Asian Journal of Immunology

Volume 6, Issue 1, Page 209-223, 2023; Article no.AJI.105793

Survival Times of Breast Cancer Patients in Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/105793

Data Article

Received: 11/07/2023
Accepted: 16/09/2023
Published: 21/09/2023

ABSTRACT

This paper presents comprehensive research into the survival times of breast cancer patients in Nigeria. Breast cancer is a significant global public health concern, and its impact is particularly profound in Nigeria due to unique socio-economic, cultural, and healthcare access factors. The immune system plays a crucial role in recognising and eliminating abnormal cells, including cancer cells. This study synthesises data from sixteen studies to provide a more robust estimation of survival times, enhance generalizability, and identify potential sources of heterogeneity among different cohorts. A comprehensive literature search of articles published about the survival rate of breast cancer in Nigeria was conducted using a snowballing approach in major electronic databases. Sixteen (16) publications were found to meet the inclusion criteria and were selected for the meta-analyses. R was used to perform all the analyses. The survival rate decreases as the time interval increases. The results showed that the survival rates for breast cancer in Nigeria were

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68.8% at one year, 50% at three years, 33.3% at five years, and 11.1% at ten years. The study's findings underscore both the challenges and progress in breast cancer mortality in the Nigerian context. Cancer makes people anxious, and anxiety affects value, so to improve survival rates and overall patient care, the Nigerian government should include mental health professionals in managing cancers. The findings of this study contribute to the global discourse on cancer management while also providing a tailored framework for improving outcomes within the unique Nigerian perspective.

Keywords: Breast cancer; survival times; Nigeria.

1. INTRODUCTION

Breast cancer development involves multiple cell types undergoing successive transformations [1]. Breast cancer, a form of malignancy originating in breast tissue, affects millions of women annually, establishing it as the predominant cancer among women on a global scale [2]. The tumour originates as ductal growth and evolves into benign or malignant cells due to exposure to carcinogenic agents. The tumour microenvironment, encompassing factors such as stromal origin and macrophage-mediated immune response, influences disease progression. The formidable capacity of metastatic breast cancer to disseminate to distant tissues and organs, including the liver, lungs, and brain, complicates therapeutic interventions. Early breast cancer detection substantially elevates patient survival rates and reduces overall mortality, particularly in developed nations [3].

Established risk factors exist for breast cancer, notwithstanding the intricate and partial comprehension of breast cancer's biology [4]. Advancing age and female gender are foremost among these risk factors. Genetic mutations, especially BRCA1 and BRCA2, account for roughly 10% of breast cancer instances. Moreover, acknowledged risk elements encompass a record of ductal carcinoma in situ, elevated body mass index, nulliparity or premature menarche (before age 13), familial history of breast or ovarian cancer, delayed menopause, and postmenopausal hormone therapy usage.

The presence and activity of immune cells within the tumour microenvironment can significantly impact cancer prognosis and survival. Immunotherapy is a class of cancer treatments that harness the power of the immune system to target and destroy cancer cells. Several types of immunotherapies include immune checkpoint inhibitors, CAR-T cell therapy, cancer vaccines, and cytokine therapy. These treatments have shown remarkable success in specific cancer types and improved survival rates in some patients.

As of 2020, the globally reported breast cancer cases reached 2.26 million, rendering it the most widespread cancer [5]. Furthermore, it is the principal cancer affecting women in developing and developed nations, constituting a substantial public health challenge [5]. Ethnicity and race contribute to variations in the incidence rates, and despite its worldwide occurrence, it holds greater prominence in developed nations [3]. In 2020, breast cancer accounted for 685,000 fatalities, ranking as the fifth leading cause of cancer-related deaths worldwide [5]. In 2012, nearly 1.68 million new cases were reported, with a notable surge to about 2.1 million new cases in 2018 [6]. Unfortunately, the mortality rates also followed a similar upward trend, registering a 14% rise [7].

Globally, breast cancer impacts many women annually by inciting uncontrolled cell proliferation, resulting in tumour growth [2]. This affliction accounted for over 570,000 deaths in 2015 alone, emerging as the foremost cause of female mortality worldwide [1]. In the United States, an estimated 252,710 new female cancer cases in 2017 were attributed to breast cancer, encompassing 30% of all new cancer cases [8]. A parallel scenario is observed in the UK, with an anticipated 286,600 new breast cancer cases projected for 2019 [8].

Unlike developed regions where breast cancer ranks as the second most common cause of cancer-related mortality after lung cancer, in developing parts of the world, such as Nigeria, breast cancer takes the lead as the primary cause of cancer-related deaths in women [6,9]. Historically limited, the incidence of breast cancer cases in Nigeria is progressively surging due to urbanisation and lifestyle adjustments. Breast cancer constitutes approximately 22.7%

of total cancer diagnoses (Fig. 1) and roughly 25.5% of mortalities, positioning it as the predominant contributor to cancer-related deaths [10].

Breast cancer represents a critical public health concern in Nigeria, and it is essential to grasp the survival times of breast cancer patients to enhance treatment outcomes and healthcare planning. By 2022, Nigeria's population exceed 218 million, establishing it as the most populous country in Africa. Nigeria is characterised by over 250 ethnic groups, the nation embodies remarkable diversity [11]. In a study involving young women with breast cancer treated at the University College Hospital in Ibadan, Nigeria, encompassing those aged forty (40) years or younger, a total of 763 cases were evaluated, of which 221 (28.96%) pertained to individuals under the age of 40. Five individuals (2%) exhibited stage I disease, while 29 (13%) presented stage II disease. Notably, stages III and IV were detected in 102 (46%) and 85 (39%) of patients, respectively [12].

