Original Article

Risk factors for breast malignancy among women presenting with breast masses in a Teaching Hospital in Lagos, Nigeria

Abstract

Background

Breast cancer is the commonest female malignancy globally with increasing prevalence in Nigeria. This study aimed at identifying factors associated with malignant breast masses among women with breast masses receiving care at the Lagos University Teaching Hospital (LUTH).

Materials

This cross-sectional, descriptive study investigated 100 women with breast masses by history-taking, clinical breast examination and biopsy for histopathology assessment. Sociodemographic characteristics, family, social, gynecologic, and obstetric history were obtained, and features of breast mass on examination were documented and histology specimens were taken for assessment. The proportion of women with malignant breast masses by biopsy was calculated. Using binary logistic regression analysis, factors associated with malignant breast masses were identified. Significance level was set at $p \leq 0.05$

Results

The mean age of participants was 39.4±13.4 years. Most were married (63.0%), overweight (53.0%) and had tertiary level of education (58.0%). The right breast was affected in 56% of women, while most breast masses were oval (49.0%). History of breast pain, exclusive breast feeding and nipple retraction was reported in 76.0%, 35.0% and 17.0% respectively. Malignant breast masses were identified in 46.0% of women and associated factors included increasing age (OR=10.95 – 442.00; p<0.05), married women (OR=6.96; p: 0.001), obesity (OR= 16.20; p: 0.003). Clinical symptoms associated with malignant breast mass included history of previous breast mass (OR = 3.93; p: 0.028), breast pain (OR = 3.07; p: 0.023), nipple retraction (OR=7.44;0.003) and nipple discharge (OR = 10.24; 0.003)

Conclusion

The study found that a high percentage of breast masses assessed by biopsy were malignant among the studied populace. Factors significantly associated with increased risk of malignant breast mass included increasing age, obesity, and marital status. We recommend lifestyle modification as well as adoption of primordial and primary prevention measures in tackling problems related with breast cancer among Nigerian women. This should also include the improvement of access to such services.

Keywords: Breast mass, malignancy, risk factors, Nigeria.

INTRODUCTION

Breast diseases are reportedly issues of global public health relevance. They have been described as the commonest causes of cancer-related deaths with a disease prevalence of 1 in 100 deaths worldwide and are responsible for up to 1 in 15 cancer-related deaths (Ayoade et al., 2012; Gokhale, 2009; Koo et al., 2017). Breast masses are common, have different manifestations and can either be benign or malignant. Fibroadenoma is the most common breast lesion with fibrocystic breast disease and breast malignancy coming after it (Gokhale, 2009).

Breast cancer has been described as the commonest female malignancy globally, within the Africa continent and in Nigeria (Ghonchen et al., 2016). It has been implicated in up to 25.1% of female cancers with approximately 1.7 million new cases reported in 2012 with associated mortality of about 521,907 patients. The burden of female breast cancers in Nigeria obtained from cancer registries in 2010 has been estimated to be about 138.6 per 100,000 of the population, showing a substantial rise in incidence from previous records (Jedy-Agba et al., 2012). Projections have also been made that as much as 12% of all women will have breast cancer and almost 3.5% will die of the disease (Jedy-Agba et al., 2012). This puts breast cancer as the commonest female cancer and commonest cancer-related cause of deaths among the female gender (Adebamowo & Ajayi, 2000; Torre et al., 2015).

The prevalence of breast cancer-related diseases is reported to be on the increase among Africans and Asians, owing to various factors including the adoption of westernized practices such as a change in diet, industrialization as well as late marriages (Agbo et al., 2014). Other factors include late case presentation, lack of awareness about the diseases and poor availability of screening practices (Agbo et al., 2014). The incidence of breast cancers in West Africa is 38.6% and is said to be highest in Mauritius followed by Nigeria (Azubuike et al., 2018). Even though Africa is rated among the countries with low prevalence of breast cancer, the highest age standardized breast cancer rates are still recorded within the continent and Nigeria has the highest mortality rates (Azubuike et al., 2018). Benign breast masses are reported to be more common than their malignant counterparts in Nigeria with fibro adenoma being the most common. The ratio of benign to malignant lesions is 2.3:1 (Anyikam et al., 2008; Uwaezuoke & Udoye, 2014). In as much as benign lesions are commoner than the malignant lesions, these

malignant variants are of utmost concern in Nigeria because of the huge burden and high incidence (Adebamowo & Ajayi, 2000; Torre et al., 2015).

