



SONOGRAPHIC ASSESSMENT OF THE EFFICIENCY OF BREAST SELF EXAMINATION

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ABSTRACT

Background: Globally, several campaigns are ongoing towards sensitizing women on screening methods for breast cancer. One of these screening methods is breast self-examination (BSE) which is geared towards the early detection of breast lumps. However, many women are incompetent in the practice of BSE and a constant reminder of this shortcoming may produce a loss of self-belief and interest in the practice. During the period of consistent incompetent BSE practice, a malignant breast lump may develop and only be discovered after it had spread to other organs. The aim of this study is to assess the efficiency of the practice of BSE among women in Calabar, Cross River State.

Materials and Methods: This was a prospective cross-sectional study that was done over a period of 7 months in the Radiology Department of the University of Calabar Teaching Hospital, Calabar, Cross River. The subjects who participated in this study were 110 in number, aged between 18 to 61 years who practiced BSE, correctly explained the stages involved in performing BSE and felt lumps in their breasts. A breast sonographic examination was done on all the subjects to characterized and

categorized breast lumps. The data obtained was analyzed using SPSS 23 and Pearson correlation, Chi-square test and T-Test were done. Ethical approval was obtained for this study.

Result: The efficiency of BSE amongst women in this study was 34.55%. The difference between the women that correctly practiced BSE and those who incorrectly practiced BSE was significant ($P = 0.000$). A greater number of the women who correctly practiced BSE were below 38 years of age (65.79%).

Conclusion: The efficiency of women who practice breast self-examination is extremely low in Calabar. However, women aged between 18 and 37 years are efficient at the practice of breast self-examination due to their active participation and interest in social media activities and social events where breast health awareness programs are conducted.

Key words: Breast cancer, Breast self-examination, Ultrasonography, Breast lump

INTRODUCTION

Breast cancer is the most common cancer in women worldwide making up 12.3% of all cancers and it was solely responsible for 425,000 deaths in 2010.^{1,2} Approximately 50% of breast cancer cases

and 58% deaths that result from breast cancer occur in less developed countries. The incidence of breast cancer in Africa ranges from 27.9/100,000 to 48.9/100,000. ¹ Based on the 2018 report of the World Health Organization (WHO), the prevalence of breast cancer is increasing in developing countries because of the rising number of citizens that are embracing a life-style related to breast cancer risk factors such as eating unhealthy food, comfortable with being obese and taking harmful substances. ³

In Africa, majority of persons with a breast lump present to the hospital for treatment late and the lumps are often discovered to be advanced carcinomas. The diagnosis of breast cancer early has been shown to be associated with a reduction in the mortality, morbidity and the cost of managing the condition. ¹ More than 90% of breast cancer can be cured if detected early. ⁴ There is therefore, a serious need for an increase in the awareness of the methods for early detection of the disease such as breast self-examination (BSE), clinical breast examination (CBE) and mammography. The most feasible of these methods is BSE. However, its practice depends on the knowledge and attitude of women to breast cancer and the competence of BSE among women. ¹

BSE involves self-breast palpation to locate and characterize a lump if present. It is done once a month between day 7 and 10 of the menstrual period but some women routinely practice BSE while bathing or dressing up. ¹ BSE is recommended because it is inexpensive, private, painless, easy, safe and does not require any equipment. It is pertinent to note that about 80% of breast cancers that are missed by mammography are detected by BSE. ¹ Moreover, mammography procedures are too expensive and out of reach of millions of women in developing countries. Due to poor access to diagnosis and treatment, women in low- and middle-income countries generally have poorer outcomes as well and this trend can potentially be substantially reduced if there is widespread education on the right BSE technique. ²

High resolution ultrasonography is safe to use in younger age groups, improves the ability to distinguish benign breast pathologies from breast cancer, is useful to examine dense breasts and

guides intervention. It has been shown to increase the likelihood of detecting small cancers by 3 to 4 cancer cases per 1,000 women who had no detected mammographic or clinical abnormality. ⁵ Okello et al ⁶ inferred that ultrasonography detected 27% more breast cancers than mammography did.