Based on data from the Ibadan Cancer Registry, breast cancer contributes to 40.8% of all female cancers [13]. Empirical studies indicate that age-standardised breast cancer incidence rates in Nigeria surged over two-fold from 1960 to 2000, increasing nearly 25% per decade [14]. Breast cancer constitutes the most prevalent malignancy, comprising about 23% of the 5,000 cases examined at the University College Hospital's Radiotherapy Centre in Ibadan, Nigeria [15].

Country-specific 5-year overall survival rates [16] exhibit variation. For instance, Canada displays an 88% survival rate, the United States a 90% rate, and South Africa reports rates of 80% for whites and 64% for blacks [17]. Conversely, a study conducted in Nigeria by Popoola, Ogunleye, and Ibrahim [18] revealed that a group of breast cancer patients examined in Lagos attained an overall 5-year survival rate of 25.6%. According to the study by Atoyebi [2], there is an overall one-year survival rate of 77.4%.

As Alabi et al. [19]. indicated, the cumulative overall survival probability stands at 0.175 (17.5%), with an estimated global mean survival period of 28.751 weeks. The typical interval between admission and death is approximately 23 weeks. The p-value (0.00032) from the comparison of tumour stage survival rates, being less than 0.05, signifies substantial evidence of variance in survival rates associated with tumour stages. Assessment of the survival function map across diverse tumour stages suggests a diminished chance of survival for stage III patients. The prognosis further suggests that patients with stage I tumours exhibit a heightened likelihood of survival.

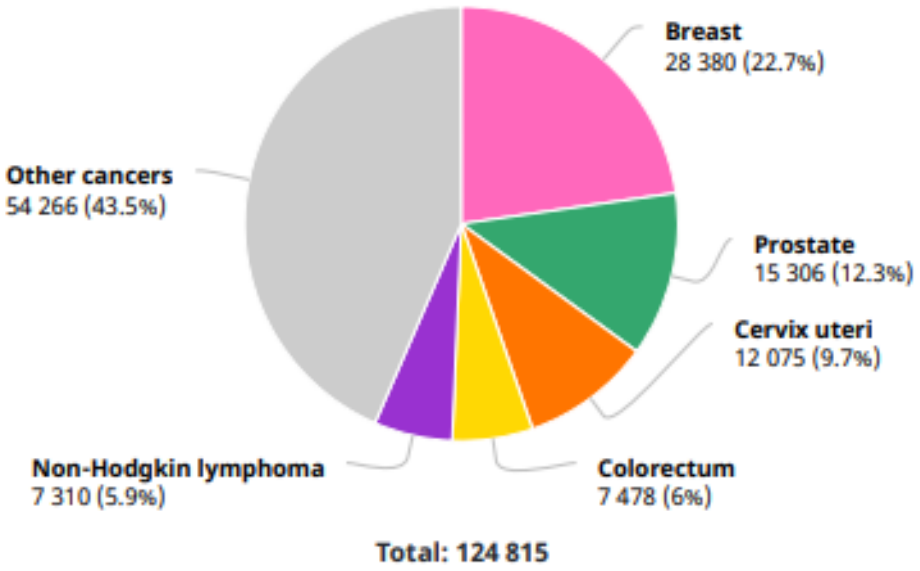

Fig. 1. Number of new cases in 2020, both sexes, all age
Source: Globocan 2020

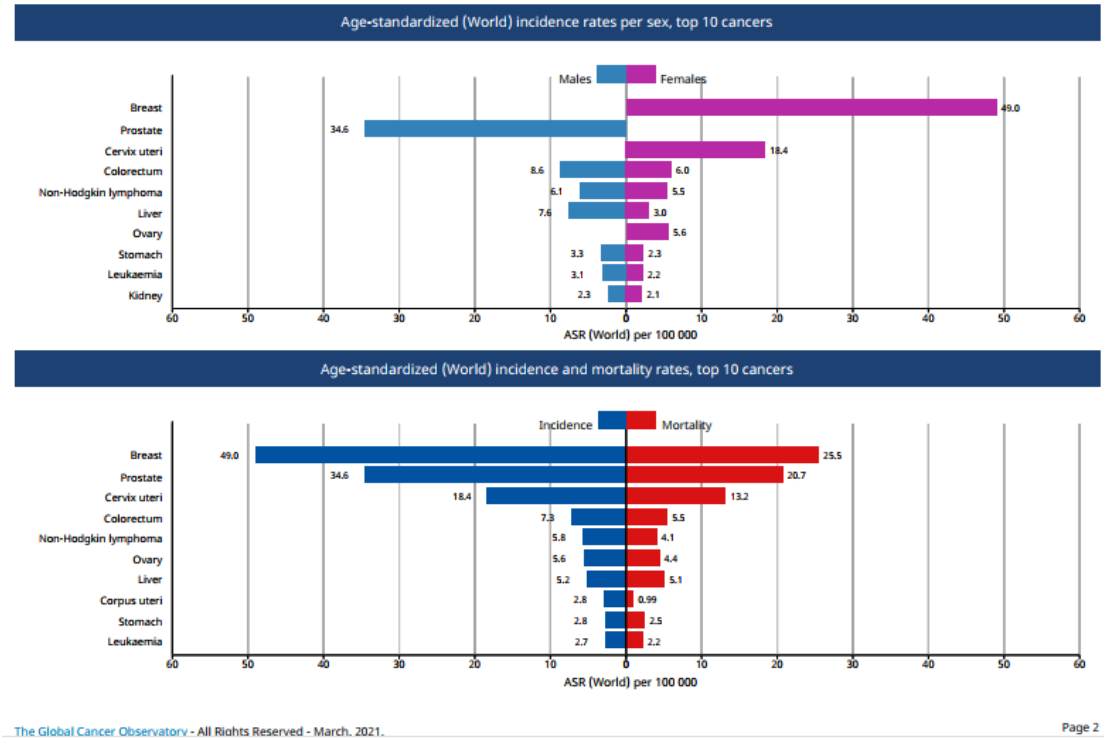

Fig. 2. Age-standardized (World) incidence rates per sex, top 10 cancers
Source: Globocan 2020

