Knowledge and Associated Risk Factors of Breast Cancer among Females in Karu Local Government Area, Nasarawa State, Nigeria

[1]UDO, SM; [2]ENE, FE; [1]IKECHUKWU, AV; [2*]GAMDE, SM; [1]YETUNDE, EA; [1]OGUNDIPE, AT, [1]OYEDUN, BD; [1]NNENNA, AG; [1]BALI, KI; [3]BIYA, A; [1]INYANG, AE; [1]OGAH, HI

[1]Federal College of Medical Laboratory Science, Jos, Nigeria
[2]Department of Medical Laboratory Science, Bingham University Nigeria
[3]General Hospital Kawo, Kaduna State Nigeria

*Corresponding Author Email: solomonmatthias85@gmail.com
*ORCID: https://orcid.org//0000-0002-7631-8782
*Tel: +2348131943803

Co-Authors Email: agnessinyang5@gmail.com; haddyibrahim74@gmail.com; udoseky@gmail.com; abigailbiya@yahoo.com; baliiliyakumfa@gmail.com; anyagracennena@gmail.com; boladeko2000@yahoo.com; walsy2108@gmail.com; bimsyetty@gmail.com; anakwevictor7@gmail.com

ABSTRACT: Breast cancer is the most common cause of cancer death in women worldwide. Many studies have identified delayed presentation, late-stage diagnosis, and inadequate treatment as the major challenges associated with poor breast cancer outcome. The number of deaths due to breast cancer is projected to increase in Nigeria. Therefore, the objective of this paper was to investigate knowledge and associated risk factors of breast cancer among females in Karu Local Government Area, Nasarawa State, Nigeria using standard methods with three hundred participants. Of the 300 participants, the majority (51.7%) have never undergone breast cancer screening like a self-breast examination, mammography, or clinical breast examination. This is a serious public health concern. The most perceived barrier to seeking timely screening for breast cancer was the lack of awareness (28%), followed by financial limitations (24.1%), fear of stigma (17.6%), lack of healthcare facilities (17.1%), and cultural beliefs (13.2%). There is a poor knowledge of breast cancer among the study participants. We advocated for breast cancer awareness campaigns and accessible screening services.

Breast cancer is a complex disease that affects millions of people worldwide. It is characterized by the uncontrolled growth and spread of cancerous cells in the breast tissue, causing a lump or mass (Gamde *et al*., 2024). Registries that represent different world regions are available and for which comparatively long time series of breast cancer were available. In 2018, about 620,000 women died of breast cancer (WHO 2019), compared to 685 000 deaths in 2020 (WHO 2021) and approximately 2.3 million women diagnosed worldwide, making it the world's most prevalent cancer among women (Sung *et al*., 2021). Unfortunately, the death rates for breast cancer in developing countries are higher when compared to the

*Corresponding Author Email: solomonmatthias85@gmail.com
*ORCID: https://orcid.org//0000-0002-7631-8782
*Tel: +2348131943803

transitioned ones, which are associated with lower survival (Nadia *et al*., 2019). In 2020, Nigeria will have one of the world's highest death rates for breast cancer, accounting for 22.7% of new cancer cases and 12,000 deaths in 2018 (Azubuike *et al*., 2018; IARC 2020; Omolara *et al*., 2021; Łukasiewicz *et al*., 2021). Surprisingly, breast cancer has no crystal clear symptoms when the tumour is small and most easily treated, which is why screening is important for early detection. Most breast cancers begin in the milk glands (lobules) or ducts that connect the lobules to the nipple and spread when the cancer cells get into the blood or lymph system to other parts of the body (Girish *et al*., 2014). The most common physical sign is a painless lump. Sometimes breast cancer spreads to underarm lymph nodes and causes a lump or swelling, even before the original breast tumour is large enough to be felt. Any persistent change in the breast should be evaluated (IARC 2016). Many studies have identified delayed presentation, late-stage diagnosis, and inadequate treatment as the major challenges associated with poor breast cancer outcomes (McCormack *et al*., 2020; Agodiri *et al*., 2023). By understanding the knowledge gaps and risk factors associated with breast cancer among females, policymakers, healthcare providers, and community leaders can develop targeted interventions aimed at raising awareness, promoting early detection, improving access to screening and treatment services, and ultimately reducing the burden of breast cancer in the region. Therefore, the objective of this paper was to investigate knowledge and associated risk factors of breast cancer among females in Karu Local Government Area, Nasarawa State, Nigeria.

