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Systematic Analysis of Factors Associated with Late Breast Cancer Screening in Women in Sub-Saharan Africa from 2014 to 2020

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Abstract

Research background: Breast cancer remains a major public health problem, with a high number of new cases and deaths each year. However, despite advances in research to improve this disease, there is a high rate of late detection, leading to diagnosis at an advanced stage and a reduced chance of survival. **Objective**: The aim of this study is to identify the factors associated with late detection of breast cancer in women in Sub-Saharan Africa from 2014 to 2020.Setting: This systematic review focuses on sub-Saharan Africa. **Methods**: We searched for articles in four databases (PubMed, Embase, Global-Health and CINAHL) between 2014 and 2020 and performed a narrative synthesis to organize and group the different factors associated with late breast cancer detection. **Result**: After reviewing 583 publications, 6 studies were selected, highlighting factors such as lack of awareness, knowledge gaps, difficulties in accessing health services and financial constraints associated with late breast cancer screening. The participants, who ranged in number from 20 to 1776, were mainly aged between 18 and 25, with a mean age of 25 years and 6 months. **Conclusion**: The analysis enabled us to identify various factors associated with late breast cancer screening. Collaboration between health professionals, community organizations and policy-makers is essential to foster an environment conducive to the prevention and early detection of breast cancer.

Keywords

Associated Factors, Late Screening, Breast Cancer, Women, Sub-Saharan Africa

1. Introduction

Breast cancer is the leading cancer in women in terms of incidence and mortality [1]. It ranks first among female cancers, surpassing cervical cancer, and poses a major public health issue in Africa and countries without cancer registries [2]. The prognosis of this disease is closely linked to the stage of diagnosis, and it is often detected at an advanced stage, resulting in poor outcomes [1] [2]. According to the World Health Organization, the incidence and mortality of breast cancer have continuously increased over the years in certain African countries [2]. The mortality-to-incidence ratio of breast cancer in low-income countries (LICs) is three times higher than in high-income countries [2] [3]. This highlights the growing burden of breast cancer in LICs.

Over the past decade, significant and increasingly efficient and reliable diagnostic means have been developed, ranging from early detection to the identification of infraclinical lesions [3]. Mammography (MMG), clinical breast examination, and breast self-examination are three widely practiced screening tests, with MMG being recommended as the standard screening test worldwide [4].

These diagnostic advancements have significantly improved the prognosis in developed countries [3]. However, in sub-Saharan Africa, 70% of diagnosed cases are at late stages, posing challenges for therapeutic management [1] [3]. The majority of women tend to seek medical treatment at the advanced stages of cancer. This delay leads to tumor enlargement, complicated treatment, and ultimately premature mortality [4].

Given such statistics, early breast cancer screening is an effective strategy to reduce the impact of this disease. It helps preserve the quality of life and avoids significant healthcare expenses [5]. To understand the factors associated with late screening, it is crucial to identify the reasons that hinder screening intentions. These reasons may include fear, lack of awareness, knowledge, and diagnosis, as well as difficulties in access and financial constraints [4] [6]. In the present study, we aim to identify factors associated with late breast cancer screening in women by examining individual, sociocultural, and systemic aspects.

2. Materials and Methods

The protocol for this systematic review was registered in the International Prospective Register of Systematic Reviews under the number CRD42023425821. An ethics statement was not required because this study is based solely on published research.

2.1. Selection Criteria

To obtain a well-defined, clear, targeted, and precise research question, we adopted the PICO(S) strategy (Population, Intervention, Comparator, Outcome, Time, and Setting) for the search, using the following criteria:

- P (Population): “woman”, “female”
- I (Intervention): “breast cancer”, “laboratory proficiency testing”
- C (Comparator): not applicable

- O (Outcome): "early detection of breast cancer", "early breast cancer detection", "early breast cancer screening"
- S (Setting): "sub-Saharan Africa", "Africa south of the Sahara"

Eligible studies had to meet the following criteria: they had to be research studies written in English or French; report information on women; use a qualitative, quantitative, or mixed methods approach; focus on the period from January 2014 to December 2020 (to observe the trend of breast cancer incidence); be limited to sub-Saharan Africa; and specifically address late breast cancer screening. Review articles, conference abstracts, and studies solely focusing on patients diagnosed with breast cancer were excluded.