Palpation detected malignant lumps are more aggressive than non-palpable breast malignancy and the former are usually assigned a higher tumour grade and a greater risk of local and distant tumour recurrence rate. ⁷ This accentuates the relevance for an extensive enlightenment of the populace on BSE as a screening method and the accurate practice of BSE technique.

The objective of this study is to assess the efficiency of the practice of BSE among women in Calabar, Cross River State.

MATERIAL AND METHODS

Study design, Period and setting

This was a prospective cross-sectional study that was done in the Radiology Department of the University of Calabar Teaching Hospital (UCTH), Calabar. The Hospital is a tertiary health facility that caters for the health needs of over seventy percent of the inhabitants of Calabar, which is the capital city of Cross River State, Nigeria. The study was conducted from October 2020 to April 2021.

Sampling population, method and sample size

The sample population consisted of women who saw the advert for this research following widespread campaigns on breast self-examination practices for the early detection of breast cancer, amongst others, conducted by the Breast Imaging Society of Nigeria (BISON) in Calabar and women who got informed by physicians and staff of UCTH, Calabar. The subjects were selected through purposive sampling method. Those who gave consent were 186 women but 110 women satisfied the criteria for participation in this study.

Inclusion Criteria

- A woman that practices BSE
- A woman who has felt a lump in her breast

Exclusion Criteria

- Educational level below SSCE

- A known biopsy proven breast cancer patient
- A pregnant woman
- A breastfeeding woman
- Males
- Breast trauma
- Breast surgery/augmentation

Pregnancy Test

Every subject had a pregnancy test done using the strip manufactured in March 2020 by Nantong Egens Biotechnology company limited, Nantong, People's Republic of China. The procedure involved dipping the absorbent tip of the strip inside a urine sample for 30 seconds afterwards it was inspected and one pink bar represented a negative result (not pregnant) while 2 pink bars represented a positive result (pregnant). 11 pregnant individuals were eliminated based on this test.

Explanation of BSE Technique

The subjects were those who could explain the standard technique of breast self-examination and practiced it at least once a month.

BSE Technique

The procedure consists of 2 stages; 1. Visual stage – The individual stands in front of a mirror and examines the breast visually for any abnormal changes in the breast such as dimpling of the skin, changes in breast contour, inversion of the nipple, change in size, shape and symmetry.

2. Tactile stage – The individual uses her fingers to palpate and examine the entire breast region and the axillary regions for any new tangible abnormality.⁸

Ultrasound Method and Data Collection

Ultrasound scan was done using Toshiba TUS-X100S (Xario 100) ultrasound machine which has attached to it a linear probe with a frequency of 8.4 MHz employing a 2-Dimensional protocol with Doppler facility. The machine was manufactured in 2015 by Toshiba Medical Systems corporation, in Japan. This was the qualitative tool utilized in this research. Ultrasound scan were performed by two Radiologists who have more than a decade experience in sonographic examination of the breast and this eliminated inter-observer errors.

The breast ultrasound procedure was explained clearly to the subjects. A chaperone was present to assist the subjects. The subjects were made to lie in a supine position on a clean couch and the chest area was adequately exposed for a complete visualization of the breasts. The hands of the subjects were extended above the head to stabilize and flatten the breasts against the chest wall.

A generous amount of acoustic gel was applied on the breast prior to scanning with a linear probe. Both breasts were symmetrically scanned in a radial and anti-radial fashion from the nipple to the periphery.⁶ The retro-areolar regions and the axillae were also scanned using the linear probe.