A number of explanations have been given to why the burden of disease seems to be increasing in Nigeria. Obajimi and colleagues found a strong correlation between ultrasound breast density, parity, demographic features and the prevalence of breast cancer (Obajimi et al., 2014). Other authors have also suggested that financial barriers were also a limitation to accessing breast cancer screening programs, which were designed for early detection of cancers (Okoronkwo et al., 2015), and could be a reason for an upsurge in breast cancer cases. Low levels of breast cancer knowledge, its risk factors and poor practice of breast self-examinations among women have also been implicated (Awodele et al., 2009; Okobia et al., 2006). In another study, the rising burden was attributed to the fact that there were delays in both presentation and initiation of treatment for these diseases. This was said to be related to poor referral systems from traditional attendants and prayer houses where proportions of the populace go to when they notice certain breast abnormalities (Azubuike & Okwuokei, 2013). It has also been reported that the fear of mastectomy was another common reason why women presented late with breast metastatic diseases (Ajekigbe, 1991)

The exact cause of breast cancer is still yet unknown; however, several factors have been associated with the occurrence of breast cancers. These include advancing age, lifestyle changes, urbanization, radiation exposure, strong family history of breast cancer in close relatives, and reproductive factors like early menarche, late menopause, and null parity (Centers for Disease Control and Prevention, 2021; Okobia et al., 2006; Singletary, 2003)(Singletary, 2003). Hormonal factors have also been implicated as increased estrogen is regarded as a strong factor. Other factors include history of other cancers in index patient, atypical benign breast changes, obesity, genetic mutations (BRCA 1 AND 2 genes), increased breast density, hormone replacement therapy (Ataollahi et al., 2015; Kluttig & Schmidt-Pokrzywniak, 2009), low physical activity, poor nutrition, racial predispositions, alcohol and smoking among others (Centers for Disease Control and Prevention, 2021).

The problem of breast cancer among the Nigerian population has been shown to indeed exist (Adebamowo & Ajayi, 2000; Torre et al., 2015) and this has been associated with a number of known and emerging factors (Centers for Disease Control and Prevention, 2021; Okobia et al.,

2006; Singletary, 2003). Considering that the burden continues to increase within Nigeria, it is imperative to identify the factors associated with breast malignancy in Nigerian women which will enable a high index of suspicion, early diagnosis, prompt intervention and favourable outcome for its treatment. This study thus set out to determine the patterns and risk factors associated with breast cancer among women with breast masses receiving care at the Lagos University Teaching Hospital.

METHODS

The study was carried out at the Lagos University teaching hospital located in Lagos state, Nigeria which runs two busy breast out-patient clinics, a multi-disciplinary breast clinic (MDT) which is the only one available in West Africa, a busy Radio-oncology and well-woman clinics. These served as the study sites from which samples were recruited for the study.

The study utilized the cross-sectional design and assessed female patients with breast masses referred from the afore-mentioned study sites to the department of Radiodiagnosis of the Lagos University Teaching Hospital. All patients who detected a breast lump on self-examination, who were referred from physicians, who had a breast mammogram or who had an incidental discovery of a breast mass on routine ultrasound examination were recruited into this study. Another inclusion criterion was that the participants had to be within the age range of 15 to 70 years. All patients who had masses with dense calcifications on mammography or ultrasonography, those that had previous surgeries or breast trauma, those with breast implants and all who presented with histologically confirmed malignancy were excluded from the study.

The Cochran formula for estimation of a simple proportion in population was used to calculate the sample size for this study. In the calculation, “Z” (the standardized normal deviate at 95% confidence level was taken to be 1.96), the prevalence (p) of breast cancer in Nigeria was taken to be 5.4% (Awodele et al., 2011) and “d”, the tolerable margin of error was taken to be 0.05. This gave a total of 78 to which a 10% attrition rate was added and the overall sample size was rounded up to 100.