2.2. Research Methods for Study Identification

Three independent investigators (HT, NB, and AK) conducted the search in online databases, study selection, data extraction, and critical analysis. On February 5, 2022, these investigators consulted the electronic bibliographic databases Embase, Medline (PubMed), Global-Health, and CINAHL without any publication date restrictions. We developed a search strategy using a combination of free-text and Medical Subject Heading terms for breast cancer, late screening, and women.

After independently conducting the initial selection based on title and abstract, we initially retained a total of 583 documents. After removing all duplicates, we examined the study titles and reviewed a list of relevant articles to find additional publications. We resolved any disagreements regarding inclusion through a discussion involving all investigators.

We individually extracted data from each study that met the criteria. The use of forms ensured that data extraction was consistent for all studies because the extracted data were used to synthesize the results. Thus, for each study, we extracted the following data: 1) the name of the first author, 2) the year of publication, 3) the country in which the study was conducted, 4) the location where the study was conducted, 5) the study design, 6) the characteristics of the participants, and 7) the main results. Regarding the main results, only information from the participants and factors associated with late breast cancer screening were considered.

2.3. Data Summary

For this step, we used a technique based on a narrative approach, employing a narrative synthesis following Petticrew and Roberts [7]. This technique involves three steps. The first is organizing studies into logical categories. In this systematic review, we grouped the studies based on their focus on breast cancer in women and factors associated with late screening. The second step was a narrative description of each study, and the third was an assessment of study quality, following Petticrew and Roberts' guidelines.

We conducted a general summary of the study results and used the socioecological model to categorize the different factors identified. The socioecological model is a framework that examines the effects and interrelation of environmental, contextual, and social factors on individual behavior [7] [8]. It allows for

a more comprehensive approach by including multiple levels of influence on health outcomes and behaviors [8].

2.4. Quality Assessment

We used the Mixed Methods Appraisal Tool (MMAT) to assess the methodological quality of the studies included in the systematic review. This allowed us to identify the strengths and weaknesses of the studies as well as the implications of the review's conclusions and recommendations.

Steps in the Implementation of MMAT

Step 1: Study Selection.

Studies meeting the criteria were selected and included in the systematic review.

Step 2: Quality Assessment.

Once the studies were selected, the investigators used the MMAT to assess the methodological quality of each study. This evaluation focused on four specific domains of each study: study design, data collection, data processing and analysis, and integration of results.

Step 3: **Assigning Scores.**

For each evaluated domain, we gave a score to each study to indicate the level of methodological quality achieved. The scores ranged from 1 (low) to 3 (high). The evaluated domains included study design (score of 1 to 3), data collection (score of 1 to 2), data processing and analysis, and integration of results (score of 1).

Step 4: **Synthesis of Results**.

Once all the studies were assessed using the MMAT, we calculated the overall quality of the studies included in the systematic review by summing up the scores obtained.

3. Results

Ultimately, we evaluated studies for their methodological quality and inclusion in the analysis. An organizational chart illustrating the selection process is presented below (Figure 1). Of the six studies included in the review, one was from Kenya, one from a rural community in South Africa, one from Ethiopia, two from Ghana, and one from Uganda.

Two of these studies were conducted using a qualitative method whereas the other four were conducted using a quantitative method. Table 1 below provides a brief overview of the main characteristics of the included studies.

Participants

Of the six studies, one was qualitative, four were nonrandomized quantitative studies, and one was a descriptive quantitative study. The number of participants in the six studies ranged from 20 to 1776. The most represented age group was 18 to 25 years, with an average age of 25 years and 6 months (see Table 1).

