

Influence of Health System Fertility Counselling and Oncofertility Knowledge on Pregnancy Intentions and Fertility Preservation Engagement Among Reproductive-Age Breast Cancer Survivors in Abuja, Nigeria: A Cross-Sectional Study

Aisha Ibrahim

aisha-esther.ibrahim@binghamuni.edu.ng

Ahmadu Bello University

Maryam Olamide Ismail-Olalere

Ahmadu Bello University

Adamu Ibrahim Muazu

Ahmadu Bello University

Khadijat Tomilobinrin Hassan-Akerele

Ahmadu Bello University

Rukayat Morenike Ibrahim

Ahmadu Bello University

Research Article

Keywords: Breast cancer, Oncofertility, Fertility counselling, Pregnancy intentions, Fertility preservation, Nigeria

Posted Date: June 19th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-9954383/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.
[Read Full License](#)

Additional Declarations: No competing interests reported.

Abstract

Background

Breast cancer frequently affects women of reproductive age, yet fertility-related concerns remain inadequately addressed in cancer care, particularly in low-resource settings. In Nigeria, where childbearing carries significant sociocultural value, treatment-induced infertility poses a substantial burden. This study examined the relationship between health system fertility counselling, oncofertility knowledge, pregnancy intentions, and fertility preservation engagement among reproductive-age breast cancer survivors in Abuja, Nigeria.

Methods

We conducted a quantitative analytical cross-sectional study among 273 breast cancer survivors aged 18–49 years recruited from National Hospital Abuja, Federal Medical Centre Jabi, and the Network of People Impacted by Cancer in Nigeria (NEPICIN). Data were collected using a structured interviewer-administered questionnaire and analysed using descriptive statistics, chi-square tests, independent t-tests, and hierarchical logistic regression.

Results

Mean age was 41.81 years (SD=5.81). Mean oncofertility knowledge score was low (1.74 ± 1.82 out of 5). Although 71.8% received fertility counselling, only 53.1% were informed about fertility preservation options, and 28.2% were referred to specialists. Fertility counselling was significantly associated with higher knowledge ($p < 0.001$). Adequate information provision was the strongest predictor of pregnancy intentions (adjusted odds ratio [AOR]=12.21, $p = 0.001$). Fertility counselling (AOR=11.93, $p < 0.001$), pre-treatment counselling (AOR=5.21, $p = 0.003$), and adequate information (AOR=14.33, $p < 0.001$) predicted fertility preservation engagement. High oncofertility knowledge was associated with fertility preservation engagement (AOR=2.62, $p = 0.037$) but not with pregnancy intentions.

Conclusions

Health system performance in fertility counselling critically shapes reproductive decision-making. Strengthening counselling quality, timely delivery, and referral systems is essential for improving oncofertility outcomes in Nigeria.

Background

Breast cancer is the most common cancer diagnosed worldwide and the primary cause of cancer-related mortality among women [1]. In Nigeria, breast cancer accounts for nearly 50% of all cancer cases, with 32,278 new cases and 16,332 deaths recorded in 2022 [2, 3]. A substantial proportion of cases occur among women of reproductive age (18–49 years), with peak incidence reported at 40–44 years [4]. This epidemiological pattern is particularly significant in sub-Saharan Africa, where the peak

age of breast cancer diagnosis is approximately a decade younger than in high-income countries, resulting in a substantial burden among women who have not completed childbearing [4, 5].

As breast cancer survival rates improve and treatment duration extends, quality-of-life considerations have gained prominence [6]. Fertility represents a significant concern for women diagnosed during their reproductive years, particularly when childbearing was not completed before cancer treatment [7]. Breast cancer treatment modalities—including chemotherapy, hormonal therapy, and radiation—can temporarily or permanently reduce fertility through mechanisms such as ovarian follicle depletion and premature ovarian insufficiency [8, 9]. Hormonal therapies requiring five to ten years of treatment create additional delays that compound age-related fertility decline [10].

Oncofertility encompasses fertility preservation discussions, management of treatment-induced hormonal dysfunction, and psychosocial support related to reproductive health [11, 12]. International clinical standards from the American Society of Clinical Oncology and the World Health Organization recommend fertility counselling before initiating cancer therapy [12, 13]. However, implementation of these recommendations remains inconsistent, particularly in low- and middle-income countries (LMICs) [14]. Barriers include limited provider training, financial constraints, unequal distribution of cancer centres, and lack of public coverage for fertility services [14, 15].