A structured proforma was used to obtain information on the socio-demographic characteristics, social history and detailed obstetric and gynecological history of all participants. Findings from a comprehensive breast examination with particular description of the breast mass were recorded

in the proforma. Finally, biopsy report on the breast mass formed the last part of the proforma.

This study was conducted among women with breast masses who were consecutively recruited from the Radio-oncology and well-woman clinics of LUTH between August 2019 and December 2019. All eligible women were educated about the objectives, procedure and benefit of the study. Details were given in simple English language; eligible participants were allowed to ask questions and answers were given. A written informed consent was extracted from patients who were satisfied with the explanations and willing to freely participate in the study. Recruited participants were thereafter clerked to obtain sociodemographic characteristics, family and social history, onset, progression, shape of the breast mass. Associated breast pain, deformity, colour changes were also explored and documented. Participants had a clinical breast examination carried out on them in a separate examination room dedicated to the study that guaranteed strict privacy. All examination was done by two doctors involved in the research. The features of the breast masses were characterized and documented in the study proforrma. The breast mass was biopsied in such a manner that ensured very minimal discomfort to the participants. A biopsy gun with 14- or 16-guage Tru-cut needle was used to obtain 3 core specimen which were preserved in formalin and sent to histopathology laboratory for analysis.

The data collected was entered and collated using the Microsoft Excel spreadsheet and the Statistical Package for Social Sciences (SPSS) was used for data analysis. Results were presented using frequency distribution tables and were expressed as mean, standard deviation, frequencies and percentages. The dependent variable was considered to be the presence or absence of breast cancers as defined by the biopsy report while the independent variables included the socio-demographic, obstetric and gynecological history of the study participants. Factors related to breast malignancy were identified using a binary logistic regression analysis. Significance level was set at $p \leq 0.05$.

RESULTS

Sociodemographic Characteristics of Participants and features of breast mass

A total of one hundred women who presented to the health facility with breast masses were involved in this study. Modal age group was between 41 – 50 years (28.0%), while the mean age of women in the study was of 39.4 years with a standard deviation of 13.4 years (Table 1). Majority of the women were married (63.0%), and had a mean age of menarche at 13.3 ± 1.8

years. Number of children ranged between 0 and 8 children, with 2 children being the median number of children (Table 1). Most of the women had also received tertiary education as the highest education attainment (58.0%) and were mostly within the body mass index (BMI) category of overweight (53.0%).

Features and known risk factors of breast cancer among study participants

As shown in Table 2, most of the breast masses were present within the right breast (56.0%), in the third breast quadrant (36.0%) and had an oval shape (49.0%). Furthermore, the breast masses were associated with a history of breast pain in majority of the women (76.0%) and about one third of the women practiced exclusive breast feeding (35.0%). Fifteen percent of the respondents reported having a history of previous breast mass and nipple discharge, while slightly above this proportion complained of nipple retraction (17.0%). There was also a family history of breast cancer and history of ovarian cancer in 11.0% and 3.0% of study participants, respectively (Figure 1).

The presence of malignant breast mass among participants

Biopsy reports for breast masses that were examined during the study showed that 46 of the breast mases (46.0%) were malignant while 54.0% were benign (Figure 2).

Relationship between sociodemographic factors and the presence of breast cancer

As shown in Table 3, the likelihood of a breast mass being malignant increased significantly with age among study participants ($p < 0.05$). Participants in the fourth decade of life were 10 times (OR – 10.95; p – 0.030), and those in the fifth decade were 65 times (OR – 65.00; p – 0.001) more likely to have a malignant breast mass than participants less than 30 years of age (reference group). Married women (OR – 6.96; p – 0.001), obese women (OR – 3.72; p – 0.03) and women

in gainful employment (formal employment: OR – 12.14; p – 0.001; self-employed: OR – 9.68, p – 0.001) demonstrated a significantly higher risk of having a malignant breast mass.

