide structural and financial support to sustain these efforts. Addressing the burden of breast cancer in LMICs is not solely a clinical challenge; it is a systemic and societal one. Coordinated approaches that link awareness, early detection, treatment, and policy strengthen health systems, reduce inequities, and improve survival outcomes. Global collaboration, local advocacy, and context-specific strategies are essential to ensure that interventions are equitable, culturally appropriate, and sustainable.

References

1. Arnold, M., Morgan, E., Rungay, H., Mafra, A., Singh, D., Laversanne, M., Vignat, J., Gralow, J. R., Cardoso, F., Siesling, S., & Soerjomataram, I. (2022). Current and future burden of breast cancer: Global statistics for 2020 and 2040. *Breast (Edinburgh, Scotland)*, 66, 15–23. <https://doi.org/10.1016/j.breast.2022.08.010>
2. Lei, S., Zheng, R., Zhang, S., Wang, S., Chen, R., Sun, K., Zeng, H., Zhou, J., & Wei, W. (2021). Global patterns of breast cancer

- incidence and mortality: A population-based cancer registry data analysis from 2000 to 2020. *Cancer communications (London, England)*, 41(11), 1183–1194. <https://doi.org/10.1002/cac2.12207>
3. Obeagu E. I. (2025). N2 Neutrophils and Tumor Progression in Breast Cancer: Molecular Pathways and Implications. *Breast cancer (Dove Medical Press)*, 17, 639–651. <https://doi.org/10.2147/BCTT.S542787>
 4. Obeagu, E. I., & Obeagu, G. U. (2024). Exploring the profound link: Breastfeeding's impact on alleviating the burden of breast cancer - A review. *Medicine*, 103(15), e37695. <https://doi.org/10.1097/MD.00000000000037695>
 5. Wheeler, S. B., Reeder-Hayes, K. E., & Carey, L. A. (2013). Disparities in breast cancer treatment and outcomes: biological, social, and health system determinants and opportunities for research. *The oncologist*, 18(9), 986–993. <https://doi.org/10.1634/theoncologist.2013-0243>
 6. Obeagu, E. I., & Obeagu, G. U. (2024). Lymphocyte infiltration in breast cancer: A promising prognostic indicator. *Medicine*, 103(49), e40845. <https://doi.org/10.1097/MD.00000000000040845>
 7. Obeagu, E. I., & Obeagu, G. U. (2024). Exploring neutrophil functionality in breast cancer progression: A review. *Medicine*, 103(13), e37654. <https://doi.org/10.1097/MD.00000000000037654>
 8. Bradley, C. J., Kitchen, S., Bhatia, S., Bynum, J., Darien, G., Lichtenfeld, J. L., Oyer, R., Shulman, L. N., & Sheldon, L. K. (2022). Policies and Practices to Address Cancer's Long-Term Adverse Consequences. *Journal of the National Cancer Institute*, 114(8), 1065–1071. <https://doi.org/10.1093/jnci/djac086>
 9. Obeagu E. I. (2025). Neutrophil-driven tumor inflammation in breast cancer: Pathways and therapeutic implications: A narrative review. *Medicine*, 104(25), e43024. <https://doi.org/10.1097/MD.00000000000043024>
 10. Gbenonsi, G. Y., Martini, J., & Mahieu, C. (2024). An analytical framework for breast cancer public policies in Sub-Saharan Africa: results from a comprehensive literature review and an adapted policy Delphi. *BMC public health*, 24(1), 1535. <https://doi.org/10.1186/s12889-024-18937-5>
 11. Espina, C., Soerjomataram, I., Forman, D., & Martín-Moreno, J. M. (2018). Cancer prevention policy in the EU: Best practices are now well recognised; no reason for countries to lag behind. *Journal of cancer policy*, 18, 40–51. <https://doi.org/10.1016/j.jcipo.2018.09.001>
 12. Obeagu E. I. (2025). The selenium paradox friend or foe in breast cancer? *Annals of medicine and surgery (2012)*, 87(9), 5569–5577. <https://doi.org/10.1097/MS9.00000000000003464>
 13. Obeagu, E. I., & Obeagu, G. U. (2025). Revolutionizing breast cancer monitoring: emerging hematocrit-based metrics - a narrative review. *Annals of medicine and surgery (2012)*, 87(6), 3327–3338. <https://doi.org/10.1097/MS9.00000000000003020>
 14. Shetty M. K. (2010). Screening for breast cancer with mammography: current status