The sonographic features of the breast lumps were categorized using the Breast Imaging Reporting and Data System (BIRADS) classification method. BIRADS 0 – Inconclusive study, BIRADS 1 – Normal, BIRADS 2 – Benign findings, BIRADS 3 – Probably benign finding, BIRADS 4 – Lesion suspicious of malignancy, BIRADS 5 – Lesion is highly suspicious of malignancy, BIRADS 6 – A known biopsy-proven malignancy.⁹ These data were recorded.

Efficiency of BSE: Efficiency in the health care sector refers to the level of performance achieved (outcome, output) relative to the effort put in (resources, time, money) to accomplish a task/system.¹⁰ The input of BSE in this study will be assumed to be the total subjects that practice BSE while the output will be assumed to be the women who correctly practice BSE.

Data Processing and Analysis

Statistical Package for Social Sciences (SPSS) version 23 was used to analyze the data and they were presented in percentages and frequency distribution tables. Chi-square test of significance, T-test to evaluate the difference in means and Pearson correlation were also performed. P value less than 0.05 was significant.

Ethical Consideration

Ethical approval was obtained from the Health Research Ethics Committee (HREC) of the University of Calabar Teaching Hospital, Calabar, Cross River State (UCTH/HREC/33/357). Subject confidentiality was ensured.

RESULTS

The age of the subjects was from 18 to 61 years and they were separated into five age groups with each group having a 10-years range. Table 1 shows that fibroadenoma was more widely spread in the age groups (three age groups) and common, with a frequency of 12, in the 28 – 37 years age group. Only breast abscess and suspicious of malignancy lumps were present in one age group, with the former seen in the 28 – 37 years age group while the latter was seen in the 38 – 47 years age group. Breast abscess was the least common in an age group with a frequency of 2. The 18 – 27 years age group and 28 – 37 years age group had the most subjects that correctly identified the presence of a breast lump (25).

Table 1: Frequency distribution of the breast lumps in the age groups

Breast Lumps	AGE GROUPS (years)									
	18 - 27		28 - 37		38 - 47		48 - 57		58 - 67	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Breast Abscess	0	0	2	1.82	0	0	0	0	0	0
Breast Cyst	0	0	4	3.64	2	1.82	0	0	0	0
Ductal Ectasia	0	0	1	0.91	6	5.46	0	0	0	0
Fibroadenoma	6	5.46	12	10.92	1	0.91	0	0	0	0
Suspicious of malignancy	0	0	0	0	4	3.64	0	0	0	0

Table 2 shows that normal breast (72) had the highest frequency. The total number of subjects that had breast lumps were 38 with fibroadenoma being the most frequent (19) while the least was breast abscess (2). The mean age for the subjects with fibroadenoma was 30.21 ± 6.35 years and this was the least while the subjects with ductal ectasia had the highest mean age (42.29 ± 5.41 years). BIRADS 2 category was assigned to 3 types of breast lumps while BIRADS 1, 3 and 4 were assigned to 1 type of breast lump each. The value of the mean age of all the subjects was 36.93 ± 10.50 years.

Table 2: The frequency, mean age and BIRADS classification of the breast lumps and normal breast

BREAST LUMPS	AGE (years)		FREQUENCY (n)	PERCENTAGE (%)	BIRADS
	Mean Age	Standard Deviation			
Breast Abscess	35.00	±0.00	2	1.8	3
Breast Cyst	37.33	±2.25	6	5.5	2
Ductal ectasia	42.29	±5.41	7	6.4	2
Fibroadenoma	30.21	±6.35	19	17.3	2
Suspicious of Malignancy	40.50	±2.89	4	3.6	4
Normal Breast	38.00	±11.78	72	65.5	1
	36.93	±10.50	110	100	

Table 3 shows that 24 subjects used oral contraceptives. The subjects between 18 and 37 years made up 75% of those who used oral contraceptives. There was a significant correlation between the subjects' age and the use of oral contraceptives (Correlation coefficient = - 0.224, $P = 0.019$).