Relationship between clinical history and the presence of breast cancer

Post-menopausal women (OR – 18.71, p – 0.006), women with previous history of breast mass (OR = 3.93, p – 0.028), history of nipple retraction (OR = 7.44; p – 0.003) and history of nipple discharges all showed greater odds of having a malignant breast mass than their counterparts without the history of these predisposing factors (Table 4). However, a positive family history of breast cancer, history of exclusive breast feeding, use of oral contraceptive pills, ovarian cyst, smoking and alcohol use, were not significantly ($p > 0.05$) related to the occurrence of a malignant breast mass in this study population (Table 4).

Table 1: Sociodemographic Characteristics of Participants in the study

Characteristics	Frequency (N = 100)	Percent (%)
Age of Participants		
• ≤ 30 years	27	27.0
• 31 - 40 years	27	27.0
• 41 - 50 years	28	28.0
• > 50 years	18	18.0
Mean age of Participants in years (SD*)	39.4 (13.4)	
Marital Status		
• Single	37	37.0
• Married	63	63.0
Mean age of Menarche in years (SD*)	13.3 (1.8)	
Median number of children (Range)	2 (0 – 8)	
Highest Educational Attainment		
• Primary	6	6.0
• Secondary	36	36.0
• Tertiary	58	58.0
Nutritional Status		
• Underweight	11	11.0
• Normal Weight	13	13.0
• Overweight	53	53.0
• Obese	23	23.0
Mean body mass index in Kg/m^2 (SD*)	26.3 (4.8)	
Occupational Status		
• Formal Employed	31	31.0
• Self Employed	43	43.0
• Unemployed	26	26.0

*SD – Standard Deviation

Table 2: Features and known risk factors of breast cancer among study participants

Characteristics	Frequency (N = 100)	Percent (%)
Features		
Breast Affected		
• Right Breast	56	56.0
• Left Breast	42	42.0
• Both Breasts	2	2.0
Quadrant of Breast Affected		
• First Quadrant	27	27.0
• Second Quadrant	15	15.0
• Third Quadrant	36	36.0
• Fourth Quadrant	22	22.0
Shape of Breast Mass		
• Round	17	17.0
• Oval	49	49.0
• Irregular	34	34.0