In Nigeria, limited data exist on how health system fertility counselling influences reproductive decision-making among breast cancer survivors. Existing studies have focused either on knowledge or pregnancy intentions independently [16, 17], without examining how these factors interact to shape both pregnancy intentions and engagement with fertility preservation services. Furthermore, sociocultural factors, including the high value placed on childbearing and religious influences on family planning, may uniquely shape reproductive decisions in the Nigerian context [18].

This study aimed to examine the relationship between health system fertility counselling, oncofertility knowledge, pregnancy intentions, and fertility preservation engagement among reproductive-age breast cancer survivors in Abuja, Nigeria. Specific objectives were to: (1) assess oncofertility knowledge levels; (2) determine the prevalence of pregnancy intentions and fertility preservation engagement; (3) examine associations between knowledge and reproductive outcomes; (4) evaluate fertility-related counselling availability, timing, and content; and (5) identify factors associated with pregnancy intentions and fertility preservation engagement.

Methods

Study design and setting

We conducted a quantitative analytical cross-sectional study across three sites in Abuja, Nigeria: National Hospital Abuja, Federal Medical Centre Jabi, and the Network of People Impacted by Cancer in Nigeria (NEPICIN). The multisite design was selected to improve statistical power, representativeness,

and external validity, given that single-site oncology clinics often yield small survivor populations and fertility counselling practices vary by institution.

Study population

The study population comprised female breast cancer survivors of reproductive age (18–49 years) who had completed or were undergoing treatment. Inclusion criteria were: diagnosis of breast cancer between ages 18 and 49 years, at least six months post-diagnosis, cognitively able to provide informed consent, and attending follow-up care at selected facilities. Exclusion criteria were: metastatic disease with medical advice against pregnancy, documented infertility prior to cancer diagnosis, and critical illness.

Sample size and sampling

Sample size was calculated using Cochran's formula for cross-sectional studies: $n = Z^2 p (1-p) / e^2 = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2 = 384$. After adjusting for 10% non-response and a design effect of 1.2 due to multisite clustering, the target sample size was approximately 510 participants. Due to logistical constraints, data collection was completed for 273 participants across the three study facilities. Post-hoc power analysis for the primary associations (e.g., fertility counselling with fertility preservation engagement, AOR = 11.93) indicated adequate power (> 80%) to detect large effects, though power for smaller effects was limited. A stratified allocation with consecutive sampling approach was used: each facility constituted a stratum, and eligible participants were consecutively recruited during clinic days until allocated quotas were met.

Variables

The independent variable was health system performance in fertility counselling, operationalised using receipt of fertility counselling (yes/no), timing of counselling (pre-treatment/post-treatment/none), initiator of counselling (provider-initiated vs patient-initiated), referral to fertility specialist (yes/no), and perceived adequacy of counselling (Likert scale).

The mediating variable was oncofertility knowledge, measured using a structured knowledge scale covering awareness of infertility risks from treatment, knowledge of fertility preservation options, and knowledge of pregnancy safety after breast cancer. Scores were categorised as poor (0–2/5) or high ($\geq 3/5$).

Dependent variables were: (1) pregnancy intentions, measured using validated items assessing desire for future pregnancy, categorised as intends pregnancy, uncertain, or does not intend pregnancy; and (2) fertility preservation engagement, measured as participation in any fertility preservation action (e.g.,

egg/embryo freezing, ovarian tissue preservation) prior to or during treatment, categorised as engaged or did not engage.

Covariates included sociodemographic (age, marital status, education, parity), clinical (cancer stage, treatment type, time since diagnosis, menopausal status), and psychosocial/cultural factors.

Data collection instrument

Data were collected using a structured interviewer-administered questionnaire (Additional file 1). Written informed consent was obtained from each participant using a standard informed consent form (Additional file 2). The questionnaire comprised five sections: sociodemographic characteristics, clinical history, health system fertility counselling, oncofertility knowledge, and pregnancy intentions with psychosocial factors.

Validity and reliability

Content validity was ensured through expert review by specialists in oncology, public health, and reproductive health. Pretesting was conducted at a comparable facility not included in the study. Internal consistency was assessed using Cronbach's alpha ($\alpha = 0.78$ for knowledge scale items, $\alpha = 0.74$ for counselling adequacy items).