MATERIALS AND METHOD
Ethical consideration: Ethical clearance was obtained from the College of Medicine and Allied Health Sciences, Bingham University, Karu, Nigeria. A written informed consent was obtained from participants, and all participants were also assured personal privacy in the questionnaire.

Study design: This is a cross-sectional survey study conducted on 300 females ages 15 to 35 from January 1 to April 1, 2024. The participants were informed of the study's objectives before information was collected using validated questionnaires on the knowledge and associated risk factors of breast cancer and their demographics.

Participants: Inclusion criteria: Eligible participants were females ages 15–35 living in the study area who gave their unreserved consent to participate in the study.

Exclusion criteria: excluded participants were those who were <15 years old or older than 35 years of age, and those who did not consent or live in the study area.

Statistical Data Analysis: An extensive statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 26. The results are presented as frequencies and percentages. The chi-square test was used to examine the relationship between variables. The level of significance was set at $p \leq 0.05$.

RESULTS AND DISCUSSION
A total of 300 participants were included in the present study. The data presented in Table 1 reveals that the highest proportion of participants falls within the age range of 15-20 years, constituting 52.7%. This is followed by the age group of 21–25 years, accounting for 39.7%, while the age groups of 26–30 and 31–35 years represent 6% and 1.7%, respectively.

Table 1: Age Range of the Respondent

		Frequency	Percent (%)
	15-20	158	52.7
	21-25	119	39.7
Age Range	26-30	18	6.0
	31-35	5	1.7
	Total	300	100.0

The result shows that 58.3% of participants possess some level of familiarity with breast cancer, with 28.7% being highly familiar and 13% lacking any familiarity at all. Furthermore, 54% of respondents are informed that breast cancer affects both genders, whereas 46% lack this awareness. Moreover, a majority (73.7%) of participants are aware of the common signs and symptoms of breast cancer, while the remaining 26.3% are not (Table 2).

Table 2: Knowledge and awareness of breast cancer among respondents

		Frequency	Percent (%)
How familiar are you with breast cancer?	Not familiar at all.	39	13.0
	Somewhat familiar	175	58.3
	Very familiar	86	28.7
Are you aware that breast cancer is not gender-specific and can affect both men and women?	Aware	162	54.0
	Not aware	138	46.0
Are you aware of the common signs and symptoms of breast cancer?	Aware	221	73.7
	Not aware	79	26.3

UDO, S. M; ENE, F. E; IKECHUKWU, A. V; GAMDE, S. M; YETUNDE, E. A; OGUNDIPE, A. T, OYEDUN, B. D; NNENNA, A. G; BALI, K. I; BIYA, A; INYANG, A. E; OGAH, H. I.

Table 3 shows that only 18% of the respondents regularly undergo breast cancer screening, while 26.7% do so but not regularly. A majority, comprising 51.7%, have never undergone breast cancer screening, and a small percentage, 3.7%, are unaware of any screening. On the other hand, 42.3% have either directly experienced breast cancer or know someone who has, while a larger proportion, 57.7%, have not had any direct experience with the disease.

Table 3: Breast cancer screening and personal experience

		Frequency	Percent (%)
Have you ever undergone breast cancer screening, such as a self-breast examination, mammography, or clinical breast examination?	Not aware	11	3.7
	No never	155	51.7
	Yes, but more than a year ago	80	26.7
	Yes, regularly	54	18.0
Have you or someone you know been directly affected by breast cancer?	No	173	57.7
	Yes	127	42.3

According to the respondents (Table 4), the most commonly cited factors believed to influence breast cancer prevalence are diet (38.1%), with alcohol (26.9%), smoking (22.7%), and exercise (12.3%) following as subsequent factors.

