Research Article

Relating self-perceived with objective risk for breast cancer among women in rural and urban communities in southwestern Nigeria

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Received May 2, 2015. Accepted June 24, 2015

Abstract

Background: In an effort to enhance the value of early detection of breast cancer, attempts are now being made to relate a woman's perceived risk of developing breast cancer with her actual risk. Women at increased risk but who underestimate this risk may unnecessarily defer the benefits of screening.

Objective: To compare the self-perceived risk for developing breast cancer with their objective risk, as determined by the objective breast cancer risk (OBCR) and the Gail's risk score.

Materials and Methods: Quantitative methods utilized a cross-sectional comparative study design. Six hundred eighty women aged 20 years or older were interviewed using a semi-structured, interviewer-administered questionnaire and selected using a multistage sampling technique from two predominantly rural and urban local government areas. A study set criteria on the OBCR was determined and classified into average or high risk for developing breast cancer (AOBCR and HOBCR, respectively), based on whether or not the respondent showed any of the two of four strong risk factors for breast cancer. Objective risk was also determined using an Internet-based Gail's breast cancer assessment tool. Quantitative data were analyzed using SPSS software, version 16.0. Qualitative methods comprised focus group discussion sessions for women in both rural and urban areas, which were analyzed using detailed content analysis, and the results were presented in Z–Y tables.

Result: The result of this study suggested that a majority of women did not accurately assess their risk of developing breast cancer as nine in 10 women at high risk underestimated their true risk of developing breast cancer. Using the study set criteria, about one in 20 respondents were assessed to have HOBCR. Among women in rural communities, about 95% and 4% revealed AOBCR and HOBCR, compared with 93% and 11% of women in urban communities showing AOBCR and HOBCR, respectively. The Gail's risk assessment tool was able to classify just two (5.6%) respondents as being at a high risk of developing breast cancer. The sensitivity of the Gail's model when applied to the respondents was 5.56%.

Conclusion: The study showed that OBCR has a potential of being used as a high-risk screening tool for breast cancer in middle- or low-resource setting. Therefore, clients who screen positively as HOBCR can subsequently be offered targeted screening, intensive health education, and counseling on various risk-reducing options.

KEY WORDS: Breast cancer, self-perceived risk, objective risk

Access this article online	
Website: http://www.ijmsph.com	Quick Response Code:
DOI: 10.5455/ijmsph.2015.02052015299	

Introduction

Breast cancer is the most common cancer in women worldwide. Report from the cancer statistics 2012 showed that breast cancer accounts for about 16% of all female cancers worldwide.[1] About 10% of female breast cancer

deaths occur in women aged 15–49 years, 33% in 50–69 years, and the rest in women aged older than 70 years.[2] In addition, there has been an increase in the occurrence of breast cancer relative to other female cancers in Nigeria,[3–5] as evidenced by the rising incidence of breast cancer from about 15.3 per 100,000 in 1976 to 33.6 per 100,000 in 1992 and 38.7 per 100,000 in 2008,[6–8] thereby making it the leading cause of cancer deaths among Nigerian women till date.

More worrisome is the observation that the average age at diagnosis of breast cancer among Africans is approximately 10 years below that of western nations.[4,9–12] The mean age of occurrence in two African countries ranged between 41.8 and 42.7 years, respectively, as opposed to the median age of 61 years in the developed nations.[13] Reports have shown that a majority of cases occurred in the younger premenopausal women in the African continent.[11] In addition, a study in Ibadan, Nigeria, revealed an increase in young female subjects with breast cancer.[4] A review of data from the two hospital units of tertiary hospital, which subserves the urban, semi-urban, and rural communities of some parts of southwestern Nigeria revealed that young and premenopausal women accounted for 67% of breast cancer. Furthermore, these group of patients showed poor treatment compliance and presented in the advanced stages of cancer, with a majority of them dead or lost to follow-up within a year of diagnosis.[10] This phenomenon of a declining age of onset calls for immense concern, as most breast cancer prevention strategies are currently targeted at older age groups.[1,14]