Missing data handling

Missing data were present for parity (23.8%, $n = 65$). For all other variables, missingness was below 3%. Complete case analysis was used for multivariable models, as the proportion of missing data was below the threshold expected to introduce bias ($< 10\%$ for all variables except parity). Parity was retained as a categorical variable with a separate missing category in bivariate analyses.

Data analysis

Data were analysed using SPSS version 26.0. Descriptive statistics (frequencies, proportions, means, standard deviations) summarised participant characteristics. Bivariate analyses (chi-square tests, independent t-tests) assessed associations between key variables. Hierarchical logistic regression models were constructed to identify factors associated with pregnancy intentions and fertility preservation engagement, with variables entered in blocks: Model 1 (sociodemographic), Model 2 (clinical), Model 3 (health system counselling), and Model 4 (oncofertility knowledge). Adjusted odds ratios (AOR) with 95% confidence intervals were reported. A p -value < 0.05 was considered statistically significant.

Ethical considerations

Ethical approval was obtained from the Health Research Ethics Committee of National Hospital Abuja (Ref: NHA/EC/174/2025, 31 December 2025) and the Health Research Ethics Committee of Federal Medical Centre Jabi (Ref: FMCABJ/HREC/2025/300, 26 January 2026). This study was conducted in accordance with the Declaration of Helsinki. Organisational support and participant facilitation were provided by the Network of People Impacted by Cancer in Nigeria (NEPICIN). All participants provided written informed consent, and NEPICIN confirmed that participants voluntarily agreed to take part in the study. Written informed consent was obtained from all participants (Additional file 2).

Results

Participant characteristics

A total of 273 reproductive-age breast cancer survivors participated. The mean age was 41.81 years (SD = 5.81, range: 25–50 years). Mean age at diagnosis was 39.26 years (SD = 5.84, range: 23–49 years). Most participants were married (68.9%, n = 188), had tertiary education (73.6%, n = 201), were employed or self-employed (85.0%), and were Muslim (73.6%, n = 201). Regarding parity, 39.2% (n = 107) had 1–2 living children, 36.6% (n = 100) had three or more children, and 23.8% (n = 65) had missing data.

The majority had early-stage cancer (Stages I–II) at diagnosis (69.6%, n = 190). Time since diagnosis: 60.8% (n = 166) were diagnosed 1–3 years prior, 24.2% (n = 66) > 3 years, and 15.0% (n = 41) < 1 year. Treatment regimens varied, with the most common being surgery, chemotherapy, and radiotherapy (26.4%, n = 72). The sociodemographic and clinical characteristics of participants are shown in Table 1.

Table 1
Sociodemographic and clinical characteristics of participants (N = 273)

Variable	Category	Frequency (n)	Percentage (%)
Marital status	Married	188	68.9
	Single	57	20.9
	Widow	19	7.0
	Divorced/Separated	9	3.3
Education	Tertiary	201	73.6
	Secondary	68	24.9
	Primary	3	1.1
	No formal education	1	0.4
Employment	Employed	119	43.6
	Self-employed	113	41.4
	Unemployed	40	14.7
Religion	Islam	201	73.6
	Christianity	72	26.4
Living children	1–2	107	39.2
	3 or more	100	36.6
	Missing	65	23.8
	0	1	0.4
Cancer stage	Early (I–II)	190	69.6
	Advanced (III–IV)	70	25.6
	Not sure	13	4.8
Time since diagnosis	1–3 years	166	60.8
	> 3 years	66	24.2
	< 1 year	41	15.0

Health system performance in fertility counselling

Overall, 71.8% (n = 196) of participants reported receiving fertility counselling. Among those counselled, 53.1% (n = 145) were informed about fertility preservation options, and 28.2% (n = 77) were referred to fertility or reproductive health specialists.

Oncofertility knowledge levels

The mean oncofertility knowledge score was 1.74 out of 5 (SD = 1.82, range: 0–5). Only 37.7% (n = 103) demonstrated high knowledge (≥ 3 correct answers), while 62.3% (n = 170) had low knowledge (0–2 correct).

Fertility counselling was significantly associated with high oncofertility knowledge ($\chi^2=14.139$, $p < 0.001$). Among counselled participants, 44.9% had high knowledge compared to 19.5% of non-counselled participants.