Regarding the 2- and 5-year survival rates, Ali-Gombe et al. [20]. reported rates of 56.4% and 37.6%, respectively. Stage I indicated the highest 2- and 5-year survival rates at 80.0% and 66.7%, followed by stage II (67.7% and 57.6%), stage III (51.4% and 27.9%), and stage IV (37.9% and 13.8%). The median survival time (95% CI = 35.0-44.0) was established at 41 months. Disease-free survival rates at 2 and 5 years were documented as 66.6% and 60.3%, respectively, with recurrence occurring within a median of 8.0 months. Statistically significant associations with survival were noted for factors such as the presence of distant metastases, clinical axillary lymph node metastasis, supraclavicular node metastasis, mode of surgery, height, tumour unilaterality, clinical tumour size, and stage at presentation, among others.

1.1 Research Aim

This research aims to ascertain breast cancer patients' historical and contemporary survival times in Nigeria while identifying potential disparities across various studies. Synthesis of data from multiple studies allows this research to provide a more robust estimation of survival times, enhance generalizability, and identify potential sources of heterogeneity among different cohorts. This study on the survival times of breast cancer in Nigeria carries immense significance for various stakeholders, including healthcare practitioners, policymakers, and breast cancer patients. Ultimately, this study is expected to improve breast cancer management and patient care in Nigeria. Understanding the survival times of breast cancer patients can profoundly impact healthcare policy and decision-making in the country.

2. METHODS

2.1 Research Design

This study aimed to achieve its research objective by utilising quantitative Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA-P). During the execution of this review, adherence to the PRISMA-P guidelines was ensured. The article search initiative commenced on April 3, 2023, concluding on June 14, 2023. PRISMA-P involves the analysis of secondary data, specifically quantitative data obtained from previous research findings. As a retrospective observational research approach, the meta-analysis compiles and summarises data without experimental manipulation [2]. By using meta-

analysis, the results will be immune to statistical issues such as multicollinearity. In survival analysis, high multicollinearity can lead to unstable parameter estimates and make it difficult to interpret the results. Multicollinearity can also complicate variable selection in survival analysis. Meta-analysis is a statistical technique used to combine and analyse the results of multiple independent studies on the same research question or topic. Meta-analysis, involving processed data derived from computed measurements, is valuable for summarising research outcomes, supporting policy formulation, and drawing statistical inferences [21]. Following the PRISMA-P guidelines ensures transparency in the systematic review and meta-analysis process. Clearly documenting the research aim, search strategies, inclusion/exclusion criteria, and planned statistical methods helps provide a clear roadmap for other researchers to understand and replicate your study. Applying PRISMA-P enhances the understanding and utilisation of evidence for decision-makers [22].

2.1.1 Data extraction and quality assessment

For streamlined review, pertinent data from selected research was extracted and organised in a tabular format. National Institutes of Health quality assessment tools aided the assessment of controlled intervention, observational, and cohort studies [23]. The evaluation criteria encompassed the rational and clear articulation of objectives, suitability of methodology for objectives, and accurate depiction of study populations. Ratings of “good,” “middling,” or “bad” were assigned based on affirmative responses to quality assessment tool criteria, in line with the National Heart, Lung, and Blood Institute’s delineated thresholds [23].

Furthermore, the evaluation of WHO publications retrieved via grey literature searches employed the open-source CRAAP guidance and template developed by the Sheridan Libraries at Johns Hopkins University [24]. This acronym-based framework assessed the information’s authority, relevance, currency, accuracy, and intent, thus ensuring its quality [24]. Since the inclusion/exclusion criteria already accounted for relevance, the parameter “Relevance” was deemed redundant and excluded.

2.1.2 Literature searches

Comprehensive database searches were executed in MEDLINE, Pubmed Central, EMBASE, Google Scholar, Web of Science, and Researchgate to locate published peer-reviewed journal articles and research on breast cancer in Nigeria. Exploring all these databases entailed a combination of ‘Medical Subject Headings’ phrases and free text for effective search queries. The search encompassed distinct concepts and their synonyms, synergised by Boolean operators, yielding the resultant search string: “Breast Cancer AND Survival rates AND Survival times AND (Nigeria)”. The search for grey literature was facilitated by consulting the WHO, Google Scholar databases, and Africa Wide. The relevant URL was included in Google searches with additional keywords to refine the outcomes, such as “Breast cancer survival times in Nigeria. Aricawide.com”.

2.1.3 Data extraction and article screening

The specified Population, Intervention, Control, Outcome, Time, and Study Design (PICOTS) criteria, as detailed in Table 1, formed the basis for the comprehensive review of full-text articles. The authors performed the article title and abstract screening, thoroughly reviewing the articles. Using the PICOTS framework for this study is considered appropriate because it provides a structured approach to formulating a research question that considers all relevant aspects of the analysis. This ensures that the meta-analysis is focused, well-defined, and capable of generating meaningful insights into survival outcomes for breast cancer patients in Nigeria.