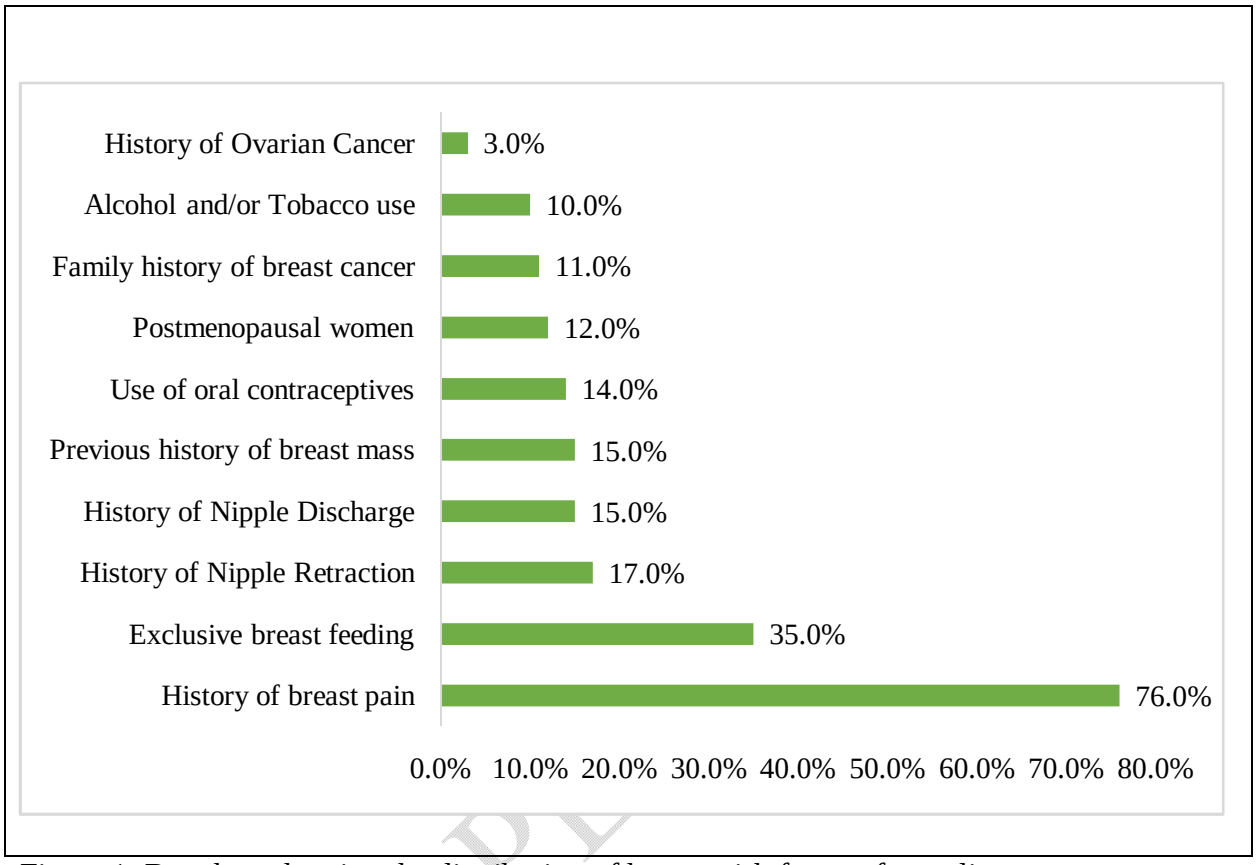

Figure 1: Bar chart showing the distribution of known risk factors for malignancy among women with breast masses in LUTH,