Pregnancy intentions and fertility preservation engagement

Regarding reproductive outcomes, 27.8% (n = 76) expressed intentions to become pregnant in the future, 7.7% (n = 21) did not intend to become pregnant, and 58.2% (n = 159) were uncertain. Fertility preservation engagement was reported by 54.6% of participants.

Bivariate associations

High oncofertility knowledge was significantly associated with fertility preservation engagement ($\chi^2=9.490$, $p = 0.002$) but only marginally with pregnancy intentions ($p = 0.057$). Fertility counselling showed strong associations with both pregnancy intentions ($\chi^2=15.068$, $p < 0.001$) and fertility preservation engagement ($\chi^2=97.348$, $p < 0.001$). Independent t-tests revealed that counselled participants had significantly higher mean knowledge scores (M = 1.97, SD = 1.92) than non-counselled participants (M = 1.17, SD = 1.38); $t = 3.332$, $p < 0.001$. Bivariate associations between key variables are presented in Table 2.

Table 2
Bivariate associations between key variables

Association	Test statistic	p-value	Significant
Fertility counselling ↔ High knowledge	$\chi^2=14.139$	< 0.001	Yes
High knowledge ↔ Pregnancy intentions	$\chi^2=3.616$	0.057	No
High knowledge ↔ FP engagement	$\chi^2=9.490$	0.002	Yes
Fertility counselling ↔ Pregnancy intentions	$\chi^2=15.068$	< 0.001	Yes
Fertility counselling ↔ FP engagement	$\chi^2=97.348$	< 0.001	Yes

Multivariable predictors of pregnancy intentions

Hierarchical logistic regression showed that adequate information provision was the strongest predictor of pregnancy intentions (AOR = 12.21, 95% CI: 2.68–55.52, $p = 0.001$) in the full model. Religion (Islam vs Christianity) remained significant (AOR = 4.75, 95% CI: 2.04–11.05, $p < 0.001$). High oncofertility

knowledge was not significantly associated with pregnancy intentions (AOR = 1.81, $p = 0.128$). Model fit improved substantially with the addition of health system variables (AIC decreased from 322.64 to 290.42). Table 3 displays the final hierarchical logistic regression model for pregnancy intentions.

Table 3
Hierarchical logistic regression: predictors of pregnancy intentions
(final model, Model 4)

Variable	AOR	95% CI	p-value
Age	1.08	0.99–1.16	0.061
Married (vs single)	0.81	0.35–1.89	0.623
Tertiary education	0.58	0.26–1.27	0.171
Employed	3.15	0.98–10.19	0.055
Islam (vs Christianity)	4.75	2.04–11.05	< 0.001
Has children	1.01	0.39–2.63	0.982
Early stage cancer	0.66	0.31–1.41	0.281
Recent diagnosis (< 1 year)	1.89	0.76–4.66	0.166
Currently menstruating	1.93	0.81–4.60	0.140
Fertility counselling	0.66	0.16–2.72	0.568
Counselling before treatment	3.12	0.82–11.84	0.093
Doctor initiated counselling	1.94	0.73–5.12	0.183
Adequate information	12.21	2.68–55.52	0.001
High knowledge ($\geq 3/5$)	1.81	0.84–3.91	0.128
Model fit: Log-likelihood = -130.21, AIC = 290.42			

Multivariable predictors of fertility preservation engagement

In the final model, fertility counselling (AOR = 11.93, 95% CI: 3.81–48.96, $p < 0.001$), counselling before treatment (AOR = 5.21, 95% CI: 1.77–15.33, $p = 0.003$), and adequate information (AOR = 14.33, 95% CI: 4.11–50.00, $p < 0.001$) were strong predictors. High oncofertility knowledge became a significant independent predictor (AOR = 2.62, 95% CI: 1.06–6.50, $p = 0.037$). Having children was negatively associated with fertility preservation engagement (AOR = 0.26, $p = 0.038$). Model fit improved substantially (AIC from 360.90 to 282.68). Table 4 shows the final model for fertility preservation engagement.