Table 4: Perceived factors that influence the prevalence of breast cancer

Factors	Number	Percent (%)
Diet	201	38.1%
Exercise	65	12.3%
Smoking	120	22.7%
Alcohol	142	26.9%
Total	528	100.0%

According to the respondents (Table 5), the most perceived barrier to seeking timely medical attention for breast cancer symptoms in Nigeria is lack of awareness (28%), followed by financial limitations (24.1%), fear of stigma (17.6%), lack of healthcare facilities (17.1%), and lastly, cultural beliefs (13.2%).

Table 5: Perceived barriers to timely medical attention

	Number	Percent
Financial constraints	186	24.1%
Lack of healthcare facilities	132	17.1%
Fear of stigma	136	17.6%
Lack of awareness	216	28.0%
Cultural beliefs	102	13.2%
Total	772	100.0%

In Table 6: Relationship between risk factors and personal experience of breast cancer, when queried about their frequency of engaging in sedentary activities, 71.7% responded that they do so very often, 20.7% indicated sometimes, and 7.7% stated never. In terms of physical activities, 33% reported engaging very often, 66.3% responded sometimes, and 0.7% answered never. Only 8% stated that they do not consume ultra-processed food, while 50.7% reported consuming it sometimes, and 41.3% indicated consuming it very often. Regarding alcohol consumption, 67.7% reported abstaining, 23.3% indicated sometimes, and 9% reported consuming it often. Regarding the correlation between these risk factors and the personal experiences of respondents with breast cancer, the findings suggest that there is no significant association between sedentary activity (p-value = 0.719), physical activity (p-value = 0.937), consumption of processed food (p-value = 0.604), and alcoholic beverages (p-value = 0.892) and whether the respondent or individuals they know have had breast cancer. The present study was conducted with 300 participants. The highest proportion falls within the ages of 15-20 years, constituting 52.7%, while 26–30 and 31–35 years represent 6% and 1.7%, respectively. We observed that 58.3% of the study population possessed some level of familiarity with breast cancer, with 28.7% being highly familiar and 13% lacking familiarity. Furthermore, the majority of the participants (73.7%) were aware of the common signs and symptoms of breast cancer, while the remaining 26.3% were not. Surprisingly, most of the respondents (51.7%) have never undergone breast cancer screening like a self-breast examination, mammography, or clinical breast examination. Many studies have identified delayed presentation, late-stage diagnosis, and inadequate treatment as the major challenges associated with poor breast cancer outcomes (McCormack *et al*., 2020; Agodiri *et al*., 2023). Concerning the perceived risk factors that influence breast cancer among the study participants, the most commonly cited factors are diet (38.1%), with alcohol (26.9%), smoking (22.7%), and exercise (12.3%) following as subsequent factors. Our finding is in tandem with previous studies that reported smoking, alcohol, diet, and sedentary lifestyle as risk factors for breast cancer (Arnold *et al*., 2015; Li *et al*., 2017; Sharma *et al*., 2021; Gamde *et al*., 2024). Similarly, about 20% of breast cancer in the world is attributed to the identified modifiable risk factors (Danaei *et al*., 2005). Overall, results from prospective studies suggest that increased physical activity has a protective effect for breast cancer. However, the exact mechanisms by which these lifestyle-related risk factors cause normal cells to become cancerous are largely unknown (Łukasiewicz *et al*., 2021).

UDO, S. M; ENE, F. E; IKECHUKWU, A. V; GAMDE, S. M; YETUNDE, E. A; OGUNDIPE, A. T, OYEDUN, B. D; NNENNA, A. G; BALI, K. I; BIYA, A; INYANG, A. E; OGAH, H. I.

