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Epidemiological Linkages Between Hypertension and Breast Cancer Among African Women

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ABSTRACT

Breast cancer and hypertension are two of the most prevalent non-communicable diseases affecting African women, with rising incidence and substantial public health impact. Emerging evidence suggests these conditions share epidemiological linkages, including overlapping risk factors, co-morbidity patterns, and complex biological interactions. Lifestyle behaviors such as obesity, physical inactivity, unhealthy diets, and alcohol consumption, along with hormonal, reproductive, and socioeconomic determinants, contribute to both diseases and their co-occurrence. Hypertension may increase susceptibility to breast cancer, while breast cancer treatments can exacerbate cardiovascular risks, complicating clinical management. Despite these interactions, data from African populations remain limited, and integrated care strategies are rarely implemented. This review examines the shared determinants, prevalence trends, co-morbidity patterns, and public health implications of hypertension and breast cancer among African women. Understanding these linkages is crucial for developing culturally appropriate prevention, early detection, and integrated management approaches that improve outcomes, reduce morbidity and mortality, and strengthen healthcare systems in resource-limited African contexts.

Keywords: Breast cancer**,** Hypertension**,** Co-morbidity**,** African women**,** Risk factors**,** non-communicable diseases.

INTRODUCTION

Breast cancer has emerged as one of the most significant public health challenges worldwide, and it continues to account for the highest incidence and mortality rates among cancers affecting women [1]. Globally, breast cancer constitutes about 24% of all new cancer cases among women and is the leading cause of cancer-related deaths. In Africa, the burden of breast cancer has grown considerably over the past few decades, partly due to demographic transitions such as population growth, increasing life expectancy, and rapid urbanization [2]. Sub-Saharan Africa, in particular, has experienced a rising incidence of breast cancer, often coupled with delayed diagnosis, limited screening infrastructure, and inadequate treatment capacity. Unlike in high-income countries, where early detection programs and improved therapies have reduced mortality rates, many African women still present with advanced stages of breast cancer, which significantly reduces survival outcomes [3].

At the same time, hypertension, commonly referred to as high blood pressure has reached epidemic proportions in Africa. The World Health Organization (WHO) estimates that the prevalence of hypertension in Sub-Saharan Africa is the highest globally, with nearly one in three adults affected. This growing prevalence is closely associated with lifestyle modifications driven by urbanization, including increased consumption of processed foods rich in salt and fat, reduced levels of physical activity, alcohol consumption, and tobacco use [4]. In addition, genetic predisposition and poor access to regular health screenings exacerbate the prevalence of uncontrolled hypertension in African populations. Hypertension is not only a major risk factor for cardiovascular diseases but also has emerging associations with cancer outcomes, including breast cancer [5].

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The coexistence of breast cancer and hypertension among women in Africa introduces unique challenges to clinical care, disease management, and overall health outcomes. Evidence suggests that hypertension may influence both the incidence and prognosis of breast cancer. Some studies indicate that hypertensive women are at higher risk of developing breast cancer due to shared risk factors such as obesity, hormonal imbalances, and metabolic dysfunctions [6]. Moreover, hypertension may complicate the management of breast cancer since many chemotherapeutic agents and hormonal therapies have cardiovascular side effects that could worsen pre-existing hypertension. This dual burden of disease not only affects the quality of life of patients but also strains already overstretched healthcare systems in African countries [7]. Therefore, examining the epidemiological intersections between hypertension and breast cancer in African women is essential for understanding the magnitude of the problem and guiding appropriate interventions. This review focuses on identifying shared risk factors, exploring the prevalence and co-morbidity patterns, and highlighting implications for public health strategies [8]. Although both breast cancer and hypertension are independently recognized as critical public health issues, the interaction between these two conditions remains underexplored, particularly within the African context. Research from high-income countries suggests that hypertension may increase breast cancer risk and negatively influence treatment outcomes [9]. However, there is limited region-specific data from Africa to establish the nature and magnitude of these associations. Most available studies in Africa tend to focus on either breast cancer or hypertension in isolation, without addressing their possible coexistence and combined impact on women's health [10].