Quality Assessment Results

A total of five studies received a score of 7/7, one received a score of 6/7 (see Table 2).

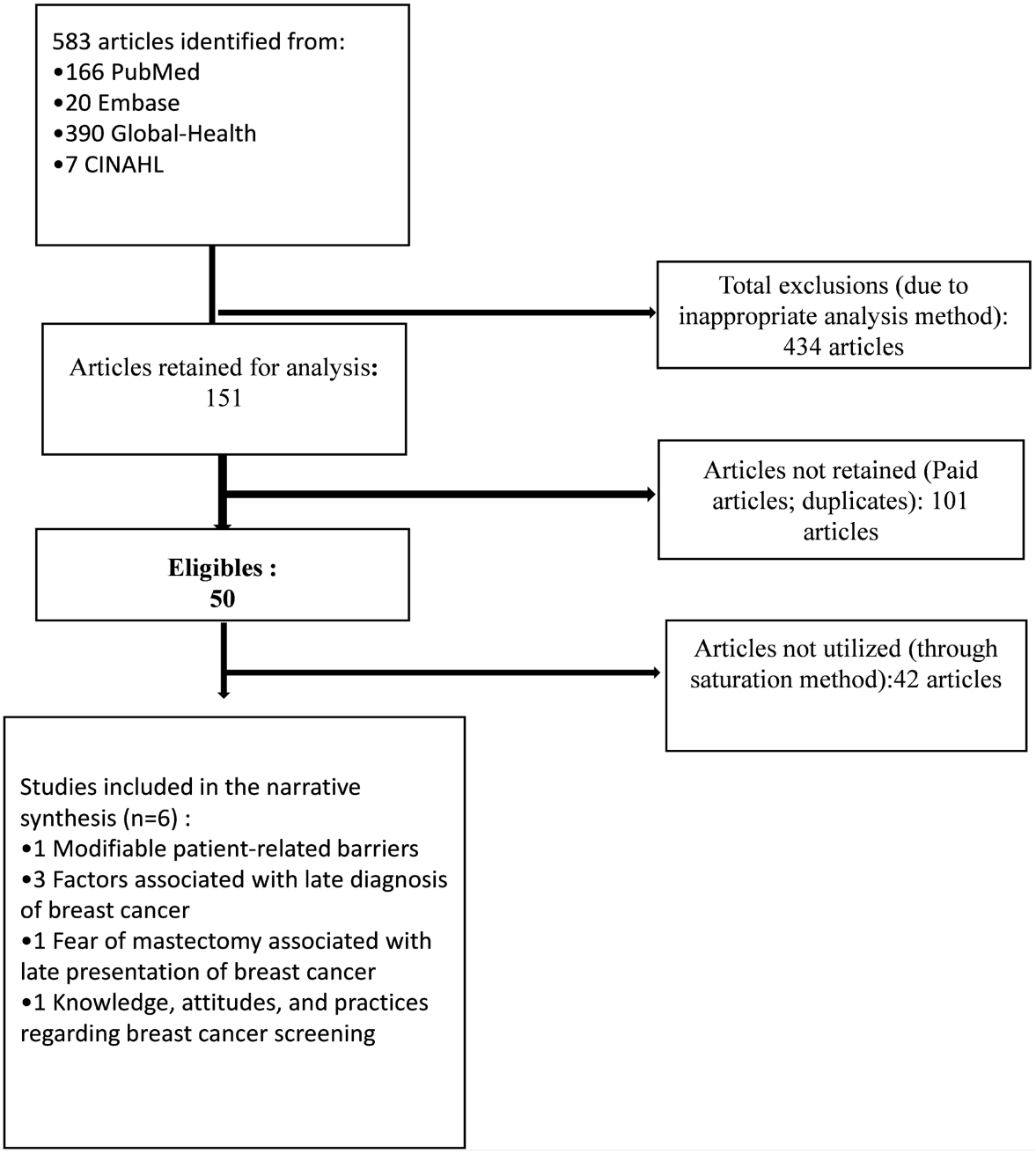

Figure 1. Flow diagram for the identification and selection of articles included in this review.