2.2 Sensitivity Analysis

Sensitivity analysis is a critical component of meta-analysis. Sensitivity analysis involves assessing the robustness and reliability of the results of a meta-analysis by systematically varying different aspects of the analysis to determine their impact on the overall findings. The stability of the study’s outcomes was further evaluated through a sensitivity analysis. The statistical significance of the results remained unaltered even upon the exclusion of particular publications from the analysis, affirming the precision and coherence of our findings. Publication bias, subgroup analyses, and heterogeneity were also examined to to evaluate the influence of various factors on the summary effect size or conclusion drawn from the combined studies.

Table 1. Criteria for article screening based on PICOTS

Population/Participants	Accessible articles detailing the survival rates of breast cancer in Nigeria were identified via electronic searches or obtained through corresponding author requests. Articles had to furnish data concerning the sample size and survival rates to be eligible. Articles with a singular focus on other types of cancer and article about breast cancer without a focus on survival rates were excluded from consideration. Moreover, international research providing insights into Nigerian breast cancer data was incorporated. Only articles authored in English or translated into English were considered eligible. Only articles published from 2010 and above were included. Only research that uses primary data was included.
Intervention	Treatment modalities include surgery, chemotherapy, radiation therapy, targeted therapy, and hormonal therapy.
Control	Patients that received standard care or placebo, or comparisons between different treatment modalities.
Outcomes	1. Overall survival rates, 2. Progression-free survival, 3. One-year, Five-year and ten-year survival rates, 4. Survival disparities based on different treatment approaches
Time	The study encompassed articles published from January 2010 to August 2023. Survival data was collected over a span of 5 to 10 years, with varying follow-up periods depending on available studies.
Study design	The research design was not a strict exclusion criterion, provided that relevant data on survival rate and/or outcome variables could be extracted. The inclusion criteria encompassed original research featuring a sample size of 10 patients, from which data related to at least one of the designated outcomes could be extracted, treated, or monitored.

2.3 Newcastle Ottawa Scale Assessment of the Quality of Evidence

For quality assessment, we adapted the Newcastle-Ottawa quality assessment tool. The Newcastle-Ottawa Scale evaluates studies based on three key domains: selection of study groups, comparability of groups, and ascertainment of the exposure or outcome of interest. Each domain is assessed through a series of criteria in this study, and the study is assigned stars (points) accordingly.

2.4 Statistical Analysis

The outcomes encompassed summaries of variable estimates aligned with our PICOTS criteria. Meta-analysis was conducted through the R software. A random-effect model employing the double arcsine transformation was employed to generate summary estimates, thus averting the undue influence of studies with values approximating 100% or 0%. The heterogeneity test was conducted to assess whether the observed variation in effect sizes is statistically significant. Addressing the statistical interdependence among different effect sizes within a single sample, specifically effect sizes nested within samples, can be achieved using the random-effects robust standard error estimator [25]. A low p-value (e.g., less than 0.05) will suggest significant heterogeneity. Subgroup analyses were performed based on different treatment groups within the variable.

3. RESULTS AND DISCUSSION

3.1 Study Selection

The initial search yielded eight hundred and eight (808) publications related to the research objective. Subsequently, four hundred and five (435) studies were assessed for eligibility based on predetermined criteria. After carefully evaluating the full-text articles, sixteen (16) publications met the inclusion criteria and were selected for the meta-analysis. Consequently, four hundred and eighteen (418) studies were excluded for several reasons: some publications did not report survival rates data, some did not include the sample size, some sample sizes were less than ten (10), some studies added

another type of cancer to breast cancer in their study, or failure to meet the specified criteria. During the selection process, duplicates were removed, and the remaining articles' titles, abstracts, and full texts were thoroughly scrutinised to ensure their relevance and suitability for the study. Fig. 3 provides a visual representation of the selection process.

The characteristics of the 16 included studies are summarised in Table 2, showcasing their diverse origins from six (6) regions of Nigeria. These 16 studies encompassed data from five thousand three hundred and twent-four (5324) breast cancer patients.

3.1.1 Study characteristics

Chart. 1 presents the utilisation of forest plots, a graphical representation to exhibit the 95% confidence interval survival rate estimates of each study that has been chosen, alongside the pooled survival rate estimates.

Table 2 and Fig. 4 demonstrate the trend of publications over the years understudied. The data encompasses studies published from 2010 to 2023. The number of studies seems to have increased over the years, with more studies published in recent years (2019-2023) compared to earlier years.

