



Breast Cancer Knowledge and Mammography Uptake among Women Aged 40 Years and Above in Calabar Municipality, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author GO was responsible for project conceptualization, acquisition and analysis of data, review of literature and preparation of draft manuscript; Author GMEN was responsible for project conception and design, coordination, statistical analysis, interpretation of data and preparation of final manuscript. Author IOO was responsible for data acquisition, review of literature and preparation of draft manuscript. Author RIEN was responsible for project methodology, statistical analysis and interpretation of data and preparation of final manuscript. Author DEL-PIII was responsible for interpretation of data and preparation of final manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: Breast cancer is the commonest cancer among women globally. Early screening remains a critical approach to reducing morbidity and mortality. Mammography, one of such screening tools, is vital in improving outcomes and survival. However, poor knowledge and ignorance have been touted as major barriers to health services uptake in Low/Middle-income countries. This study therefore determined breast cancer knowledge and mammography uptake among women aged ≥ 40 years in Calabar Municipality.

Methods: A cross-sectional study design was used to elicit information from 365 women that were

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randomly selected using a semi-structured questionnaire. Data analysis was carried out using SPSS version 20. The results were descriptively presented by frequencies and percentages. Pearson Chi-Square (χ^2) analysis was performed to detect the association between variables at 5% level of significance (p -value of ≤ 0.05).

Results: Majority of the 365 study participants 121 (33.3%) were aged between 40 – 44 years and had attained tertiary level of education 231 (63.2%). Most of the respondents had low knowledge score 214 (58.6%) of breast cancer and mammography. Only 36 (9.9%) of the respondents have had mammography out of which most 22 (61.0%) used it only once. Knowledge level of breast cancer and mammography was statistically significantly associated with uptake ($p = .00001$). Conversely knowledge of breast cancer and mammography was not statistically significantly associated with educational attainment ($p = .54$).

Conclusions: Knowledge level of breast cancer and uptake of mammography among women aged ≥ 40 in Calabar Municipality was very poor. The need to increase awareness about breast cancer and breast cancer screening are highly advocated.

Keywords: Breast cancer; mammography; knowledge; uptake; women ≥ 40 years; calabar.

1. INTRODUCTION

Breast cancer is a health problem affecting both the developing and developed world with a rapid incidence increase in developing countries. Breast cancer is an uncontrolled growth of breast cells. These cells form a tumour that can often be seen on an x-ray or felt as a lump [1]. These tumours can be benign or malignant. Malignant tumours are cancerous and if left unchecked, they spread to other parts of the body. Breast cancer affects both men and women but common in women affecting over 1.5 million women yearly. The risk of breast cancer doubles every year until menopause, after which it decreases. Breast cancer is however more common in post-menopausal women [2]. Breast cancer is a serious public health issue worldwide [3]. The greatest number of cancer-related deaths among women is attributed to breast cancer. While breast cancer is thought to be a disease of the developed world, nearly 50% of breast cancer cases and 58% of breast cancer deaths occurred in less developed countries [4]. Breast cancer is becoming a serious public health challenge in low-resource countries. In sub-Saharan Africa, it is the commonest cancer in women after cervical cancer. The breast cancer burden as at 2012 was reported to be about 100,000 per year and about 49,000 deaths per year [5]. In many parts of the developed world, incidence and mortality rates of breast cancer have remained stable and even decreasing in the last two decades. In Africa however, the trend has been on a rapid increase. Even with a relatively low incidence rate, age standardized mortality rate is highest globally in Africa, with Nigeria having the highest mortality rates [6]. One in four cancer diagnosis and one in

five cancer deaths in African women are breast cancer related [7].

Nigeria is Africa's most populous nation with about 20% of the continent's population and slightly over half of West Africa [8]. Nigeria contributed about 15% of the breast cancer cases in Africa in 2008 [9] with approximately 100,000 new cases every year [7]. Breast cancer presentation in Nigeria has been reported to occur 10 years earlier than in the Western world [10]. This has been reported to be as a result of increased adoption of western lifestyle and diet which is worsened by poor knowledge and attitudes towards cancer-related issues [11]. Evidence shows that early detection and intervention remains vital in improving the outcome and survival of breast cancer. This is the mainstay of any breast cancer control program [12]. Breast cancer screening practices however remain poor in Nigeria [13]. Early breast cancer screening services such as breast self-examination (BSE), clinical breast examination (CBE) and mammography remain pivotal to reducing breast cancer-related morbidity and mortality [10-14]. The breast cancer screening method that has proved to be effective in pre-symptomatic breast cancer is mammography [15]. Mammography has been used in developed countries with considerable success but very little is known about this imaging modality in low resource settings including Nigeria [16]. Many of the studies on breast cancer screening in Nigeria have focused on clinical breast examination and breast self-examination.