Table 1. Literature review summary.

Topics addressed	Participants	Study type	Data analysis	Main results
Factors associated with late diagnosis of breast cancer among women in Addis Ababa, Ethiopia [20]	441 women with invasive breast cancer	Quantitative study	Multivariable Poisson regression model	The prevalence of advanced-stage disease was significantly higher among women who used traditional medicine before confirmation of the diagnosis (adjusted prevalence ratio [aPR] = 1.31; p = 0.001), experienced a delay of > 3 months (aPR = 1.16; p = 0.042), and had a diagnostic delay of > 2 months (aPR = 1.24; p = 0.004). However, it was lower among women with a history of breast self-examination (aPR = 0.77; p = 0.021).

Continued

Fear of mastectomy associated with late presentation of breast cancer among Ghanaian women [21]	31 women with breast cancer	Quantitative study	-Principles of Grounded Theory methodology. -Interviews transcribed, coded, and organized using NVivo.	-Average duration of delay—Recurring themes related to late presentation: 1. Fear that a mastectomy would lead to a decrease in sexuality and femininity 2. Limited knowledge about breast cancer 3. Belief that a painless breast lump is not associated with breast cancer 4. Role of the church as a social support system 5. Financial reasons contributing to delayed presentation and treatment
Knowledge, attitudes, and practices regarding breast cancer screening in a rural community in South Africa [22]	150 women with breast cancer	Quantitative study	Descriptive analysis	-The mean age of participants was 41.6 with a range of 30 to 65 years. -One hundred and four (69%) of the women had never heard of breast cancer. -33 (22%) agreed and 7 (4.7%) strongly agreed with the statement that treatment worsens the disease. -One hundred and forty-two (94%) of the women reported never having undergone breast cancer screening.
Understanding the causes of breast cancer treatment delays at a teaching hospital in Ghana [23]	20 women with breast cancer	Qualitative study	-transcribed interviews -analysis using the thematic approach (Attride-Stirling, 2001) -analysis guided by a coding framework comprising two sections: 1) a section of pre-existing deductive codes derived from previous studies on the causes of delay in breast cancer treatment, 2) an open section of deductive codes on the causes of delay in breast cancer treatment.	The three main categories of causes of delay in cancer treatment are: - Patient-related factors (misinterpretation of symptoms, fear) - Healthcare provider-related factors (negative attitudes) - Health system-related factors (shortage of medications)
Patient-related modifiable barriers and their association with breast cancer detection practices among Ugandan women without breast cancer diagnosis [18]	401 women with no personal history of breast cancer	Quantitative study	binomial regression to adjust group comparisons of urban/rural and age results -differences were presented as probability differences (PD) -standard errors were calculated using a robust sandwich estimator -number of barrier types compared between groups using Wilcoxon rank sum test	-median age of participants: 38. -most frequently identified barriers to early diagnosis: -lack of knowledge about early diagnosis (79%), -economic barriers to accessing care (68%), -fear (37%), lack of social support (24%). However, only women who reported lack of knowledge as a modifiable barrier were less likely to participate in cancer detection practices ($p < 0.05$). Women who had received prior breast cancer education ($p < 0.001$) and/or practised BSE ($p = 0.02$) were more likely to know where to go for breast diagnostic assessment.
Obstacles to the adoption of breast cancer screening in Kenya [24]	733 women with no personal history of breast cancer	Quantitative study	-Descriptive analyses with SAS version 9.3 and STATA version 11.0. -bivariate analysis of potential differences between those who had heard of the screening event and those who had not.	-median age: 33 years, IQR = 26-43. reasons for not attending the screening event: -personal factors, including a busy schedule (41.0%), -perceived low personal risk (12.7%), -lack of transportation (4.2%), factors related to the health facility: -poor advertising (14.4%) and long queues (8.7%).