Table 4
Hierarchical logistic regression: predictors of fertility preservation engagement (final model, Model 4)

Variable	AOR	95% CI	p-value
Age	0.97	0.90–1.05	0.501
Married (vs single)	0.96	0.39–2.39	0.933
Tertiary education	1.68	0.71–3.99	0.238
Employed	0.66	0.21–2.03	0.467
Islam (vs Christianity)	0.81	0.35–1.87	0.624
Has children	0.26	0.07–0.93	0.038
Early stage cancer	1.01	0.45–2.28	0.983
Recent diagnosis (< 1 year)	0.64	0.20–2.07	0.447
Currently menstruating	0.82	0.32–2.14	0.688
Fertility counselling	11.93	3.81–48.96	< 0.001
Counselling before treatment	5.21	1.77–15.33	0.003
Doctor initiated counselling	0.69	0.26–1.81	0.454
Adequate information	14.33	4.11–50.00	< 0.001
High knowledge ($\geq 3/5$)	2.62	1.06–6.50	0.037
Model fit: Log-likelihood = -126.34, AIC = 282.68			

Discussion

This study provides the first quantitative evidence from Nigeria on the relationship between health system fertility counselling, oncofertility knowledge, and reproductive decision-making among breast cancer survivors. The findings demonstrate that health system performance—particularly the provision of adequate information and timely counselling—strongly influences both pregnancy intentions and fertility preservation engagement.

Comparison with existing literature

The mean oncofertility knowledge score of 1.74 out of 5 indicates a substantial knowledge gap, consistent with findings from other LMICs. A study among Chinese breast cancer patients reported similarly low knowledge levels, with most participants unaware of fertility preservation options before treatment [19]. In Ghana, Sefogah and colleagues found that non-disclosure of fertility preservation options by doctors was a major barrier to effective oncofertility discussions [20]. Our finding that 55.1%

of counselled participants still had low knowledge suggests that current counselling practices may be insufficient in content or delivery quality.

The “counselling-referral gap” observed—71.8% received counselling, but only 28.2% were referred to specialists—aligns with observations from other resource-limited settings. Martinez-Cannon and colleagues noted that even when fertility counselling occurs, referral pathways and specialist availability remain major barriers in LMICs [14]. This gap represents a missed opportunity for comprehensive oncofertility care.

The strong association between fertility counselling and fertility preservation engagement (AOR = 11.93) exceeds effect sizes reported in high-income settings. Park and Kim found that among Korean breast cancer survivors, those who received pre-treatment counselling were significantly more likely to pursue preservation [21]. The larger effect in our study may reflect the lower baseline awareness and greater information asymmetry in the Nigerian context, making any counselling exposure more impactful.

Consistent with McClam and colleagues’ findings in China [19], parity was negatively associated with fertility preservation engagement. Women who already had children were less likely to pursue preservation, suggesting that childbearing completion status is a consistent predictor across cultural contexts.

Interpretation of findings

Several mechanisms may explain why oncofertility knowledge predicted fertility preservation engagement but not pregnancy intentions. Pregnancy intentions likely reflect broader sociocultural values, partner dynamics, and religious considerations that operate independently of specific medical knowledge. The persistence of religious affiliation (Islam vs Christianity) as a significant predictor across all models supports this interpretation. In contrast, fertility preservation engagement requires specific, actionable knowledge about procedures, timing, and logistics—knowledge that counselling can effectively transmit.

The finding that adequate information provision was the strongest predictor of both outcomes (AOR = 12.21 for pregnancy intentions; AOR = 14.33 for fertility preservation engagement) suggests that information quality matters more than mere receipt of counselling. This aligns with patient-centred care frameworks emphasising that informed decision-making requires not just exposure to information but information that is comprehensible, relevant, and actionable [22].

The high proportion of participants with uncertain pregnancy intentions (58.2%) merits attention. This uncertainty may reflect genuine ambivalence, insufficient information to form intentions, or the emotional complexity of reproductive decision-making after cancer. Similar findings have been reported in other survivorship populations, suggesting that “uncertain” is a meaningful response category rather than missing data.

Implications for practice and policy

These findings support integrating standardised fertility counselling into routine breast cancer care in Nigeria. Structured counselling checklists ensuring discussion of treatment-related fertility risks, preservation options, pregnancy safety, and referral pathways could improve information adequacy. Systems should be established to ensure counselling occurs before gonadotoxic treatment initiation, as pre-treatment counselling was associated with five-fold higher odds of preservation engagement.

At the policy level, the Federal Ministry of Health should consider mandating fertility risk assessment and counselling as standard components of breast cancer management protocols. Financing mechanisms for fertility preservation services, including inclusion in cancer care benefit packages, warrant exploration. Mandatory oncofertility training modules for oncology residents and continuing medical education for practising oncologists could address provider-level barriers.