Table 3: The frequency distribution of oral contraceptive use within the age groups and their correlation

	AGE GROUPS (years)						P value
	18 - 27		28 - 37		38 - 47		
Oral contraceptive use	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)	0.019*
	Subjects who use	6	25	12	50	6	

P value < 0.05 is significant

Figure 1 shows that 42% (10) of the subjects with normal breasts used oral contraceptives, while 34% (8) of the subject with fibroadenoma used oral contraceptives. There were 2 subjects (8%) with suspicious of malignancy lumps who used oral contraceptives. Subjects with breast cysts and ductal ectasia who used oral contraceptives were 2 each (8%, respectively).



Figure 1: Frequency of Oral contraceptive use in subjects with normal breasts and the subjects with breast lumps.

Table 4 shows that 38 subjects correctly practiced BSE with an efficiency of 34.55% ($Efficiency = \frac{Output}{Input} \times 100$).¹⁰ The difference in the mean of the subjects who correctly practiced BSE and those who incorrectly practiced BSE was significant ($P = 0.000$).

Table 4: The frequency distribution of subjects that practice BSE, the efficiency of BSE practice and the effect of the difference in the practice of BSE

BSE	Frequency (n)	Percentage (%)	Efficiency (%)	P value
Correct practice	38	34.55	34.55	0.000*
Incorrect practice	72	65.45		

P value < 0.05 is significant

DISCUSSION

The women who participated in this study practiced breast self-examination at least once in a month and convincingly stated that they had one or more lumps in either or both breasts. However, a sonographic examination confirmed the presence of breast lumps in 38 out of 110 subjects which meant that a meager 34.55% correctly practiced BSE. In a similar trend, Shallo et al¹¹ in Ethiopia, noted that the correct practice of BSE was low (32.6%). Extremely low numbers were noticed in studies done elsewhere. Tuyen et al⁴ found that 7.7% Vietnamese women correctly practiced BSE and Dagne et al,¹² also in Ethiopia, observed that only 4.9% of the respondents in their study correctly

practiced BSE. The variation in these values could be due to differences in the study period and study area (racial differences).¹¹

The subjects who incorrectly practiced BSE were 65.45% and the difference between them and those who correctly practiced BSE was significant ($P = 0.000$) with a BSE efficiency of 34.55%. Regular BSE practice builds up the level of BSE efficiency with time. The following may be mistaken for a lump by the women who incorrectly practiced BSE in this study; a prominent rib, a costochondral junction, an imaginary mass (created by pinching of the breast tissues) and nodularity (which is a physiological process seen in young female breasts due to the bilateral lumpiness of the glandular tissue that fluctuates with the menstrual cycle).¹³ Therefore, women should not assume that the practice of BSE is simple and does not require any form of guidance by professional BSE trainers. Khatun et al¹⁴ corroborated the findings in this study as they inferred that BSE efficacy had a significant correlation with correct BSE practices ($P < 0.010$).

The subjects that were below 38 years of age constituted the majority (65.79%) of those who correctly practiced BSE in this study. Dinegde et al³ and Dadzi et al² were in full agreement as they also reported that 75% of women below 24 years and over 66% of respondents below 30 years, respectively, correctly practiced BSE and a significant association between age and the correct practice of BSE existed in their studies ($P < 0.010$ and $P = 0.003$, respectively). This trend was likely because younger women are more actively involved in social media activities and social events than older women. There were several rallies organized to create awareness of the need for BSE and breast imaging for the early detection of breast cancer and the enthusiasm might have heightened the practice amongst women below 38 years and also made them to show interest in participating in the study.