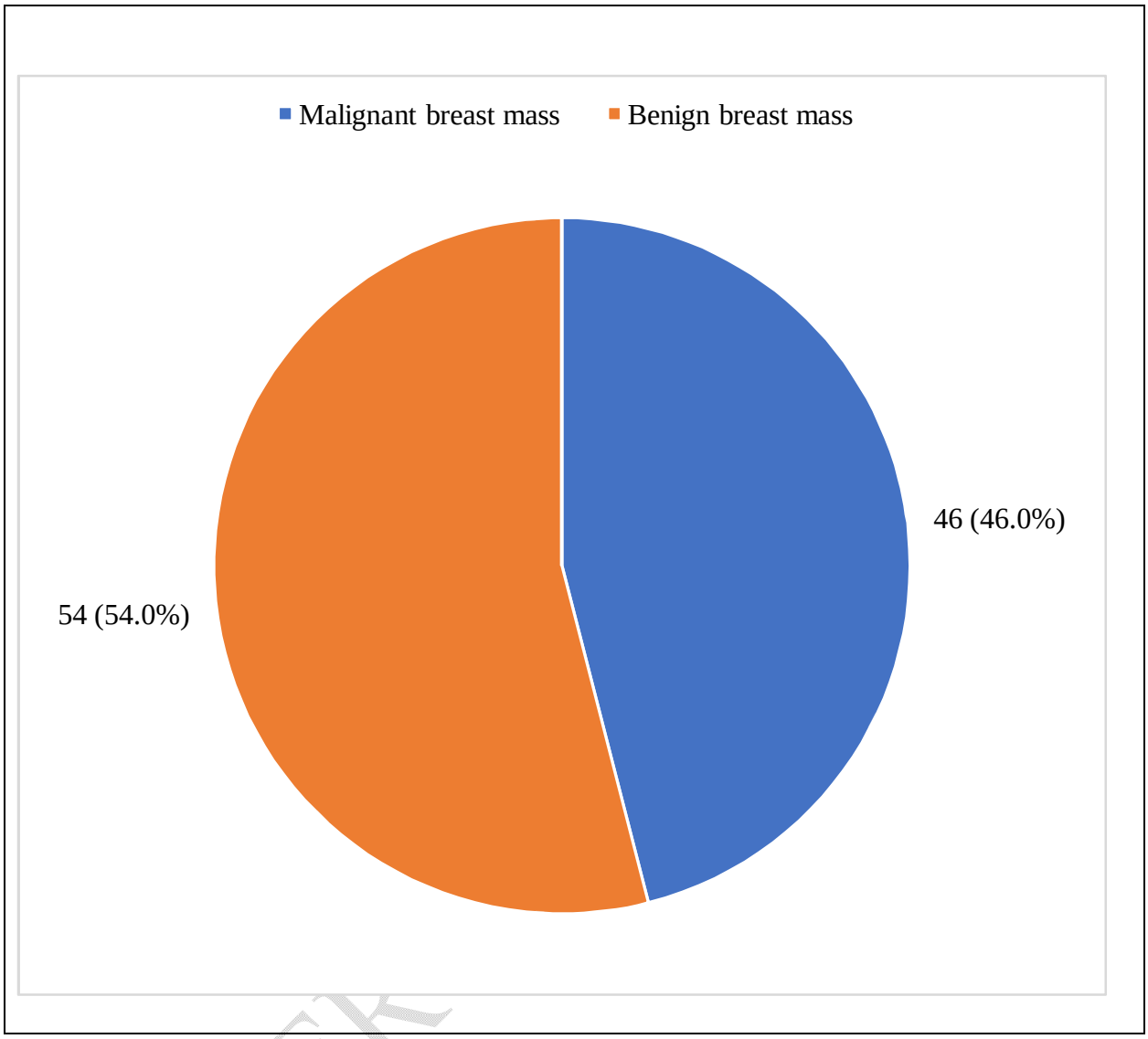

Figure 2: Pie chart showing proportion of malignant and benign breast masses among study participants

Table 3: Relationship between sociodemographic factors and presence of breast cancer in participants (Biopsy results)

Characteristics	β	OR	95% CI		p-value
			Min	Max	
Age of Participants					
• ≤ 30 years	-	1	-	-	-
• 31 - 40 years	2.39	10.95	1.26	95.06	0.030*
• 41 - 50 years	4.17	65.00	7.50	563.08	0.001*
• > 50 years	6.09	442.00	25.87	7553.23	0.001*
Marital Status					
• Single	-	1	-	-	-
• Married	1.94	6.96	2.65	18.32	0.001*
Highest Educational Attainment					
• Primary	2.18	8.81	0.96	80.53	0.054
• Secondary	0.79	2.20	0.94	5.14	0.068
• Tertiary	-	1	-	-	-
Nutritional Status					
• Underweight	-	1	-	-	-
• Normal Weight	-0.20	0.82	0.10	7.02	0.855
• Overweight	1.32	3.72	0.73	18.91	0.113
• Obese	2.79	16.20	2.61	100.45	0.003*
Occupational Status					
• Formal Employed	2.50	12.14	2.98	49.40	0.001*
• Self Employed	2.27	9.68	2.52	37.18	0.001*
• Unemployed	-	1	-	-	-

*Statistically significant

Table 4: Relationship between clinical history and Presence of Breast Cancer in Participants (Biopsy results)

Characteristics	β	OR	95% C.I.		p-value
			Min	Max	
Family history of Breast Cancer					
• Yes	0.81	2.24	0.61	8.22	0.222
• No	-	1	-	-	-
History of Exclusive Breast feeding					
• Yes	0.69	2.00	0.87	4.60	0.103
• No	-	1	-	-	-
History of Oral contraceptive Use					
• Yes	0.19	1.21	0.39	3.73	0.746
• No	-	1	-	-	-
History of Smoking and Alcohol Use					
• Yes	1.12	3.05	0.74	12.56	0.122
• No	-	1	-	-	-
Post-Menopausal Women					
• Yes	2.93	18.71	2.33	150.48	0.006*
• No	-	1	-	-	-
Previous history of Breast mass					
• Yes	1.37	3.93	1.16	13.35	0.028*
• No	-	1	-	-	-
History of breast pain					
• Yes	1.12	3.07	1.17	8.05	0.023*
• No	-	1	-	-	-
History of Nipple retraction					
• Yes	2.01	7.44	1.98	27.92	0.003*
• No	-	1	-	-	-
History of Nipple Discharge					
• Yes	2.33	10.24	2.17	48.32	0.003*
• No	-	1	-	-	-
History of Ovarian Cyst					
• Yes	-0.97	0.38	0.04	3.76	0.406
• No	-	1	-	-	-