Limitations

This study has several limitations. First, the cross-sectional design precludes causal inference; temporal relationships between counselling, knowledge, and outcomes cannot be definitively established. Second, the achieved sample size ($n = 273$) was below the calculated minimum ($n = 510$), reducing statistical power for smaller effects. However, post-hoc power analysis for the primary associations (e.g., fertility counselling with fertility preservation engagement, AOR = 11.93) indicated adequate power ($> 80\%$) to detect large effects. Third, selection bias may be present as participants were recruited from follow-up care, potentially excluding survivors not engaged with health services. Fourth, self-reported data are subject to recall bias, particularly regarding counselling content and timing that may have occurred years before the interview. Fifth, missing data on parity (23.8%) were handled using complete case analysis, which may have introduced bias if missingness was not random. Sixth, the high proportion of “uncertain” pregnancy intentions (58.2%) limited the analysis of factors distinguishing clear intentions from uncertainty. Seventh, the single geographic location (Abuja) limits generalisability to other Nigerian regions with different healthcare infrastructures and cultural contexts.

Conclusions

Health system performance in fertility counselling drives reproductive decision-making among breast cancer survivors in Abuja, Nigeria. Adequate information provision and pre-treatment counselling timing are strong predictors of both pregnancy intentions and fertility preservation engagement. Oncofertility knowledge mediates the pathway to fertility preservation engagement but not to pregnancy intentions, which are more strongly influenced by sociocultural factors. These findings identify modifiable health system factors that can be targeted to improve oncofertility outcomes. Future research should evaluate structured counselling interventions through prospective designs and explore the meanings of reproductive decisions through qualitative methods across diverse Nigerian regions.

Abbreviations

AIC

Akaike Information Criterion
AOR
Adjusted Odds Ratio
ASCO
American Society of Clinical Oncology
FP
Fertility Preservation
LMICs
Low- and Middle-Income Countries
NEPICIN
Network of People Impacted by Cancer in Nigeria
SD
Standard Deviation
SPSS
Statistical Package for the Social Sciences

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Health Research Ethics Committee of National Hospital Abuja (Ref: NHA/EC/174/2025, 31 December 2025) and the Health Research Ethics Committee of Federal Medical Centre Jabi (Ref: FMCABJ/HREC/2025/300, 26 January 2026). Organisational support and participant facilitation were provided by the Network of People Impacted by Cancer in Nigeria (NEPICIN). All participants provided written informed consent, and NEPICIN confirmed that participants voluntarily agreed to take part in the study. Written informed consent was obtained from all participants (Additional file 2).

Human Ethics and Consent to Participate declarations

This study was conducted in accordance with the Declaration of Helsinki. All participants gave written informed consent.

Consent for publication

Not applicable (no individual person data).

Clinical trial number

not applicable.

Competing interests

The authors declare that they have no competing interests.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author Contribution

Author Contributions Statement
Author initials: AEI – Aisha Esther Ibrahim MIOI – Ismail-Olalere Maryam Olamide MAI – Muazu Adamu Ibrahim KTHA – Khadijat Tomilobinrin Hassan-Akerele RMI – Rukayat Morenike Ibrahim
Contributions: AEI and MIOI conceptualised the study, designed the methodology, performed data analysis, interpreted the results, and wrote the main manuscript text. MAI, KTHA, and RMI conducted the literature review, collected data, and drafted specific sections of the manuscript. All authors reviewed, edited, and approved the final manuscript. All authors contributed equally to this work. This study was conducted as a group project for the Master of Public Health programme at Ahmadu Bello University, Zaria, and all authors contributed financially equally.

Acknowledgement

The authors thank the management and staff of National Hospital Abuja, Federal Medical Centre Jabi, and the Network of People Impacted by Cancer in Nigeria (NEPICIN) for facilitating access to participants. We are particularly grateful to Mrs. Gloria Orji, President of NEPICIN, for her support. We are grateful to all breast cancer survivors who participated in this study.

Data Availability

The datasets generated and/or analysed during the current study are available from the corresponding authors on reasonable request.

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* 2021;71(3):209–49.
2. Igbokwe U, Yahaya MN, Nnebe I, Nasir AU, Salihu D, Abdullahi H, et al. Evaluating the implementation of the National Primary Health Care Development Agency gateway for the Basic Healthcare Provision Fund across six Northern States in Nigeria. *BMC Health Serv Res.* 2024;24:1404.