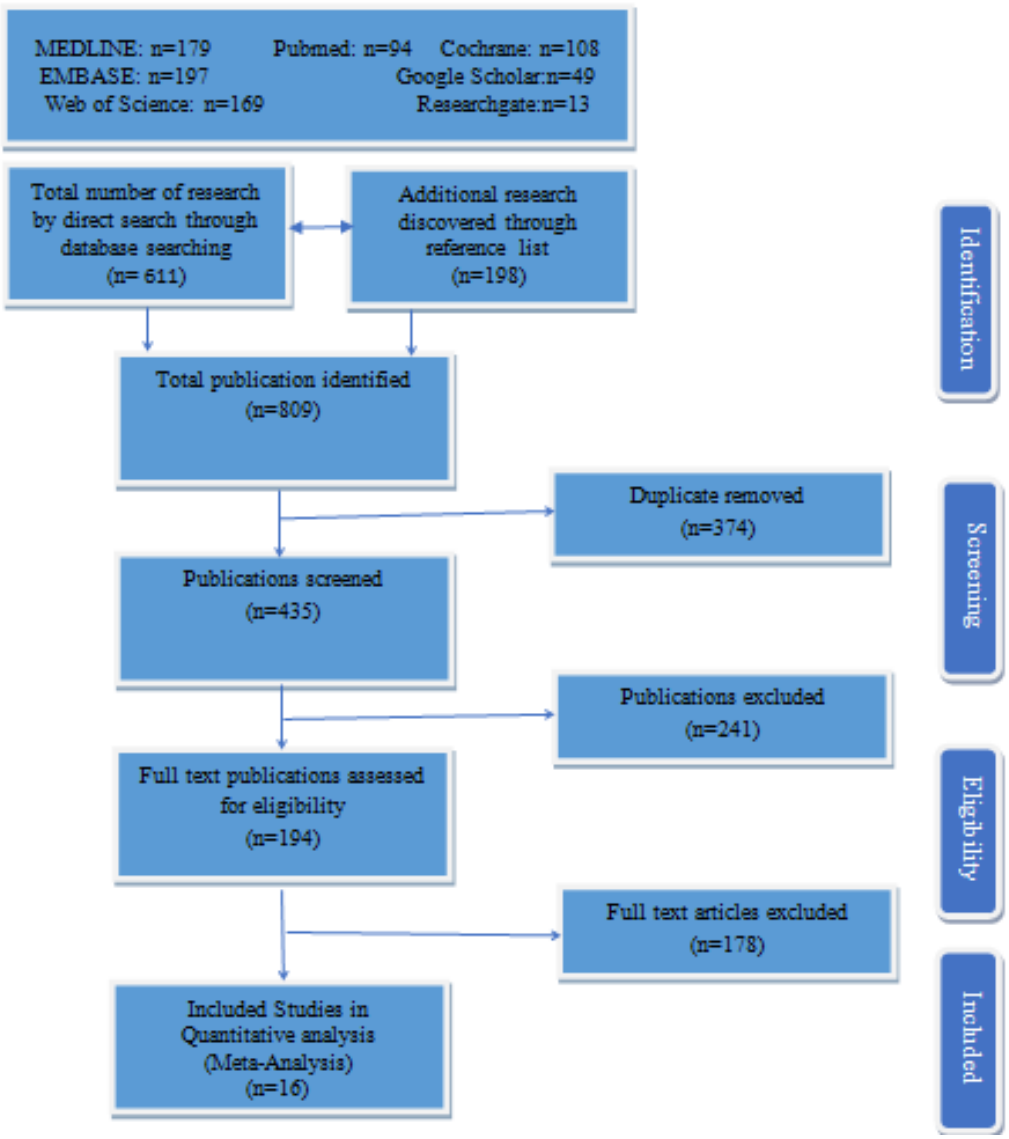

Fig. 3. Study selection

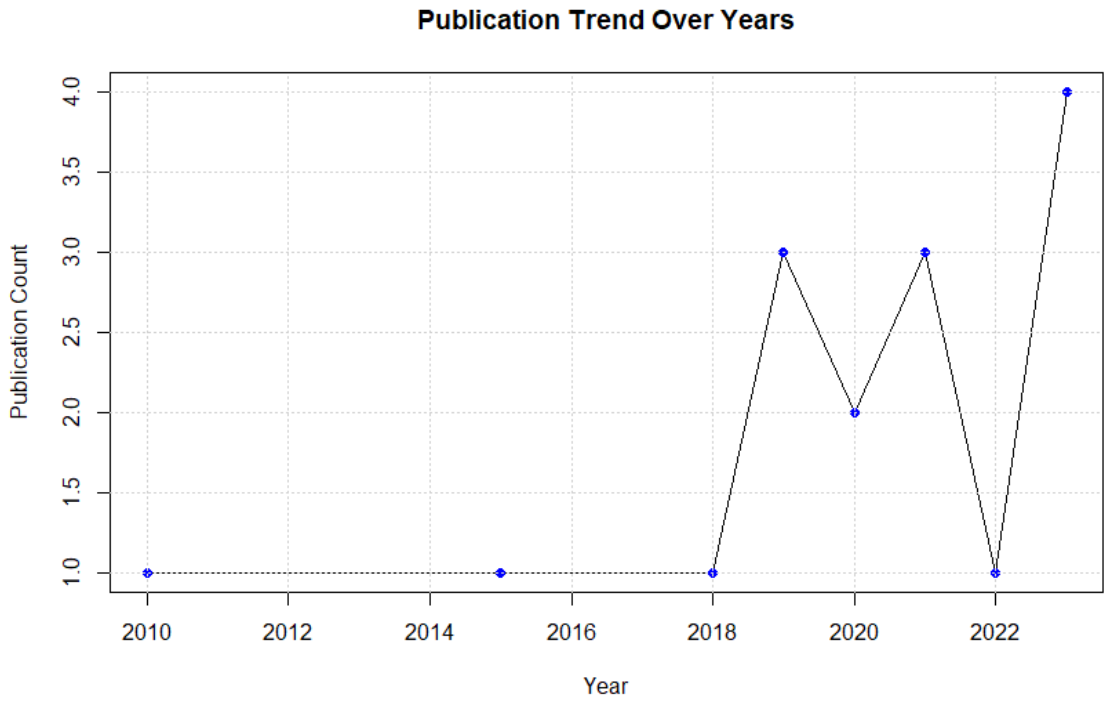

Fig. 4. Years of publications

Table 2. Characteristics of studies

Author	Year	Study Design	State	Sub-regions
Nabegu et al. [26]	2023	Retrospective study	Kano	North West
Akanno et al. [27]	2023	Cox and Parametric Survival Models	Imo	South East
Agodirin et al. [28]	2023	Prospective study	Kwara	North Central
Olaogun et al. [29]	2023	Prospective study	Ekiti	South West
Alabi et al. [30]	2022	Kaplan-Meier (K-M)	Oyo	South West
Gregory et al. [31]	2021	Prospective study	Osun	South West
Ali-Gombe et al., [20]	2021	Retrospective cross-sectional study	Oyo	South West
Olalekan et al. [32]	2021	Prospective study	Osun	South West
Julius et al. [33]	2020	Descriptive retrospective study	Ekiti	South West
Usman and Awosan [34]	2020	Retrospective study	Sokoto	North West
Popoola et al., [35]	2019	Cox proportional hazard regression analysis	Oyo	South West
Ayandipo et al. [36]	2019	Prospective cohort study	Oyo	South West
Ntekim, et al. [37]	2019	Observational retrospective study	Gombe	North East
Awodutire et al. [38]	2018	The descriptive study	Osun	South West
Akinde et al. [39]	2015	Retrospective study	Lagos	South West
Kene, et al. [40]	2010	Retrospective	Kaduna	North West

3.1.2 Random effects analysis and exploration of heterogeneity

The analysis was based on data from 15 studies. The tau-squared (τ^2) estimator used for estimating 6the amount of total heterogeneity is REML (Restricted Maximum Likelihood). The estimated value of τ^2, representing the amount of total heterogeneity across the studies, is 0.6101 with a standard error of 0.3271. The square root of the estimated τ^2 value is approximately 0.6824. The I-squared (I^2) statistic, the proportion of total variability attributed to heterogeneity, is 100.00%. This suggests substantial variability between the studies. The H-squared (H^2) statistic is 110835.27. The value of Q statistic, which tests for heterogeneity, is 2876303.0413 with degrees of freedom equal to 16 with a p-value of less than 0.0001, indicating strong evidence of heterogeneity among the studies.

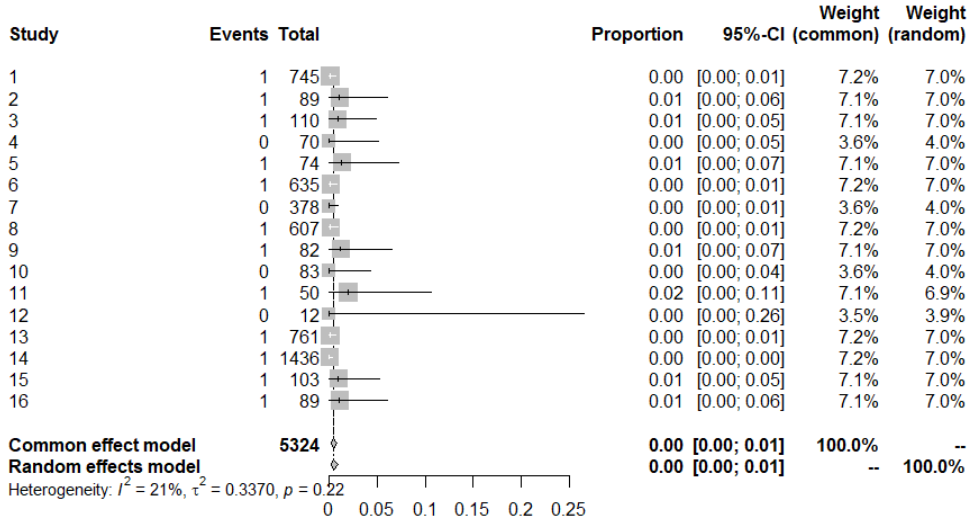

Chart 1. Forest plots