- and an overview. *Indian journal of surgical oncology*, 1(3), 218–223. <https://doi.org/10.1007/s13193-010-0014-x>
15. Ponce-Chazarri, L., Ponce-Blandón, J. A., Immordino, P., Giordano, A., & Morales, F. (2023). Barriers to Breast Cancer-Screening Adherence in Vulnerable Populations. *Cancers*, 15(3), 604. <https://doi.org/10.3390/cancers15030604>
 16. Obeagu E. I. (2025). The nutritional equation: decoding diet's influence on breast cancer risk and progression - a perspective. *Annals of medicine and surgery* (2012), 87(9), 5528–5534. <https://doi.org/10.1097/MS9.00000000000003612>
 17. Gbenonsi, G. Y., Martini, J., & Mahieu, C. (2024). An analytical framework for breast cancer public policies in Sub-Saharan Africa: results from a comprehensive literature review and an adapted policy Delphi. *BMC public health*, 24(1), 1535. <https://doi.org/10.1186/s12889-024-18937-5>
 18. Obeagu, E. I., & Maibouge Tanko, M. S. (2025). Iron metabolism in breast cancer: mechanisms and therapeutic implications: a narrative review. *Annals of medicine and surgery* (2012), 87(6), 3403–3409. <https://doi.org/10.1097/MS9.00000000000003173>
 19. Wilkinson, L., & Gathani, T. (2022). Understanding breast cancer as a global health concern. *The British journal of radiology*, 95(1130), 20211033. <https://doi.org/10.1259/bjr.20211033>
 20. Obeagu E. I. (2025). Thromboinflammatory pathways in breast cancer: clinical and molecular insights into venous thromboembolism risk - a narrative review. *Annals of medicine and surgery* (2012), 87(9), 5822–5828. <https://doi.org/10.1097/MS9.00000000000003644>
 21. Kitaw, T. A., Tilahun, B. D., Zemariam, A. B., Getie, A., Bizuayehu, M. A., & Haile, R. N. (2025). The financial toxicity of cancer: unveiling global burden and risk factors - a systematic review and meta-analysis. *BMJ global health*, 10(2), e017133. <https://doi.org/10.1136/bmjgh-2024-017133>
 22. Obeagu, E. I., & Obeagu, G. U. (2024). Predictive models and biomarkers for survival in stage III breast cancer: a review of clinical applications and future directions. *Annals of medicine and surgery* (2012), 86(10), 5980–5987. <https://doi.org/10.1097/MS9.00000000000002517>
 23. Bhatia, S., Landier, W., Paskett, E. D., Peters, K. B., Merrill, J. K., Phillips, J., & Osarogiagbon, R. U. (2022). Rural-Urban Disparities in Cancer Outcomes: Opportunities for Future Research. *Journal of the National Cancer Institute*, 114(7), 940–952. <https://doi.org/10.1093/jnci/djac030>
 24. Malope, S. D., Norris, S. A., & Joffe, M. (2024). Culture, community, and cancer: understandings of breast cancer from a non-lived experience among women living in Soweto. *BMC women's health*, 24(1), 594. <https://doi.org/10.1186/s12905-024-03431-2>
 25. Sítima, G., Galhardo-Branco, C., & Reis-Pina, P. (2024). Equity of access to palliative care: a scoping review. *International journal for equity in health*, 23(1), 248. <https://doi.org/10.1186/s12939-024-02321-1>
 26. Kreuter, M. W., Thompson, T., McQueen, A., & Garg, R. (2021). Addressing Social Needs in Health Care Settings: Evidence, Challenges, and Opportunities for Public