Breast cancer screening practices have long been recognized for their value in preventing morbidity and mortality from breast cancer.[15] There is evidence depicting low knowledge of breast cancer and its preventive practices such as breast self-examination and clinical breast examination among rural dwellers.[16–20] While this may be true, there is a growing realization that early diagnosis and prompt treatment of breast cancer does not apparently prevent the progression of breast cancer.[21,22] In fact, the contribution of breast self-examination, clinical breast examination, mammography, and even chemoprevention to reduce the number of deaths from cancer is currently a source of controversy.[23–26] A working group of the International Agency for Research on Cancer and other breast cancer research teams have concluded that there is an inadequate evidence supporting the role of breast self-examination and some other early detection strategies in reducing mortality from breast cancer.[10,27,28] This has evolved into a major public argument, causing physicians, women, and policy analysts to rethink and debate screening guidelines.[23,26,29,30]

In an effort to enhance the value of early detection of breast cancer, attempts are now being made to relate a woman's perceived risk of developing breast cancer with her actual risk.[31–33] Women at increased risk but who underestimate the same may unnecessarily defer the benefits of screening or primary prevention.

Materials and Methods

The study was conducted in four local government areas (LGAs) areas namely: Ife north, Atakumosa west (rural LGAs) and Ife east and Ife central LGAs (urban LGAs) of Osun state, southwestern part of Nigeria. This is a cross-sectional study involving 680 women aged 20 years and older in selected rural and urban LGAs. A study set criteria, the OBCR was determined and classified into average or high risk for developing breast cancer (AOBCR and HOBCR) based on whether or not the respondent had any of two of four strong risk factors for breast cancer. Objective risk was also determined using an Internet-based Gail's breast cancer assessment tool.

The respondents were selected using multistage sampling technique. The first stage involved selection of one of the three senatorial districts using simple random sampling method. The second stage involved the selection of two predominantly rural and two urban LGAs by simple random sampling method from a sample frame of all rural and urban LGA in the selected senatorial district. The third stage involved the listing of wards in each chosen LGA and the selection of five wards by simple random sampling method. The listing of all the settlements in the wards was done in the fourth stage, and two settlements were selected from each ward by simple random sampling technique. The fifth stage involved the listing of streets or compounds in each selected settlement thereafter; three streets were selected using simple random sampling technique. At the street level, respondents were selected using the systematic sampling method. In households where no one met the eligibility criteria, the house number was noted and the next to it visited. In areas without well-demarcated streets, a landmark feature of the community (the main market, town hall, or palace of the king in some cases) was identified and a bottle spurned round with the tip of the bottle pointing to the starting point.

Additional data were sought by conducting sessions of focus group discussions (FGDs), with women who reside in rural and urban areas. A total of four FGD sessions were conducted, and each group comprised about eight participants. The qualitative data collected from the FGD sessions were recorded on tape, translated, and transcribed on to text and validated. The outputs were coded, and detailed content analysis was performed. Some results of the FGD were presented in pros in the discussion.

The quantitative data entry was done using Epi data, version 3.1, with appropriate checks and skip patterns programmed in to the data entry form to minimize errors. The data were then exported to SPSS for Windows, version 16, software for subsequent data cleaning and statistical analysis. Descriptive, bivariate, and multivariate analyses were carried out as appropriate. Summary statistics generated mean and standard deviations. For inferential statistics, χ^2-test was used to test for associations between categorical variables. A p value of 0.05 or less and a 95% confidence interval limits were used to test for statistical significance.