This study therefore determined the knowledge of breast cancer and uptake of mammography as a breast cancer screening service among women

aged 40 years and above in Calabar Municipality, Cross River state, Nigeria.

2. METHODS

The study area: Calabar Municipality, capital of Cross River State, located in the South-South region of Nigeria. Calabar Municipality lies between Latitude $04^{\circ} 15'$ and 5° N, and 5° E. It has an area of 406 square kilometres, with an estimated population of 371,022 people as of 2006 census. It comprises ten (10) Political Wards. There are two indigenous ethnic groups (the Quas and Efiks), but its cosmopolitan nature attracts non-indigenes from several other parts of Nigeria and the world at large. Major occupations of the indigenes are fishing and farming. Located within Calabar Municipality are several healthcare facilities including one Tertiary health facility, one Navy Reference Hospital, one General Hospital, 29 primary health centres and about 18 privately owned health facilities. There were three functional Mammography screening centres in Calabar Municipality at the time of this study, domiciled in Asi Ukpo Diagnostics & Medical Centre, Navy Reference Hospital and Arubah Specialist Hospital & Diagnostics.

Study population and design: The study population comprised women aged 40 years and above in Calabar Municipality. Only women aged 40 years and above, and resident in Calabar Municipality were used for the study, while women who were aged below 40 years were excluded from the study. A descriptive cross-sectional study design using quantitative method of data collection was used in this study.

Sample size determination / Sample size: The sample size was calculated using Bluman formula [17] and inputting the values for mammography awareness rate of 40.5% reported by previous study Amoran, Toyobo, & Fatugase [18], 95% confidence interval and margin of error of 5%. The desired sample size thus arrived at after taking into account a possible 10% non-response rate was 411 of women 40 years and above.

$$n = \frac{Z^2 pq}{d^2}$$

Where n = desired sample size

z = confidence interval at (95% = 1.96)

p = (Mammography awareness rate - 40.5% Amoran, Toyobo, & Fatugase.[18])

q = (1-p) proportion of non-occurrence – 59.5%

d = 5% Precision

Therefore:

$$n = \frac{370.3}{0.05} = 370.3 = 411$$

$$1 - 0.1 \ 0.9$$

Sampling methods: The study setting was purposively selected due to the availability of Mammography screening facilities in some health facilities in the study area. A multi-stage sampling technique was thereafter used to randomly select 411 women aged 40 years and above for the study. In stage one, five (5) out of the 10 political wards were selected through simple random sampling. Stage two, consisted of the selection of streets from the selected political wards. A total of 30 streets were randomly selected from the five political wards and used for the study. Systematic sampling method was used in stage 3 to select 14 households from each of the 30 selected streets giving a total of 420 households. The sampling at this stage employed a fixed interval and a random starting point to select households from the selected streets, where the interval (K) was determined by dividing the total number of households by the desired number of households to be sampled. Stage 4 involved the selection of at least one eligible respondent from each of the randomly selected households. Through this method, a total of 411 women aged 40 years and above were recruited for the study.

Method of data collection: The instrument for data collection was a semi-structured questionnaire which was prepared based on the research objectives. It consisted of 5 sections (A, B, C, D and E). Section A elicited information on socio-demographic characteristics of the respondents, section B on knowledge of breast cancer and mammography screening, Section C on perceptions of mammography screening, section D on uptake of mammography screening and section E elicited information on factors influencing uptake of mammography among women aged 40 years and above. The research instrument was pre-tested for reliability using 10% of the sample size (41) women aged ≥ 40 years in Calabar South Local Government Area of Cross River State, that share similar characteristics with the study area.

Method of data analysis: A total of 365 copies of the questionnaire were retrieved, giving a response rate of 88.8%. Each completed questionnaire was checked manually to ensure

that there was no missing information. The data were analysed using Statistical Packages for the Social Sciences (SPSS) version 20. The results were descriptively presented by frequencies, percentages and charts. Pearson Chi-Square χ^2 analysis was performed to detect the association between variables at 5% level of significance (p -value of ≤ 0.05).

The Knowledge level on breast cancer and mammography was analysed by scoring questions and statements in the relevant section of the questionnaire. The scoring range of was 5 (maximum) to 0 (minimum). A cut-off score of 0-1 was considered as low, 2-3 was considered as moderate, and 4-5 was considered as high.