Table 6: Relationship between risk factors and personal experience with breast cancer

		Have you or someone you know been directly affected by breast cancer?			Chi-square statistics
		No	Yes	Total	
How often do you engage in sedentary activities?	Never	12	11	23 (7.7%)	df=2
	Sometimes	34	28	62 (20.7%)	$X^2 = 0.66$
	Very often	127	88	215 (71.7%)	p-value = 0.719
How often do you engage in physical activities?	Never	1	1	2 (0.7%)	df=2
	Sometimes	116	83	199 (66.3%)	$X^2 = 0.02$
	Very Often	56	43	99 (33.0%)	p-value = 0.937
How often do you eat ultra-processed foods?	Never	16	8	24 (8.0%)	df=2
	Sometimes	88	64	152 (50.7%)	$X^2 = 1.01$
	Very Often	69	55	124 (41.3%)	p-value = 0.604
How often do you drink alcoholic beverages?	Never	116	87	203 (67.7%)	df=2
	Sometimes	42	28	70 (23.3%)	$X^2 = 0.23$
	Very Often	15	12	27 (9.0%)	p-value = 0.892

Surprisingly, a majority, consisting of 51.7%, have never undergone breast cancer screening, while 3.7% are unaware of any screening. This is a serious public health concern. Previous studies have identified delayed presentation, late-stage diagnosis, and inadequate treatment as the major challenges contributing to poor breast cancer outcomes (McCormack *et al.*, 2020; Łukasiewicz *et al.*, 2021). The most perceived barrier to seeking timely medical attention for breast cancer in the study area is the lack of awareness (28%), followed by financial limitations (24.1%), fear of stigma (17.6%), lack of healthcare facilities (17.1%), and lastly, cultural beliefs (13.2%). On the other hand, our data showed 42.3% have either directly experienced breast cancer or know someone who has. It is already established that a family history of breast cancer is a major risk factor for the disease, which increases the number of first-degree relatives affected (United Nations 2012; Shiyanbola *et al.*, 2017; Brewer *et al.*, 2020).

Conclusion: Breast cancer is poorly understood in the study area. Surprisingly, most of the respondents have never undergone breast cancer screening like a self-breast examination, mammography, or clinical breast examination. The most cited risk factors that influence breast cancer among the study participants were diet, with alcohol, smoking, and exercise following as subsequent factors.

Declaration of Conflict of Interest: The authors declare no conflict of interest.

Data Availability Statement: Data are available upon request from the first author or corresponding author.

REFERENCES

Agodirin, O; Aremu, I; Rahman, G; Olatoke, S; Akande H; Olasehinde, O; Olaogun, J; Romanoff, A (2023). Breast Cancer Treatment and Outcomes in Nigeria: A Systematic Review and Meta-analysis. *Asian Pac. J. Cancer Care*, 8 (3), 591-598. DOI:10.31557/APJCC.2023.8.3.591.

Arnold, M; Pandeya, N; Byrnes, G; Renehan, AG; Stevens, GA; Ezzati, M (2015). Global burden of cancer attributable to high body-mass index in 2012: a population-based study. *Lancet Oncol.* 16(1):36–46. doi:10.1016/S1470-2045(14)71123-4 PMID:25467404.

Azubuike, SO; Muirhead, C; Hayes, L; McNally, R (2018). Rising global burden of breast cancer: the case of sub-Saharan Africa (with emphasis on Nigeria) and implications for regional development: a review. *World J. Surgical Oncology*, 22; 16(1):63. https://doi.org/10.1186/s12957-018-1345-2.

Brewer, H; Jones, R; Schoemaker, M; Ashworth, A; Swerdlow, AJ (2017). Family history and risk of breast cancer: an analysis accounting for family structure. *Breast Cancer Res. Treat.* 165, 193–200.

Danaei, G; Vander, H; Lopez, S; Murray, CJ Ezzati, M (2005). Causes of cancer in the world: comparative risk assessment of nine behavioral and environmental risk factors. *Lancet,* 366, 1784–1793.

UDO, S. M; ENE, F. E; IKECHUKWU, A. V; GAMDE, S. M; YETUNDE, E. A; OGUNDIPE, A. T, OYEDUN, B. D; NNENNA, A. G; BALI, K. I; BIYA, A; INYANG, A. E; OGAH, H. I.