Result

The prevalence of age at 40 years and older among women living in rural and urban areas was found to be 22.4% and 15.3%, respectively. That for age at menarche less than 12 years was 1.2% and 2.4% for urban and rural areas, respectively, while for family history of breast cancer, it was 4.4% for both rural and urban areas, respectively. The prevalence of first birth at 30 year or older was 9.4% among women in rural areas compared with 22.1% in urban areas, while that for nulliparity was 14.1% and 38.5% in rural and urban areas, respectively [Table 1]. Prevalence of HOBCR according to study criteria was 4.4% and 6.2% for urban and rural areas, respectively. Among the respondents with HOBCR in rural areas, 15 (93.8%) women showed a combination of any two risk factors while one (6.2%) woman showed three risk factors combined [Table 2]. Majority of respondents in rural areas believed they have a low chance of developing breast cancer, low self-risk rating, and worried less about breast cancer compared with women in urban areas. Worrying about breast cancer and self-perceived risk showed a statistical significant association with place of residence [Table 3]. Using OBCR, 644 (94.7%) women were classified as average while 36 (5.3%) women were classified as high. Of those classified as average OBCR, 622 (94.8%) women felt they had average risk, while of the 36 classified as high OBCR, two (8.3%) felt that they had a high risk [Table 4].

Table 1: Prevalence of all risk factors for breast cancer among women in rural and urban areas

Risk factors	Place of residence		Total, $n = 680$ (%)	Statistical tests
	Rural, $n = 340$ (%)	Urban, $n = 340$ (%)		
Nonmodifiable				
Age (in years)				
40 or older	76 (22.4)	52 (15.3)	128 (18.8)	$\chi^2 = 5.54$, $df = 1$, $p = 0.019$*0
Less than 40	264 (77.6)	288 (84.7)	552 (81.2)	
Age at menarche				
Earlier than12 years	4 (1.2)	8 (2.4)	12 (1.8)	Fisher's exact probability = 0.192
At or after 12 years	336 (98.8)	332 (97.6)	668 (98.2)	
Family history of breast cancer				
Positive	15 (4.4)	15 (4.4)	30 (4.4)	$\chi^2 = 0.00$, $df = 1$, $p = 1.000$
Negative	325 (95.6)	325 (95.6)	650 (95.6)	
Family history of any cancer				
Positive	19 (5.6)	35 (10.3)	54 (7.9)	$\chi^2 = 5.15$, $df = 1$, $p = 0.033$*
Negative	321 (94.4)	305 (89.7)	626 (92.1)	
Modifiable				
Age at first birth				
At or after 30 years	32 (9.4)	75 (22.1)	107 (15.7)	$\chi^2 = 20.50$, $df = 2$, $p = 0.0001$**
Earlier than 30 years	308 (90.6)	265 (77.9)	573 (84.3)	
Hormonal contraceptives use				
Ever use	121 (35.6)	117 (34.4)	238 (35.0)	$\chi^2 = 0.10$, $df = 1$, $p = 0.748$
Never use	219 (64.4)	223 (65.6)	442 (65.0)	
Physical activity				
No exercise	97 (28.5)	103 (30.3)	200 (29.4)	$\chi^2 = 0.25$, $df = 1$, $p = 0.614$
Regular exercise	243 (71.5)	237 (69.7)	480 (70.6)	
BMI				
Above 24.9	167 (49.1)	258 (58.6)	425 (54.5)	$\chi^2 = 7.00$, $df = 1$, $p = 0.008$*
Less than 24.9	173 (50.9)	182 (41.4)	355 (45.5)	
Parity				
Nulliparity	48 (14.1)	131 (38.5)	179 (26.3)	$\chi^2 = 52.23$, $df = 1$, $p = 0.0001$**
Parous with at least one	292 (85.9)	209 (61.5)	501 (73.7)	
Attitude toward breast self-examination				
Negative	217 (63.8)	132 (52.7)	349 (51.3)	$\chi^2 = 42.53$, $df = 1$, $p = 0.0001$**
Positive	123 (36.2)	208 (47.3)	331 (48.7)	
Duration of breast feeding				
Less than 12 months	55 (18.8)	43 (20.6)	98 (19.6)	$\chi^2 = 0.23$, $df = 1$, $p = 0.629$
More than 12 months	237 (81.2)	166 (79.4)	403 (80.4)	

*Statistically significant at p value < 0.05; **statistically significant at p value < 0.001.