The problem is compounded by the structural limitations of healthcare systems in many African countries. Early detection services for breast cancer are often inadequate, leading to late-stage diagnoses, while hypertension is frequently underdiagnosed and poorly managed. As a result, women living with both conditions face poorer outcomes due to delayed recognition, limited treatment options, and the absence of integrated care models that address both cancer and cardiovascular health [11]. Furthermore, the presence of shared risk factors such as obesity, unhealthy diets, physical inactivity, and hormonal influences suggests that the coexistence of breast cancer and hypertension may not be coincidental but rather interconnected. Without a clear understanding of how these conditions interact epidemiologically, policymakers and healthcare providers may fail to design comprehensive prevention and treatment strategies [12]. Thus, there is a pressing need to explore the epidemiological intersections of hypertension and breast cancer among African women, not only to improve clinical care but also to inform public health policy and resource allocation. This review aims to explore the intersection of breast cancer and hypertension among African women, focusing on epidemiology, shared risk factors, co-morbidity trends, and implications for clinical management and public health. The study's specific objectives include examining the prevalence and patterns of both conditions, identifying risk factors that predispose women to these diseases, assessing co-morbidity trends, evaluating the effects of coexisting breast cancer and hypertension on treatment outcomes, and highlighting research gaps to inform integrated prevention and management strategies. Guided by research questions, the review seeks to determine current epidemiological trends, identify shared risk factors such as obesity, sedentary lifestyles, and dietary habits, assess the prevalence of co-morbidity, examine the clinical and public health consequences of managing breast cancer in hypertensive women, and explore strategies for integrated prevention, diagnosis, and treatment within African health systems. The study is significant because it addresses knowledge gaps on the dual burden of breast cancer and hypertension in African contexts, providing evidence-based insights for healthcare providers, researchers, and policymakers. Understanding shared risk factors can inform health promotion campaigns targeting both cancer and cardiovascular disease prevention, while insights into treatment interactions can guide clinicians in delivering safer, coordinated care for hypertensive cancer patients. From a policy perspective, the findings can inform resource allocation, suggesting integrated screening and management programs to optimize efficiency in resource-limited African health systems. Moreover, by focusing on African women, the review contributes regionally relevant evidence that accounts for local demographic, lifestyle, and healthcare system contexts, unlike much existing literature derived from high-income countries. Overall, this study emphasizes the importance of context-specific research to improve prevention, diagnosis, and management of these prevalent non-communicable diseases, ultimately aiming to enhance health outcomes and reduce the growing burden on African women.

Lifestyle and Behavioral Factors

Hypertension and breast cancer are significantly influenced by modifiable lifestyle and behavioral factors, making prevention through health promotion a critical strategy. Key contributors include obesity, physical inactivity, unhealthy dietary patterns, and excessive alcohol consumption. Urbanization and the nutritional transition across African cities, including many regions in sub-Saharan Africa, have led to widespread adoption of diets high in salt, saturated fats, and processed foods, while traditional diets rich in fruits, vegetables, and fiber have declined [13]. This shift has contributed to rising body mass index (BMI) levels, particularly among women, which is strongly

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associated with both hypertension and certain types of breast cancer, especially postmenopausal breast cancer. Physical inactivity further compounds these risks. Sedentary lifestyles, often driven by urban living, office-based work, and limited access to recreational facilities, reduce cardiovascular fitness and metabolic regulation, increasing susceptibility to hypertension. Similarly, inadequate physical activity contributes to hormonal imbalances and chronic inflammation, which are recognized risk factors for breast cancer development. Alcohol consumption, particularly in urban populations, is another modifiable risk factor. Excessive intake not only elevates blood pressure but also influences estrogen metabolism, thereby increasing breast cancer risk [14]. Collectively, these lifestyle and behavioral factors underscore the need for targeted public health interventions that promote healthy diets, regular physical activity, weight management, and moderate alcohol use to reduce the dual burden of hypertension and breast cancer among African women.