Table 2. Summary of the scores obtained for each study by field of interest.

Topics addressed	Scores by domain							Total
	Study design			Data collection		Data analysis	Results integration	
	Are the research questions clear?	Is the sampling strategy relevant to the research question?	Is the sample representative of the target population?	Do the data collected answer the research questions?	Is there consistency between the sources, collection, analysis and interpretation of qualitative data?	Are outcomes data complete?	Is the interpretation of results sufficiently supported by the data?	
Factors associated with late diagnosis of breast cancer among women in Addis Ababa, Ethiopia [20]	1	1	1	1	1	1	1	7
Fear of mastectomy associated with late presentation of breast cancer among Ghanaian women [21]	1	1	1	1	1	1	1	7
Knowledge, attitudes, and practices regarding breast cancer screening in a rural community in South Africa [22]	1	1	0	1	1	1	1	6
Understanding the causes of breast cancer treatment delays at a teaching hospital in Ghana [23]	1	1	1	1	1	1	1	7
Patient-related modifiable barriers and their association with breast cancer detection practices among Ugandan women without breast cancer diagnosis [18]	1	1	1	1	1	1	1	7
Obstacles to the adoption of breast cancer screening in Kenya [24]	1	1	1	1	1	1	1	7

4. Discussion

Factors Linked to Lack of Knowledge

Insufficient knowledge of breast cancer and the importance of early detection have been identified as major factors. Several studies have highlighted the lack of knowledge about breast cancer and the importance of early detection as primary factors contributing to late detection. Suh *et al.* (2017) in Cameroon observed that many women had a limited understanding of the disease and were unaware of screening methods [9]. Akhtari-Zavare *et al.* (2015) found that Malaysian students with hearing impairment had limited knowledge of breast self-examination due to a lack of accessible information [10].

This may be explained by the lack of access to information about breast cancer. Indeed, most campaigns are based on media or mass communication, now including digital technologies. They inform via TV and radio spots, promotional displays, websites, social networks, smartphones, or filmed media. However, in some regions or communities, access to these means of communication may be limited, making it difficult to disseminate essential information about breast cancer and early detection. Moreover, even if these means of communication are available, there may be language or cultural barriers that make it difficult to understand and assimilate the information transmitted [11]. These results suggest that education and awareness-raising are essential levers for promoting early detection of breast cancer.

Factors Linked to Geographical and Financial Accessibility

Limited access to healthcare services is a critical factor contributing to the late detection of breast cancer. Barriers such as geographical distance, lack of infrastructure and qualified personnel, and overcrowded health facilities hinder women's access to regular screening. The results of a study conducted by Gwarzo *et al.* (2019) in sub-Saharan Africa highlighted the importance of strengthening access to health services to promote early detection [12]. Indeed, integrating breast cancer screening into the advanced strategy activity package of community-based health workers could prove a valid solution to remedy limited access to health services and promote early detection.

Socioeconomic barriers have been identified as another predominant factor. The study by Ukwenya *et al.* (2008) in Nigeria revealed that the high cost of health care and limited access to screening services were major barriers for women at risk. [13]. A study conducted in India by Gupta *et al.* (2017) showed that low-income women were less likely to undergo screening due to financial constraints [14]. This may be because in many countries, healthcare costs, including breast cancer screening examinations such as mammograms, can be high. Women with low incomes or without adequate health insurance may find it difficult to afford these costs. As a result, they may be less likely to seek regular screening services, leading to late detection [13].

To overcome these socioeconomic obstacles, community insurance programs may represent a promising solution. By setting up social protection mechanisms such as affordable and accessible health insurance programs, women on limited

incomes could benefit from financial coverage for breast cancer screening services [14].