3. RESULTS

Majority of the respondents 121 (33.1%) were aged 40-44 years followed by those aged 45-49 years 110 (29.6%). There was a preponderance of the respondents 263 (72.0%) that were married. The occupation distribution shows 214(58.6%) were civil/public servants were the predominant occupation. Majority of the respondents 231(63.2%) had tertiary education with those who had no formal education 14(3.8%) were the least. Similar proportion of respondents were categorized as low income

earners 133(36.4%) with monthly income of \leq N30,000 and 134(36.7%) classified as belonging to the high income earners' category with monthly income of \geq N71,000 respectively. Almost all respondents 363(99.4%) were Christians while 2(0.6%) respondents were Muslims (Table 1).

3.1 Knowledge of Breast Cancer and Mammography

Majority of the respondents had low knowledge level 214(58.6%) of breast cancer and mammography, 126(34.5%) had a moderate knowledge level, while only 25(6.8%) had a high knowledge level (Fig. 1). The mean knowledge score was 1.28 with a standard deviation of 1.44 (Table 2). The information elicited from respondents that were used to infer the knowledge score included; knowledge about breast cancer (a lump in the breast that can spread and cause death), how breast cancer can be screened and diagnosed, whether they have heard about mammography; what mammography is used for, how mammography is done, what age they thought mammography should be started, when they thought one should go for a mammogram, and how often mammography should be done.

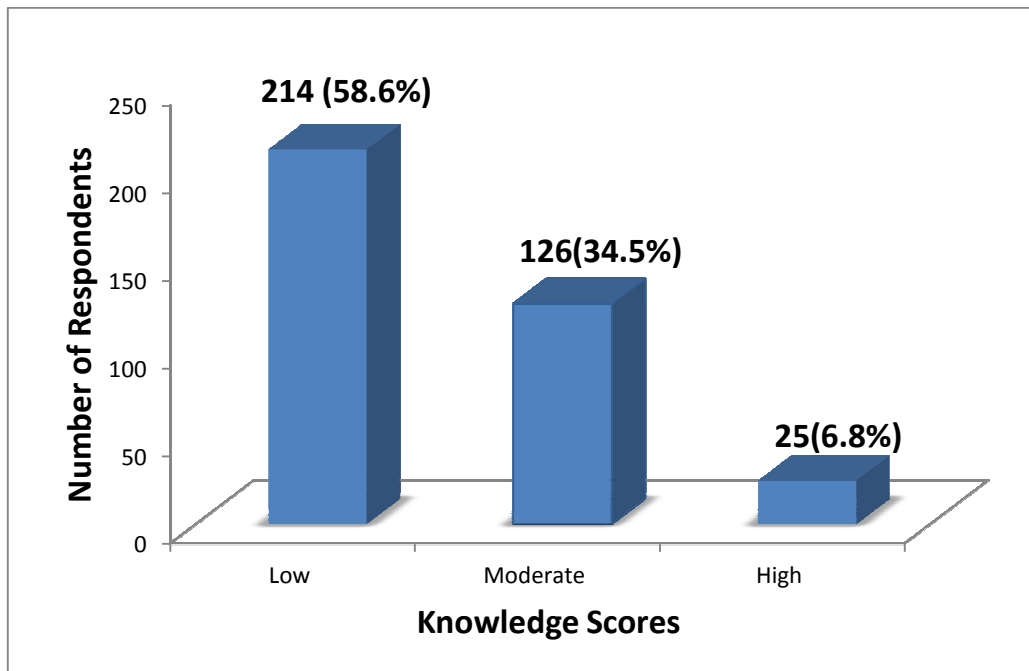


Fig. 1. Breast cancer/mammography knowledge scores of respondents

Table 1. Socio-demographic characteristics of respondents

Characteristics	Frequency (n= 365)	Percentage (%)
Age (in years)		
40-44	121	33.1
45-49	108	29.6
50-54	82	22.5
55-59	35	9.6
≥60	19	5.2
Educational Level		
No formal education	14	3.8
Primary	34	9.3
Secondary	86	23.5
Tertiary	231	63.2
Marital status		
Married	263	72.0
Single	40	11.0
Widowed	48	13.1
Divorced	5	1.4
Separated	9	2.4
Religion		
Christianity	363	99.4
Islam	2	0.6
Denominational affiliation		
Pentecostals	173	47.3
Catholics	3	0.8
Deeper Life Bible Church	65	17.9
Jehovah's Witnesses	59	16.1
Protestants	65	17.9
Occupation		
Civil/Public Servant	214	58.6
Business	86	23.6
Farming	15	4.1
Unemployed	11	3.0
Retired	16	4.3
Health workers	23	6.3
# Income level (₦ Naira)*		
Low income (<₦ 30000)	133	36.4
Mid income(₦31000– ₦70000)	98	26.9
High income (≥₦71000)	134	36.7