Hormonal and Reproductive Health

Reproductive and hormonal factors play a critical role in the risk and progression of both breast cancer and hypertension. Early menarche, late onset of menopause, nulliparity (having no childbirths), and the use of hormonal contraceptives have all been identified as established risk factors for breast cancer [15]. These factors influence cumulative exposure to endogenous and exogenous estrogens, which can promote breast tissue proliferation and contribute to carcinogenesis. Similarly, hormonal fluctuations affect cardiovascular physiology. Estrogen, for example, exerts vasodilatory effects, improves lipid profiles, and modulates endothelial function. As a result, changes in estrogen levels across a woman's reproductive life course can impact blood pressure regulation. Postmenopausal women, in particular, exhibit increased vulnerability to both breast cancer and hypertension due to the decline in protective estrogen levels. The loss of estrogen not only facilitates the development of vascular stiffness and increased peripheral resistance, contributing to hypertension, but also alters metabolic and inflammatory pathways that may promote tumor growth [16]. Additionally, reproductive history interacts with other lifestyle and genetic factors, further influencing disease risk. Understanding these hormonal and reproductive determinants is essential for identifying at-risk populations, informing preventive strategies, and integrating screening approaches that simultaneously address cardiovascular and oncological health in women.

Socioeconomic Determinants

Socioeconomic factors play a critical role in shaping the risk, detection, and management of both hypertension and breast cancer among African women. Poverty remains a major determinant, limiting access to nutritious foods, safe housing, and quality healthcare services, which are essential for the prevention and early detection of these conditions. Women in low-income households often face challenges in seeking timely medical care due to the costs associated with clinic visits, diagnostic tests, and long-term treatment, resulting in delayed diagnosis and poorer health outcomes [17]. Limited access to preventive healthcare services, including routine blood pressure monitoring, mammography, and health screenings, further compounds the burden of disease. Many women reside in areas where health facilities are sparse, under-resourced, or located far from their communities, creating logistical and financial barriers to care. Additionally, gaps in health literacy hinder the recognition of early warning signs and reduce adherence to lifestyle modifications and treatment regimens. Urbanization and rapid socioeconomic changes in African countries expose women to risk environments characterized by sedentary lifestyles, dietary shifts toward high-calorie processed foods, and increased stress levels, all of which contribute to hypertension and elevate the risk of breast cancer. These intertwined socioeconomic determinants underscore the need for targeted interventions that address poverty, improve access to preventive services, and enhance health education to mitigate disease risk and improve outcomes for African women [18].

Co-morbidity Patterns

Emerging evidence from both African and global studies indicates a notable co-occurrence of hypertension and breast cancer among women, suggesting potential interactions between these conditions. Women with hypertension appear to have an increased risk of developing breast cancer, particularly hormone receptor-positive subtypes, though the mechanisms underlying this association remain under investigation [19]. Factors such as chronic inflammation, hormonal imbalances, and metabolic changes related to hypertension may contribute to an environment conducive to breast tumor development. Furthermore, certain antihypertensive medications, including diuretics and calcium channel blockers, have been examined for possible links to breast cancer risk. While some studies suggest potential associations, the findings are inconsistent and inconclusive, highlighting the need for further research. On the other hand, breast cancer survivors frequently develop hypertension as a comorbidity, which may be pre-existing or arise as a consequence of cancer treatment. Chemotherapy, hormone therapy, and radiation can all influence cardiovascular function, increasing blood pressure and long-term cardiovascular risk. Recognizing

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these co-morbidity patterns is critical for designing integrated care strategies that address both cancer management and cardiovascular health, ensuring better outcomes for affected women [20].