3. Ntekim A, Oluwasanu M, Odukoya O. Breast cancer in adolescents and young adults less than 40 years of age in Nigeria: a retrospective analysis. *Int J Breast Cancer*. 2022;2022:9943247.
4. Adesunkanmi ARK, Lawal OO, Adelusola KA, Durosimi MA. The severity, outcome and challenges of breast cancer in Nigeria. *Breast*. 2006;15(3):399–409.
5. Porter P. Westernizing women's risks? Breast cancer in lower-income countries. *N Engl J Med*. 2008;358(3):213–6.
6. Assogba ELF, Kamga AM, Costaz H, Jankowski C, Dumas A, Roignot P, et al. What are young women living conditions after breast cancer? Health-related quality of life, sexual and fertility issues, professional reinsertion. *Cancers*. 2020;12(6):1564.
7. Logan S, Anazodo A. The psychological importance of fertility preservation counseling and support for cancer patients. *Acta Obstet Gynecol Scand*. 2019;98(5):583–97.
8. Anazodo A, Ataman-Millhouse L, Jayasinghe Y, Woodruff TK. Oncofertility-an emerging discipline rather than a special consideration. *Pediatr Blood Cancer*. 2018;65(11):e27297.
9. Burns KC, Hoefgen H, Strine A, Dasgupta R. Fertility preservation options in pediatric and adolescent patients with cancer. *Cancer*. 2018;124(9):1867–76.
10. Partridge AH, Niman SM, Ruggeri M, Peccatori FA, Azim HA Jr, Colleoni M, et al. Interrupting endocrine therapy to attempt pregnancy after breast cancer. *N Engl J Med*. 2023;388(18):1645–56.
11. Oktay K, Harvey BE, Partridge AH, Quinn GP, Reinecke J, Taylor HS, et al. Fertility preservation in patients with cancer: ASCO clinical practice guideline update. *J Clin Oncol*. 2018;36(19):1994–2001.
12. Lee SJ, Schover LR, Partridge AH, Patrizio P, Wallace WH, Hagerty K, et al. American Society of Clinical Oncology recommendations on fertility preservation in cancer patients. *J Clin Oncol*. 2006;24(18):2917–31.
13. Martinez F, International Society for Fertility Preservation–ESHRE–ASRM Expert Working Group. Update on fertility preservation from the Barcelona International Society for Fertility Preservation-ESHRE-ASRM 2015 expert meeting. *Fertil Steril*. 2017;108:407–e41511.
14. Martinez-Cannon BA, Barragan-Carrillo R, Villarreal-Garza C. Young women with breast cancer in resource-limited settings: what we know and what we need to do better. *Breast Cancer: Targets Ther*. 2021;13:641–50.
15. Ranjith S, Dave A. Filling the gaps in oncofertility care by addressing challenges faced by patients and providers. *Cureus*. 2023;15(12):e50219.
16. Bamidele OO, Egonu CC, Oladejo RA. Knowledge and screening practices for breast cancer among women of reproductive age in Akodo town, Lagos, Nigeria. *Int J Community Med Public Health*. 2024;11:1437–42.
17. Effiong ME, Afolabi IS, Chinedu SN. Influence of age and education on breast cancer awareness and knowledge among women in South Western Nigeria. *Afr J Reprod Health*. 2023;27(3):87–107.
18. Iwelumor OS, Nwogu KC, Ogundipe OA. Cultural factors influencing fertility decisions among cancer survivors in Nigeria. *J Psychosoc Oncol*. 2020;38(4):456–70.

19. McClam MZ, Yan R, Su Y, Zhang Z. Knowledge, attitude, and behavior towards oncofertility among female breast cancer patients in China. Research Square [Preprint]; 2024.
20. Sefogah PE, Attah D, Swarray-Deen A, Nsaful J, Moyer CA, Oppong SA. Perspectives on fertility preservation among women living with breast cancer in Ghana. BMC Womens Health. 2025;25:409.
21. Park J, Kim A. Oncofertility experience in young women with breast cancer. J Korean Acad Fundam Nurs. 2025;32(1):82–93.
22. Stacey D, Légaré F, Lewis K, Barry MJ, Bennett CL, Eden KB, et al. Decision aids for people facing health treatment or screening decisions. Cochrane Database Syst Rev. 2017;4:CD001431.