In the index study, fibroadenoma was the most common lesion, making up 50% of the breast lumps that were sonographically identified and 63.2% of them were found in the subjects whose ages were between 28 to 37 years of age while 31.6% of fibroadenomas were noted in the subjects between 18 to 27 years of age. Aligning with the findings of this study, Vimal et al¹⁵ noticed that fibroadenoma constituted 55.4% of the array of

breast lumps present in their study and majority of the cases were seen in the 21 to 30 years age group while the rest were in the 31 – 40 years age group. Fibroadenoma was also the most common breast pathology in Nahar et al's¹⁶ Bangladesh based study, with a value of 76.2%. Fibroadenoma has a predilection for negroes and is common in young women.^{16,17} This could possibly be the reason for its prevalence in this study and in the subjects who were lesser than 40 years. A simple fibroadenoma confers no risk of breast malignancy but a complex fibroadenoma does.¹⁵

In variance to this study, Saadaat et al¹⁷ discovered that fibroadenoma was the 2nd most common pathology making up 22.4% of the cases in their study and the mean age at diagnosing fibroadenoma was 23.5 years. The mean age that fibroadenoma was seen in this study was 30.21 years, which was higher than that recorded in Saadaat et al's¹⁷ study, but was in keeping with several literature.^{13,18}

In our study, the prevalence of suspicious of malignancy cases was relatively high, even though the diagnosis was the fourth most common breast lump and accounted for 10.53% of all the lesions. They were mainly found in the subjects within the 38 to 47 years age group with a mean age of 40.5 years. In contrast, Saadaat et al¹⁷ observed a lower number of suspicious of malignancy cases in their research and this made up 5.5%. However, in a similar fashion to the index study, the women with this condition were mostly in the 36 to 45 years age group, with a mean of 43.4 years.¹⁷

Breast abscess was the least common in this study with a prevalence of 5.26% and they were wholly seen in the 28 to 37 years age bracket. The mean age of the subjects in this study who were diagnosed of breast abscess was 35 years. Vimal et al¹⁵ observed a reduced number of cases as they noted that breast abscess made up 2.7% of their cases. Saadaat et al¹⁷ realized that the women with inflammatory breast conditions such as breast abscess, were in the age group between 26 to 35 years, which was similar to the age group of the subjects in our study who had breast abscess. They opined that breast abscess was common in this age group because this was the most active phase of reproductive age and the proliferation of vascular tissue that results from pregnancy increases the occurrence of breast abscess.

In this study, the third most common lump was breast cysts. It had a prevalence of 15.79% and was found in the 28 to 37 years and 38 to 47 years age groups. However, two-thirds of the subjects with the lump were in the 28 to 37 years age group and the mean age was 37.33 years. In support of our findings, Pradhan et al¹⁸ observed that a bulk of patients with breast cysts were aged 30 years and above while fewer number were below 30 years but the lump accounted for a small fraction of the lumps in their study (1.38%). This reinforces the belief that breast cysts are the most common cause of breast lumps in women between 35 and 50 years of age.¹⁹

The prevalence of ductal ectasia in this study was 18.42% and a substantial proportion of the subjects who had the lumps were noted in the 38 to 47 years age group. In a dissimilar trend, Raza et al²⁰ and Pradhan et al¹⁸ noted quite a low number of participants with breast cysts as they were found to constitute 4.3% and 0.62%, respectively, of all the lumps in their research. Interestingly, Mohammed et al²¹ demonstrated a significant relationship between the consumption of coffee and the development of mammary ductal ectasia ($P = 0.034$). Probably the women involved in our study consumed a lot of coffee/tea which consequently, increased the prevalence of ductal ectasia. The mean age of the subjects with ductal ectasia in our study (42.29 years) was higher than that seen in Mohammed et al's²¹ research (35.81 years). The subjects with ductal ectasia in this study were the most predominant amongst all the lumps noted above 40 years, which is the age from when malignancies abound.¹⁹ This is possibly because the symptomatology of mammary ductal ectasia mimics breast cancer and it is considered a precursor for malignancy²⁰

The report from this study shows that BIRADS 1 was the most common category as 65.5% of the subjects were found to be sonographically free of any breast lump. In agreement, Olarinoye-Akorede et al²² and Akande et al⁹ also noted that BIRADS 1 was the commonest in their studies with 44.4% and 30.1%, respectively. The high number of women within BIRADS 1 category could likely be due to rampant sensitization of women on breast health awareness worldwide who seek treatment early and excise any breast lump that is suspicious.²²