*₦ (Nigerian Naira). # Income level categorizations are based on the Nigerian national minimum wage of ₦30000 per month, at the exchange rate of one USD to ₦474.00

Table 2. Respondents' Overall knowledge score on breast cancer and mammography

	Frequency	Percentage %	Mean	SD
Low	214	58.6		
Moderate	126	34.5	1.28	1.44
High	25	6.8		
Total	365	100.0		

3.2 Uptake of Mammography Screening by Respondents

Few respondents 36 (9.9%) had undergone mammography examination. A greater proportion of the respondents 329(90.1%) had not done a

mammography examination. Out of the respondents that had undergone mammography examination, majority 22(61.0%) had done it only once, 8(22.0%) twice, 2(6.0%) three times while 4(11.8%) had done it more than three times respectively (Table 3).

Table 3. Uptake of mammography

Variable	Frequency (n =365)	Percentage %
Mammography uptake		
Uptake	36	9.9
No Uptake	329	90.1
Frequency of uptake		
Once	22	61.0
Twice	8	22.0
Thrice	2	6.0
More than thrice	4	11.0

3.2.1 Association between respondents' breast cancer and mammography knowledge score and educational level/uptake of mammography

The association between respondents' breast cancer and mammography knowledge score and educational level/uptake of mammography are shown on Table 4. The greater proportion of respondents 214(58.6%) had low knowledge of breast cancer and mammography, with the majority 135(36.9%) in the tertiary education level. Of the respondents with high knowledge score 25(6.8%), 16(64%) had tertiary education, and 6(24%) had secondary education. Knowledge level of breast cancer and mammography was not statistically significantly associated with educational attainment ($\chi^2 = 5.06$, p-value = 0.54). Conversely, mammography uptake was statistically significantly associated with knowledge score ($X^2 = 171.81$, p-value = <0.00001); as uptake was highest among respondents with high 21(58.3%) and lowest among respondents with low knowledge level 3(8.3%).

3.3 Factors Influencing Uptake of Mammography

Table 5 shows factors influencing uptake of mammography, categorized into three major sub-groups: knowledge, access, and uptake motivating factors. Most respondents indicated that knowledge related factors were the most influencing for mammography uptake with the majority 164(44.9%) being those who were ignorant of what mammography is all about. Access related factors influencing mammography uptake were the least reported by the respondents, with transportation 33(9.0%) and cost 21(5.7%) prominent among variables in this category. Of the uptake motivating factors, the majority of respondents 145 (39.7%) and

123(33.6%) would have a mammography if they received encouragement by health workers and if they had a breast problem respectively.

4. DISCUSSION

Early detection of breast cancer is pivotal to reducing its public health burden. However, early detection is predicated on breast cancer screening. This study investigated the knowledge level about breast cancer and mammography as a screening tool among women aged 40 years and above in a metropolitan city in Nigeria. This study revealed that more than half of the respondents had low knowledge level of breast cancer and mammography. This is similar to a study conducted by Elsie et al, [18] among women in Uganda, Amoran et al. [19] in Sagamu local government area of Ogun State, Nigeria, Ayoola, and Oyedunni [20] in Ibadan and Akwo et al. [21] in which majority of the women did not know about mammography.

The dearth of knowledge on breast cancer and mammography may in part be contributory to the increasing rise of breast cancer prevalence with concomitant poor breast cancer outcomes in Low- and middle-income countries [22-25]. Researches have shown direct link between knowledge and positive health-seeking behaviours and utilization of healthcare services [3,6,26,27]. The low knowledge level observed in this study begs for urgent attention if this rise is going to be checked particularly since more than two-third of respondents in this study had attained tertiary level of education. This then reveals that high educational attainment did not translate to high knowledge about breast cancer and mammography (p = 0.535). Thus, the need for deliberate mounting of awareness and sensitization programmes on breast cancer to stem the rise.