Psychosocial and Emotional Factors

In addition to the factors highlighted above, psychosocial and emotional factors can also influence late detection. Odusanya and Tayo (2016) found that fear of a breast cancer diagnosis and feelings of shame were significant psychological barriers for Nigerian women [15]. Similarly, Yawe *et al.* (2019) highlighted the importance of stigmatizing beliefs and fear of social judgment in women's decisions to delay seeking care [16]. This result may be explained by the fact that in some societies, breast cancer can be associated with stigma and shame. Women are afraid of being judged or marginalized if they are diagnosed. This social stigma could influence their willingness to undergo screening and seek early treatment. Fear of diagnosis and the possibility of discovering a serious illness could also lead to a reluctance to undergo screening.

In view of all this, it is vital to consider psychosocial and emotional factors when promoting early detection of breast cancer. By guaranteeing confidentiality and medical secrecy, running informative awareness campaigns, and providing psychosocial support, we can help alleviate the psychological and emotional barriers to early detection. This will improve health outcomes and the well-being of the women concerned.

Social and Cultural Factors

Cultural and social beliefs play a significant role in late detection. Studies by Gwarzo *et al.* (2019) and Canuto *et al.* (2018) found that some women in Nigeria attributed breast cancer to supernatural causes, which delayed their seeking medical care [17] [18]. A study by Yawe *et al.* (2019) showed that negative cultural beliefs associated with breast cancer could lead to fear, denial, and delayed screening-seeking [19]. This could be explained by the fact that in some cultures, breast cancer is perceived as the result of supernatural forces, energy imbalances, or past bad deeds. This perception could lead to a tendency to attribute the disease to external causes rather than risk factors and to consider early detection less relevant [19]. To achieve this, it is essential to involve local leaders such as community chiefs, religious leaders, and cultural representatives in awareness campaigns. Indeed, these local leaders play a crucial role in transmitting health information and messages to members of their communities.

5. Conclusion

This systematic review has enabled us to identify the factors associated with late detection of breast cancer in women in sub-Saharan Africa. These factors act at several levels. Our results show the need for community awareness and education programs on the signs, symptoms, and treatment options of breast cancer as well as the benefits of early detection in subsequent management.

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Declaration of Data Availability

We declare that all data used in this systematic review are available and accessible in accordance with the principles of transparency and reproducibility of research.

We are committed to providing timely and efficient access to data to enable a transparent and rigorous evaluation of our systematic review.

Declaration of Conflict of Interest

The authors of this systematic review declare that they have no conflicts of interest to declare.

Statement on Funding

The submission of this systematic review is financed exclusively by the author's personal resources and does not benefit from any financial support from an external organisation.

Ethics Statement

All authors have contributed to the design, implementation, analysis, and interpretation of data, as well as to the writing and revision of the manuscript. They have read and approved the final version of the manuscript and agree to its submission.

All data sources have been properly cited and referenced, and all ethical procedures have been followed in the conduct of the systematic review.

Authors' Contribution

The development and correction of this manuscript benefited from the invaluable collaboration of Ahmed Kabore, Nayi Zongo, Nestor Bationo, Francis Tognon Tchegnonsi, Akoyi Ludmila, Bague Abdoul Halim and Maxime K. Drabo. Their invaluable commitment and knowledge enriched every aspect of the process, from initial conception to final review. Their contributions were essential in refining and improving the quality of the content, reflecting exemplary teamwork and a collective pursuit of academic excellence.

Suggestions

Raising awareness of the importance of early detection of breast cancer, using a variety of media and disseminating messages in all languages to reach a wide audience.

Make screening services more accessible by providing mobile clinics, flexible

hours, and affordable or free rates for low-income populations.

Provide ongoing training for healthcare professionals on best practice in breast cancer screening and early diagnosis.

Encourage collaboration between public health sectors, NGOs, local communities and governments to develop comprehensive and coordinated breast cancer screening strategies.

Set up monitoring and evaluation systems to measure the effectiveness of screening initiatives and adjust strategies accordingly to achieve better results.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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