The breast lumps that had features which were in keeping with benign findings (BIRADS 2 & BIRADS 3) constituting 31%, were overwhelmingly more than those with malignant features (BIRADS 4), which made up 3.6% of the lumps in the subjects of this study. In consonance with our findings, Olarinoye-Akorede et al²² found that benign findings predominated as well (BIRADS 2 to 3) with 42%, while malignant findings (BIRADS 4 to 6) were noted in 14% of the patients.

It was realized in this study that 21.82% of the subjects used oral contraceptives. About 34% and 8% of the oral contraceptive users were diagnosed with fibroadenoma and suspicious of malignancy, respectively. However, Shah et al²³ lucidly stated that oral contraceptive use was a well-documented risk factor for the development of malignant breast lumps. Even though fibroadenoma was the most common breast lump in this study, we did not follow up the women to see if there will be a transformation to complex fibroadenomas, which have malignant potentials.¹⁵ Shah et al²³ also observed that 23.80% of their respondents were on oral contraceptives which was similar to the result of this study.

We found out that oral contraceptive use had a significant negative relationship with the subjects' age ($P = 0.019$). Majority of the subjects who used oral contraceptives were below 38 years of age (75%) whereas a fewer number was noted in those above 38 years. This trend was likely because the necessity to prevent unwanted pregnancy was probably higher in the subjects below 38 years than those above it. Bathea et al²⁴ noted that the odds ratio for the occurrence of a malignancy was higher in premenopausal women below 40 years who had used oral contraceptives for more than 10 years. On the other hand, Estevao et al²⁵ amazingly, opined that levonorgestrel (a progestin hormone) offers protection to the breast by reducing the size of fibroadenoma lumps. However, they also noticed that estrogen derived contraceptives nullify the effect of Levonorgestrel.²⁵ This suggests that a progesterone-only oral contraceptive may have a growth-inhibitory effect on breast lumps. More research is advocated for in this aspect of breast health.

Keeney et al²⁶ encourage women to examine their breasts more frequently so that they will be

more aware of the texture which increases the ease of detecting a lump. Furthermore, they noted that majority of the women who practiced BSE admitted not being certain of their ability to accurately detect breast pathologies. Repeatedly being told that one is incorrectly practicing BSE may dampen self-confidence and negatively impact on the continuation of the practice which might lead to a delay in detecting a breast lump that is malignant. Moreover, women with thick breasts find it difficult to accurately feel a lump.²⁶

The efficacy of BSE in detecting potentially malignant lumps is a function of the individual's discretion and proper training on how to perform BSE.²⁶ With proper education on BSE technique women tend to express self-efficacy and feel empowered to control potentially devastating events in their lives.²⁶ This was established by Ozaras et al,²⁷ in a Turkey based study, when they noted that detailed training of women in the proper method of BSE significantly improves the efficiency of performing the breast screening exercise ($P = 0.0001$). This inference was backed by the research conducted by Yohanay et al.²⁸ There is also a lack of adequate training of health professions who are involved in educating the masses on the appropriate technique of BSE.²⁶ There is thus, a serious need for uninterrupted widespread public education of BSE as a potent breast cancer screening tool and urgent need for a concerted and extensive education of the expedient technique to perform BSE.³

It would have been appropriate to request that all the participants perform BSE in the presence of a female BSE expert and only those who performed the act satisfactorily would have been included in the study. This was regarded as a limitation of this study in addition to the small sample size that was utilized.

CONCLUSION

The efficiency of women who practice breast self-examination is extremely low in Calabar. However, women aged between 18 and 37 years are efficient at the practice of breast self-examination due to their active participation and interest in social media activities and social events where breast health awareness programs are conducted.

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