Table 4. Relationship between respondents' breast cancer and mammography knowledge score and educational level/uptake of Mammography

Test variable		Low knowledge	Moderate Knowledge	High knowledge	Chi-square (χ^2)	p- value
Educational level	No Formal Education	10	2	2	5.06	0.54
	Primary	18	15	1		
	Secondary	51	29	6		
	Tertiary	135	80	16		
Uptake of mammography	Have done	3	12	21	171.81	<0.00001
	Have not	211	114	4		

Figures in parenthesis represent percentages, Statistical significance based on p-value < 0.05

Table 5. Factors influencing uptake of mammography

Factors	Variable	*Frequency (n=365)	Percentage
Knowledge	I don't know what mammography is	164	44.9
	It is painful and frightening	24	6.5
	I am not old enough to do mammography exam	7	1.8
	I'm afraid of being diagnosed with cancer	5	1.3
	I don't think I will have breast cancer	70	19.1
	My religion will not allow me go for such test	62	16.9
	Others	37	10.1
Access Factors	No facility to do the mammography	22	6.0
	It is expensive	21	5.7
	The screening centre is far from where I live	16	4.3
	My husband refused for me to go for the test	2	0.5
	I don't have transport money to go and do the test	33	9.0
	Others	24	6.5
Uptake motivating factors	Breast problems	123	33.6
	Family history/friend with breast cancer	19	5.2
	Health worker encourages me to go do the mammography exam	145	39.7
	Health campaign on breast cancer	18	4.9
	Friend's advice	7	1.9
	Free medical services	31	8.4
	Others	5	1.3

*Multiple responses allowed

Uptake of mammography in this study was extremely poor as only 9.9% of the respondents had ever had a mammography examination. This poor uptake of mammography observed in this study was similar to mammography screening rate in studies conducted by Elsie et al. [18] in Mulago, Uganda and Eman and El-Nasr, [28] in Cairo; lower than that of Akwo et al. [21] but higher than the screening rate reported by Olashinde et al. [24] of uptake of mammography of 2.8% in Ife and 1.8% in Iwo, both in Osun State, Nigeria and Gali [29] in Borno, Nigeria. Elsie et al, (2010) equally reported low uptake of mammography among women in Uganda. The aforementioned reveals that low uptake of mammography is not only an issue in Nigeria

alone but also in Africa. The contrasting findings by Marinho et al. [30] in Australia and Scotland of high uptake of mammography by respondents. This could probably be due to the fact that most of these countries in Africa do not have an established national screening program compared to developed countries [23,24,31].

The suffusing low knowledge level of breast cancer and mammography observed in this study may have significantly contributed to the low uptake of mammography. This is evidently reflected in the fact that most of this study's respondents identified lack of knowledge, ignorance and myths as major factors influencing mammography uptake. This is similar to findings

of Bello et al. [31]; Ayoola, and Oyedunni [20], Azubuike and Okwuokei [26], Olashinde et al. [24] and Akwo et al. [21]. Another perspective to this low uptake of mammography observed in this study conducted in a metropolitan setting where mammogram facilities exist x-rays the potential urban-rural differential in uptake and further demonstrates the need for targeted breast cancer awareness programmes. Therefore, Awareness programmes will not only help improve breast cancer screening rates but would help in dispelling myths surrounding breast cancer and invariably improve outcomes.

Additionally vantage potential area of targeted awareness programme that has been revealed by the findings of this study is the need to strengthen the knowledge of healthcare providers to improve prompt referrals of women with suspected breast problems. This was strongly indicated by majority of the respondents (39.7%) in this study that reported that advice from a healthcare worker would motivate their uptake of mammography. This notion was corroborated by findings of Ayoola and Oyedunni [20], Madubogwu et al, [32], Olashinde et al. [24] and Akwo et al. [21].

However, increasing knowledge level without giving requisite consideration to issues of access to breast cancer screening facilities may produce minimal desired results. Findings of this study shows that majority of the respondents reported cost of mammography examination and transportation cost to screening centres as the most access limiting factors to mammography uptake. This is not surprising, as many Nigerians live below poverty lines and financial issues remain potent challenges to utilization of healthcare services [33] Olashinde et al, [24] [25]

5. CONCLUSION

Knowledge level and uptake of mammography among women aged ≥ 40 in Calabar Municipality was very poor. High level of educational attainment did not translate to high knowledge about breast cancer and mammography. The need to increase awareness and sensitization programmes about breast cancer and breast cancer screening are highly advocated.

CONSENT AND ETHICAL APPROVAL

Ethical approval was obtained from the Ethics Committee of the Department of Public Health following a thorough review of the research

proposal. A copy of the approval was tendered to the Management of the Health facilities where the study was conducted. The study participants were informed of the purpose of the research, and verbal informed consent obtained from the respondents before administering the questionnaire. All the respondents were assured of anonymity and confidentiality. They were also informed that participation in this study was voluntary and that participants were at liberty to discontinue from the study if they no longer felt comfortable with the issues raised in the questionnaire.

DISCLAIMER

Authors have declared that no competing interests exist. Also, the research was not funded by any producing company rather it was funded by personal efforts of the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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