Girish Ch; Vijayalakshmi, P; Ramesh, M; Chandu, BR; Sreekanth N (2014). A Review on Breast Cancer. *Inter. J. Pharm. Biolog. Sci.* 4(2):47-54.

IARC. Handbooks of Cancer Prevention. Breast Cancer Screening. *IARC.* http://publications.iarc.fr/Book-And-Report-Series/Iarc-Handbooks-of Cancer Prevention/Breast- Cancer-Screening-2016 (2016).

IARC. Nigeria-Global Cancer Observatory. https://gcoiarcfr/today/data/factsheets/ populations/566-nigeria fact-sheets. 2020.

Li, Z; Yin, S; Zhang, L; Liu, W; Chen, B (2017). Prognostic value of reduced E-cadherin expression in breast cancer: A meta-analysis. *Oncotarget,* 2017, *8*, 16445–16455

Łukasiewicz, S; Czeczelewski, M; Forma, A; Baj, J; Sitarz, R; Stanisławek, A (2021). Breast Cancer—Epidemiology, Risk Factors, Classification, Prognostic Markers, and Current Treatment Strategies—An Updated Review. *Cancers*, *13*, 4287. https:// doi.org/10.3390/cancers13174287.

McCormack, V; McKenzie, F; Foerster, M; Zietsman, A; Galukande, M; Adisa, C; Anele, A (2020). Breast cancer survival and survival gap apportionment in sub-Saharan Africa (ABC-DO): A prospective cohort study. *The Lancet. Global Health,* 09; 8(9):e1203-e1212. https://doi.org/10.1016/ S2214-109X(20)30261-8.

Gamde, SM; Ogenyi, DO (2024). Angiogenesis in Breast Cancer: A Review. *Asian Pacific J. Cancer Biol.* 9 (1), 97-103

DOI:10.31557/APJCB.2024.9.1.97.

Nadia, H; Frédérique, P; Javier, C; Michael, G; Nehmat, H; Philip, P; Kathryn, R; Janice, T; Fatima, C (2019). Breast cancer. *Nat. Rev. Disease Primers.*5:66.

Omolara, A; Fatiregun, TO; Nwamaka, N; Lasebikan, EN; Abiola, AI; Olufunmilayo, O (2021). Breast Cancer Research to Support Evidence-Based Medicine in Nigeria: A Review of the Literature. *JCO Global Oncol.* 7:384-390.

Sharma, R (2021). Global, regional, national burden of breast cancer in 185 countries: Evidence from GLOBOCAN 2018. *Breast Cancer Res. Treat.* 187, 557–567

Shiyanbola, OO; Arao, RF; Miglioretti, DL (2017). Emerging Trends in Family History of Breast Cancer and Associated Risk. *Cancer Epidemiol. Biomarkers Prev.* 26(12):1753-1760.

Sung, H; Ferlay, J; Siegel, RL; Laversanne, M; Soerjomataram, I; Jemal, A; Bray, F (2021). Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA: A *Cancer J. Clinicians*, 05;71(3):209-249. https://doi.org/10.3322/caac.21660.

United Nations (2012). World population prospects (demographic data). Available from: HTTP://www.UN.org/esa/population/unpop.htm.

World Health Organization (WHO) | Breast Cancer. WHO, 2019.

World Health Organization. *Global Health Estimates 2016:* Disease Burden by Cause, Age, Sex, by Country and by Region, 2000–2016; World Health Organization: Geneva, Switzerland, 2018.HTTP://WWW.who.int/health info/global_burden_disease/estimates/en/index1.HTML (accessed on 9 July 2021).

UDO, S. M; ENE, F. E; IKECHUKWU, A. V; GAMDE, S. M; YETUNDE, E. A; OGUNDIPE, A. T, OYEDUN, B. D; NNENNA, A. G; BALI, K. I; BIYA, A; INYANG, A. E; OGAH, H. I.