The estimated pooled effect size (estimate) is 1.1804, indicating an overall increase in the hazard of breast cancer events across the studies, with the estimate of standard error being 0.3410. The z-value is 4.8100, suggesting that the estimate is statistically significant with the p-value (pval) associated is less than 0.0001, further supporting the statistical significance of the pooled effect. The estimate's confidence interval (CI) is reported with lower and upper bounds (ci.lb and ci.ub) as 0.6912 and 1.601, respectively. These results indicate significant heterogeneity among the studies, with a substantial proportion of total variability attributed to differences between the studies. The pooled effect size suggests an overall increase in the hazard of breast cancer events. The statistical significance of the estimate and the narrow confidence interval further reinforces the findings.

3.2 Analysis of Pooled Survival Times

The one-year survival rate is estimated to be approximately 68.8% (0.688). The standard error associated with this estimate is 0.116 and the 95% confidence interval for this rate ranges from 49.4% to 95.7%. The one-year survival rate suggests that about 68.8% of breast cancer patients in Nigeria survive one year after diagnosis. The three-year survival rate is estimated to be approximately 50% (0.5). The standard error is 0.125 and 95% confidence interval for the 3-year survival probability ranges from 0.306 to 0.816. The three-year survival rate suggests that about 50% of breast cancer patients in Nigeria survive three years after diagnosis. The five-year survival rate is estimated to be approximately 33.3% (0.333). The standard error is 0.127 and the 95% confidence interval for the five-year survival rate ranges from 0.158 to 0.705. The five-year survival rate suggests that about 33.3% of breast cancer patients in Nigeria survive five years after diagnosis. The ten-year survival rate is estimated to be approximately 11.1% (0.111). The standard error is 0.1 and 95% confidence interval for the 10-year survival probability ranges from 0.019 to 0.65. The ten-year survival rate suggests that about 11.1% of breast cancer patients in Nigeria are expected to survive ten years after diagnosis.

3.3 Subgroup Analysis

The outcomes of the mixed-effects meta-analysis was conducted to determine the survival rates in different Sub-Regions for breast cancer patients in Nigeria. The estimated value of τ^2, representing the amount of residual heterogeneity unaccounted for by moderators, is 0.5921 with a standard error of 0.2420. The square root of the estimated τ^2 value is approximately 0.7695. The I-squared (I^2) statistic indicates that 100.00% of the residual heterogeneity remains unaccounted for. The H-squared (H^2) statistic is 81018.27, reflecting unaccounted variability in relation to sampling variability. The R-squared (R^2) statistic is 17.12%, indicating the proportion of heterogeneity accounted for by moderators.