Prevalence Trends in Africa

Hypertension and breast cancer represent significant and growing public health concerns across Africa, particularly among women. Hypertension prevalence among African women ranges from 25% to over 40%, with higher rates observed in urban populations and older age groups. Rapid urbanization, sedentary lifestyles, unhealthy dietary patterns, and limited access to preventive healthcare services contribute to this rising burden [21]. Uncontrolled hypertension increases the risk of cardiovascular complications, which can further complicate the management of other chronic conditions. Breast cancer incidence also varies across the continent but is notably increasing in urban centers where lifestyle and reproductive risk factors, such as obesity, delayed childbirth, and reduced breastfeeding, are more prevalent. In many regions, late-stage presentation, limited screening programs, and inadequate access to diagnostic and treatment facilities exacerbate mortality rates. Emerging evidence suggests a dual burden in which hypertension frequently coexists with breast cancer, although comprehensive data on co-prevalence remain limited. This overlap poses significant challenges for clinical management, as hypertension can influence treatment options, increase the risk of adverse events, and affect survival outcomes. Understanding these trends is essential for developing integrated healthcare strategies targeting both conditions [22].

Public Health Implications

The observed epidemiological association between hypertension and breast cancer highlights an urgent need for integrated non-communicable disease (NCD) strategies, particularly in African settings where healthcare resources are often limited. Both conditions share common risk factors, including obesity, sedentary lifestyles, and poor dietary habits, making it essential to implement coordinated prevention and management approaches. Screening programs should be designed to concurrently identify women at risk for hypertension and breast cancer, especially at the primary care level and within community outreach initiatives. Early detection campaigns, including regular blood pressure monitoring and breast health assessments, can facilitate timely intervention, improve treatment outcomes, and reduce the burden of disease. Lifestyle modification programs promoting physical activity, balanced nutrition, and reduced alcohol consumption are vital for mitigating risk factors for both conditions [23]. Strengthening health systems to effectively manage comorbidities, ensuring access to affordable medications, and training healthcare providers on integrated care approaches will enhance patient outcomes. By addressing hypertension and breast cancer together, public health initiatives can reduce mortality, improve the quality of life for women, and contribute to sustainable health improvements across African populations.

Future Directions

Future research and policy efforts are essential to deepen the understanding and improve the management of the intersection between hypertension and breast cancer, particularly among African populations. Longitudinal studies are needed to clarify causal relationships and temporal associations between hypertension and the development or progression of breast cancer, providing stronger evidence for targeted interventions [24]. In addition, research exploring genetic predispositions and environmental interactions specific to African women will be critical, as such factors may differ significantly from those in other populations, influencing both disease risk and treatment outcomes. From a public health perspective, integrated policies that address lifestyle-related risk factors, including diet, physical activity, and reproductive health, can help mitigate the dual burden of hypertension and breast cancer. Preventive strategies should be culturally appropriate and accessible, targeting high-risk groups while promoting overall health. Moreover, the establishment of collaborative frameworks between oncology and cardiovascular care is essential for holistic patient management. Such interdisciplinary approaches can improve screening, early detection, and treatment outcomes, ensuring that women receive comprehensive care that addresses both chronic conditions simultaneously. Prioritizing research, policy, and clinical collaboration will strengthen healthcare systems and reduce the morbidity and mortality associated with these coexisting conditions in African populations [25].

CONCLUSION

Hypertension and breast cancer represent significant and interrelated public health challenges among African women, with both conditions rising in prevalence due to lifestyle, hormonal, reproductive, and socioeconomic factors. Evidence indicates that these diseases share common risk factors, including obesity, physical inactivity, unhealthy diets, and hormonal influences, contributing to co-morbidity and complicating clinical management. Hypertension may increase susceptibility to breast cancer, while breast cancer treatment can exacerbate cardiovascular risks, underscoring the need for integrated care approaches. The dual burden of these conditions poses challenges for early detection, treatment, and overall health outcomes, particularly in resource-limited African

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healthcare settings. Addressing this intersection requires context-specific strategies, including longitudinal research to clarify causal links, culturally tailored public health interventions, and collaborative frameworks between oncology and cardiovascular care. By prioritizing integrated prevention, screening, and management, policymakers and healthcare providers can reduce morbidity and mortality, improve quality of life, and strengthen health systems to more effectively respond to the dual burden of hypertension and breast cancer among African women.

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