*Statistically significant

Discussion

In this study, it was found that certain factors were significantly associated with an increased risk of developing breast cancer and these factors included increasing age, obesity, and the post-menopausal status of study participants. The risk of having a malignant breast mass began to rise in the 4th decade of life. This was found to be similar to the work of other authors who found

associations between the manifestation of breast malignancy and the age, BMI status and post-menopausal status of women (Ataollahi et al., 2015; Kluttig & Schmidt-Pokrzywniak, 2009; Singletary, 2003). These findings imply that as women get older there is a need for the practice of breast care through regular breast self-examination (BSE), and periodic institutionalized mandatory clinical breast examination which enhance early identification and categorization of breast masses (Ogu & Ephraim-Emmanuel, 2019). It is also important that to emphasize the adoption of healthy lifestyles including physical exercises, habits and nutrition that would facilitate the attainment of healthy body mass index (BMI) level. These measures will be useful in the prevention and early detection of malignant breast masses and also limit the risk of developing breast malignancies in late adulthood or in old age (Laamiri et al., 2016; Okobia et al., 2006; Oladimeji et al., 2016). This is especially necessary for women with a family history of breast malignancy, chronic exposure to radiation and so on, who are more at risk of developing breast malignancies (Singletary, 2003).

This study also found that the history of breast pain, nipple retraction, nipple discharge as well as previous breast masses were associated with a higher incidence of malignancy in the study participants. It is thus necessary that health education targeted at improving knowledge and awareness of symptoms and signs suggestive of breast cancer, and associated risk factors be sustained as a form of primary prevention of this public health problem. Women should be enlightened on the importance of regular self-breast examination which promotes early diagnosis and prompt treatment where necessary (Agbo et al., 2014; Ogu & Ephraim-Emmanuel, 2019). Several avenues including clinical visits, public enlightenment in workplaces, markets, religious organizations should be explored to teach and emphasize the practice and methods of self-breast examination by women in our locality. The provision of well-funded, and effectively coordinated, functional screening facilities at the primary health care delivery level will also contribute immensely to the reduction of the disease burden of breast cancer (Agbo et al., 2014). Other factors which have been reported as important contributors to development of breast cancers such as parity, exclusive breast feeding, the use of oral contraceptives, alcohol, tobacco usage, age at menarche, and family history of breast cancer (Ataollahi et al., 2015; Kluttig & Schmidt-Pokrzywniak, 2009; Obajimi et al., 2014; Okobia et al., 2006); were not significant predisposing factors in the present study. This finding in summary suggests that factors that were previously known to predispose women to an increased risk of breast cancer did not hold true in

this study. This may be indicative of changing patterns or newer factors that may be predisposing Nigerian woman to the rising episodes of breast cancer (Abdulrahman & Rahman, 2012). It will thus be helpful to have more studies conducted in this regard in order to have a clearer picture of the problem within this region.

Study limitation

The sample size used in this research was not large enough to make categorical statements on Nigerian women. This limitation could not be surmounted as at the time of the study because this was a time-bound work that was linked to a dissertation. Though it has provided a picture of the present status of breast cancer morbidities in Nigeria, further hospital- and community-based studies using larger sample sizes can be conducted for a more wholesome conclusion on this subject.

Conclusion

In this study that assessed the risk factors associated with breast malignancy among women with breast mass, it was found that a high percentage of breast masses assessed by biopsy were malignant among the studied populace. Factors significantly associated with an increased risk of malignant breast mass among the study population included increasing age, obesity, and post-menopausal status of the participants. Adoption of primordial and primary prevention measures in tackling problems related with breast cancer among Nigerian women is strongly recommended. These should include life style modifications early in life, health promotion and attitudinal change towards breast health. Lastly, the integration of periodic, mandatory, clinical breast-screening exercise into the services at the primary health facilities will enhance access to breast-related care services.

Ethical Approval and consent :

Research ethics approval was obtained from the Research and Ethics Committee of the Lagos University Teaching Hospital. Before data collection commenced, the research procedure, benefits and risk were explained to the patients and a written informed consent was obtained from all participants. Patients had the freewill to continue with the study or opt out at any stage with no implications to their care.

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