The QE statistic test is 1023417.0427 with degrees of freedom (df) equal to 12. The p-value associated with the QE statistic is less than 0.0001, signifying strong evidence of residual

heterogeneity. The QM statistic tests for the impact of moderators, focusing on coefficients 2 to 5 (related to Sub-Regions). The QM statistic is 7.3022 with df = 4. The p-value associated with the QM statistic is 0.1208, greater than 0.05, suggesting no significant impact of the moderators on the model. The interpretation of the results suggests that the survival rates across the different subregions (North East, North West, South East, and South West) are not statistically significantly different from each other. The p-values associated with the estimated effects of subregions are all greater than the conventional significance level (e.g., 0.05), indicating no strong evidence to suggest that the survival rates vary significantly across these subregions. However, the high residual heterogeneity (I^2 = 100.00%) suggests substantial variability among the study outcomes that the model does not explain.

3.4 Publication Bias

The analysis of precision asymmetry funnel plots and Egger's test indicated that the included studies did not suffer from publication bias. The results of Egger's test showed that publication bias was not statistically significant, as the p-value of 0.9551 indicates the absence of publication bias in this analysis. The t-value of 0.06 also supports this finding. This symmetry in the funnel plots suggested that the conclusions drawn from the studies were not influenced by publication bias. Therefore, the findings from this analysis are less likely to be distorted by biased reporting of studies, providing more confidence in the reliability of the results.

As shown in Table 3, the maximum possible score is 15 stars, with more stars indicating higher study quality. The selection domain includes representativeness of the exposed cohort, non-exposed cohort selection, and exposure ascertainment. The comparability domain assesses the comparability of cohorts based on the design or analysis. The exposure/Outcome domain evaluates the assessment of outcome, follow-up period, and adequacy of follow-up. These results show that all the studies have higher NOS scores, implying that they are more methodologically rigorous and likely to produce more reliable and valid results.

4. DISCUSSION

The aim of this study is to estimate breast cancer survival rates in Nigeria through a meta-analysis of available data. The results highlight both the challenges and progress in breast cancer survival rates in the Nigerian context. The meta-analysis yielded the following survival rates for breast cancer in Nigeria: 68.8% at one year, 50% at three years, 33.3% at five years, and 11.1% at ten years.

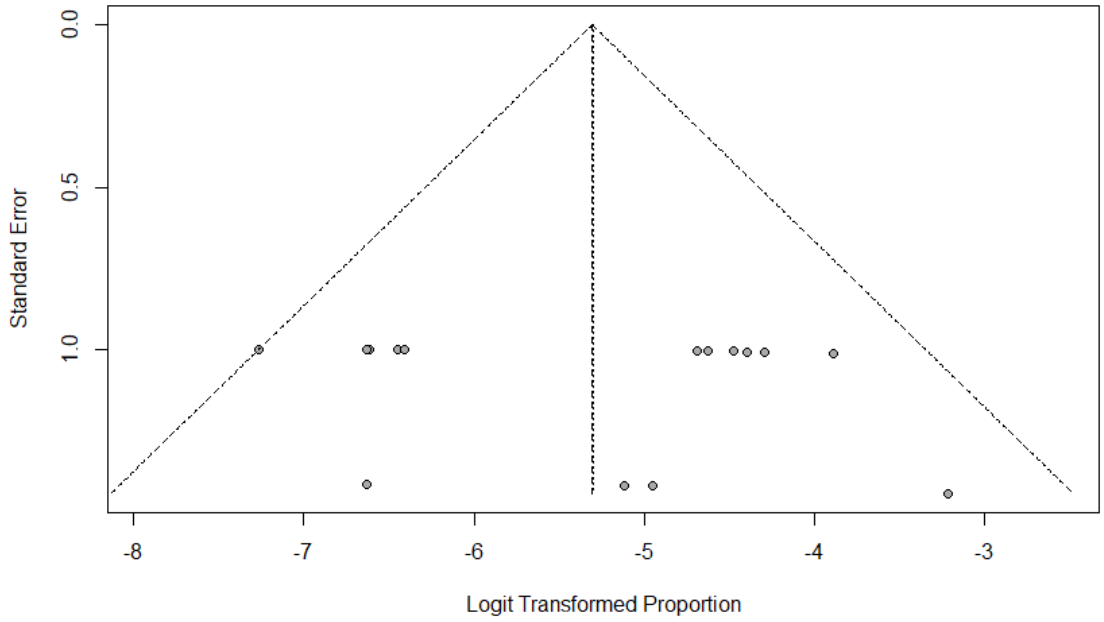

Fig. 5. Flow chart for publication bias

Table 3. Study quality assessment using Newcastle-Ottawa Scale (NOS)

Study ID	Selection	Comparability	Exposure/Outcome	Total Stars
1	★★★★☆	★★★★	★★★★★	12/15
2	★★★★☆	★★★☆	★★★★★	11/15
3	★★★★☆	★★★★	★★★★★	12/15
4	★★★★☆	★★★★	★★★★★	12/15
5	★★★★☆	★★★☆	★★★★☆	10/15
6	★★★★☆	★★★★	★★★★★	12/15
7	★★★★☆	★★★☆	★★★☆☆	10/15
8	★★★★☆	★★★★	★★★☆☆	11/15
9	★★★☆☆	★★★☆	★★★★★	10/15
10	★★★★☆	★★★☆	★★★★★	11/15
11	★★★★☆	★★★☆	★★★☆☆	10/15
12	★★★★☆	★★★★	★★★☆☆	11/15
13	★★★★☆	★★★★	★★★★★	12/15
14	★★★★☆	★★★★	★★★★★	12/15
15	★★★★☆	★★★★	★★★★★	12/15
16	★★★★☆	★★★★	★★★★★	12/15