- Health. *Annual review of public health*, 42, 329–344. <https://doi.org/10.1146/annurev-publhealth-090419-102204>
27. Aslam, A., Mustafa, A. G., Hussnain, A., Saeed, H., Nazar, F., Amjad, M., Mahmood, A., Afzal, A., Fatima, A., & Alkhalidi, D. K. (2024). Assessing Awareness, Attitude, and Practices of Breast Cancer Screening and Prevention Among General Public and Physicians in Pakistan: A Nation With the Highest Breast Cancer Incidence in Asia. *International journal of breast cancer*, 2024, 2128388. <https://doi.org/10.1155/2024/2128388>
 28. Alrosan, A. Z., Alwidyan, T., Heilat, G. B., Rataan, A. O., Madae'en, S., Alrosan, K., Awwad, F. S., & Ali, T. (2025). Knowledge and awareness of breast cancer signs and symptoms among Jordanian women. *Future science OA*, 11(1), 2510871. <https://doi.org/10.1080/20565623.2025.2510871>
 29. Turkson-Ocran, R. N., Nkimbeng, M., Erol, D., Hwang, D. A., Aryitey, A. A., & Hughes, V. (2022). Strategies for Providing Culturally Sensitive Care to Diverse Populations. *Journal of Christian nursing : a quarterly publication of Nurses Christian Fellowship*, 39(1), 16–21. <https://doi.org/10.1097/CNJ.0000000000000900>
 30. Wakefield, M. A., Loken, B., & Hornik, R. C. (2010). Use of mass media campaigns to change health behaviour. *Lancet (London, England)*, 376(9748), 1261–1271. [https://doi.org/10.1016/S0140-6736\(10\)60809-4](https://doi.org/10.1016/S0140-6736(10)60809-4)
 31. AlMutawah, K., Taqi, G., Radhwan, S., AlMutairi, A., AlHussainan, A., Faraj, M., & AlBaloul, A. H. (2025). Knowledge and awareness of breast cancer symptoms, risk factors, and screening barriers among women in Kuwait: a cross-sectional study. *BMC women's health*, 25(1), 448. <https://doi.org/10.1186/s12905-025-03994-8>
 32. Gbenonsi, G. Y., Martini, J., & Mahieu, C. (2024). An analytical framework for breast cancer public policies in Sub-Saharan Africa: results from a comprehensive literature review and an adapted policy Delphi. *BMC public health*, 24(1), 1535. <https://doi.org/10.1186/s12889-024-18937-5>
 33. Al Hasan, S. M., Bennett, D. L., & Toriola, A. T. (2025). Screening programmes and breast cancer mortality: an observational study of 194 countries. *Bulletin of the World Health Organization*, 103(8), 470–483. <https://doi.org/10.2471/BLT.24.292529>
 34. Iqbal J. (2025). Women-Centric Breast Cancer Care in Low- and Middle-Income Countries: Challenges, Solutions, and a Roadmap for Equity. *Cancer control : journal of the Moffitt Cancer Center*, 32, 10732748251378804. <https://doi.org/10.1177/10732748251378804>
 35. Caldwell, H. A. T., Yusuf, J., Carrea, C., Conrad, P., Embrett, M., Fierlbeck, K., Hajizadeh, M., Kirk, S. F. L., Rothfus, M., Sampalli, T., Sim, S. M., Tomblin Murphy, G., & Williams, L. (2024). Strategies and indicators to integrate health equity in health service and delivery systems in high-income countries: a scoping review. *JBIM evidence synthesis*, 22(6), 949–1070. <https://doi.org/10.11124/JBIES-23-00051>