Nigeria's 1-year survival rate (68.8%) is notably lower than England's (96%) and Australia's (98.1%) rates in 2009 [41]. This discrepancy can be attributed to several factors, primarily the underdeveloped health system, resulting in delayed diagnoses and inadequate treatment. Deficiencies in management capacities, screening measures, diagnostic procedures, and prevention efforts are also contributing factors [42]. Socio-economic disparities and limited access to diagnostic resources are intertwined with a nation's economic status, impacting survival rates [43].

Breast cancer survival rates in Africa are generally lower compared to developed nations [2]. In Nigeria, factors like limited breast cancer knowledge and obstacles to healthcare accessibility contribute to late diagnosis and poor survival rates [2,44,45,46]. Deficiencies in management capacities, diagnostic capabilities, screening, prevention, and timely diagnoses amplify this situation. Access to diagnostics is a global challenge, affecting nearly half of the world's population [42].

However, Nigeria's breast cancer survival rates at one year are comparable to those of China and India. Chinese studies reported 1-year and 3-year survival rates of 76.0–83.1% and 51.5–74.1%, respectively [47], while Indian studies found rates of 76% and 51.5% [48]. Relative 5-year survival rates ranged from 52% in India to 82% in China [49], which is higher than Nigerian five-year survival rate (33.3%).

In Nigeria, the five-year overall survival rate stands at 33.3%—a figure notably below the corresponding rates in the United States and European nations. Compared to India with a 5-year survival rate of 46%, Oman, Greece, and Germany report rates of 64%, 65%, and 71%, respectively [50]. Higher rates are observed in Belgium at 78%, the United Kingdom at 84%, and the USA at 89%. This discrepancy can be attributed to several factors, including limited breast cancer awareness among Nigerian women and religious and cultural barriers that deter some Nigerian women from seeking medical attention for sensitive female-specific health issues.

Breast cancer survival rates in Nigeria are lower at ten years, 11.1%. These survival rates might be because of a lack of data; it could be that breast cancer in Nigeria stop attending clinics after a few years of managing breast cancer. The absence of efficient population-based cancer registries in Nigeria impedes comprehensive surveillance and control programs. Factors such as a lack of faith in healthcare quality and misconceptions about breast cancer contribute to patients avoiding clinics, resulting in delayed treatment [51,52].

While positive, Nigeria's lower survival rates still fall short of developed countries like the United States. American Cancer Society data from 2015–2016 reported higher survival rates of 89% at five years and 83% at ten years. Similarly,

European studies found higher survival rates ranging from 69% to 84% [53]. Notably, these rates have consistently improved over time in various nations, including Canada and England [54,41].

5. CONCLUSION

Breast cancer is a significant health concern globally, and Nigeria is no exception to this challenge. Breast cancer poses a considerable burden on both public health and healthcare systems in the country. The study's findings underscore the progress in breast cancer survival rates in Nigeria, with survival rates decreasing over 1, 3, 5, and 10 years. This study shows that there are still challenges due to gaps in the healthcare system and awareness, hindering timely diagnoses and treatment. This study serves as a significant stepping stone towards a better understanding of breast cancer survival dynamics in Nigeria. The insights gained from this research contribute to the global discourse on cancer management and provide a tailored framework for improving outcomes within the unique Nigerian context. As progress is made in implementing the recommendations, it is anticipated that breast cancer patients in Nigeria will experience improved survival times and enhanced quality of life, ultimately positively impacting the nation's health landscape.

However, it is important to acknowledge the limitations of this study. The analysis, while comprehensive, is based on available data and may not encompass all possible influencing factors. Furthermore, the dynamic nature of healthcare systems and societal changes necessitates continuously reevaluating strategies and interventions.

6. RECOMMENDATIONS

Based on the findings and insights derived from the comprehensive study on breast cancer survival times in Nigeria, the following recommendations are formulated to enhance breast cancer management, healthcare planning, and policy formulation within the Nigerian context:

To improve survival rates and overall patient care, the Nigerian government should include mental health professionals in managing cancers, such as a therapist or counsellor who specialises in managing anxiety and can provide cancer patients with tailored strategies and support. Cancer makes people anxious, and anxiety affects value. Cancer diagnosis and treatment can significantly impact a person's psychological well-being, often leading to heightened stress levels.

Policymakers and healthcare authorities should prioritise establishing and maintaining comprehensive cancer registries to track trends, monitor progress, and inform evidence-based decisions. Data-driven insights from these registries can guide resource allocation and targeted interventions. It can help improve the quality of health that cancer patients receive in Nigeria.

Collaborative efforts among medical oncologists, surgeons, radiologists, and other healthcare professionals are essential for providing comprehensive and holistic care to breast cancer patients. Strengthening interdisciplinary teamwork and promoting the adoption of evidence-based treatment guidelines can lead to more effective and personalised treatment plans, consequently improving survival rates.

Public awareness and eradication of stigma should be prioritised. A comprehensive strategy to raise public awareness about breast cancer, dispel myths, and reduce stigma is essential. Educating communities about the disease, encouraging open conversations, and challenging cultural taboos surrounding breast health can contribute to earlier diagnoses and improved treatment outcomes.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
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