Table 2: Prevalence of objective breast cancer risk (OBCR) among respondents rural in and urban areas

	Place of Residence		Total *n* = 680 (%)	Statistical tests
	Rural, *n* = 340 (%)	Urban, *n* = 340(%)		
Objective risk				
HOBCR	15 (4.4)	21 (6.2)	36 (5.3)	χ^2 = 1.06, *df* = 1, *p* = 0.304
AOBCR	325 (95.6)	319 (93.8)	644 (94.7)	
Combined risk				
2 Risk factors	15 (93.8)	21 (91.3)	36 (92.3)	Fisher's exact probability = 0.778
3 Risk factors	1 (6.2)	2 (8.7)	3 (7.7)	

*Statistically significant at *p* value < 0.05; ** statistically significant at *p* value < 0.001.

Table 3: Respondents' self-perceived chance, self-risk rating, and worry about developing breast cancer in life time by place of residence

	Place of residence, *n* (%)		Total *N* = 680 (100%)	Statistical tests
	Rural *N* = 340 (100%)	Urban *N* = 340 (100%)		
Chance of getting breast cancer				
Low	324 (95.6)	317 (93.2)	641 (94.4)	χ^2 = 5.30, *df* = 2
Same as average woman	10 (3.0)	8 (2.4)	18 (2.6)	*p* = 0.070
High	5 (1.4)	15 (4.4)	20 (3.0)	
Self-rating of risk of getting breast cancer				
0%–30%	331 (97.4)	328 (96.4)	659 (96.9)	χ^2 = 0.50, *df* = 2
31%–60%	5 (1.4)	6 (1.8)	11 (1.6)	*p* = 0.777
61%–100%	4 (1.2)	6 (1.8)	10 (1.5)	
Breast cancer—a source of worry?				
Not at all	244 (71.8)	212 (62.3)	456 (67.1)	χ^2= 6.83, *df* = 2
Not much a problem	54 (15.9)	73 (21.5)	127 (18.7)	*p* = 0.033 *
Definitely a problem	42 (12.3)	55 (16.2)	97 (14.2)	
Summary of self-perceived risk				
Average	332 (97.6)	324 (95.3)	656 (96.5)	χ^2 = 2.76, *df* = 1
High	8 (2.4)	16 (4.7)	24 (3,5)	*p* = 0.09

*Statistically significant at *p* value < 0.05; ** statistically significant at *p* value < 0.001.

The performance of Gail's model in the detection of individual at high risk of developing breast cancer showed that the Gail's risk assessment tool was able to classify just two (5.6%) respondents as being at high risk of developing breast cancer. The sensitivity of the Gail's model when applied to the respondents was 5.56%. However, the Gail's risk assessment tool did not falsely classify as average risk respondent at high objective risk [Table 5].

Majority of the participants strongly believe in mystical entities such as "evil spirits" as being the cause of breast cancer. Other participants are of the view that keeping money in the breast is also a risk factor for breast cancer. However, a few participants were of the opinion that excessive consumption of canned food was a risk factor for breast cancer. Some of the opinions expressed by the participants on the etiology of breast cancer were as follows:

"Keeping hand-phones close to or in the bra can cause breast cancer" (a 34-year-old housewife in a rural area).

"Wearing dirty bra, when you wear the same bra everyday can cause breast cancer" (an urban dwelling hair dresser).

"…when women's breast has dirt on the nipple and failing to wash underneath the breast, when money is kept in the bra many hands have touched money" (an urban dwelling petty trader).

Majority of the participants in both rural and urban areas consider breast cancer as being of no threat at all. Some participants who felt anybody may be at risk believed it was much less than an average woman. Other views expressed by the participants on their risk perception are as follows:

"Anybody can have it but God forbid, may God prevent me from having it" (an urban dwelling trader of age 41 years).

"…I can't have it. Everyone will die someday…" (a 29-year-old farmer in a rural area).

Discussion

In Nigeria, objective risk assessment for breast cancer is not routinely done, and most cases of the breast cancer are detected accidentally by women themselves. The Gail's breast cancer risk assessment tool (BCRT) has been used

Table 4: Description of respondents' according to objective breast cancer risk (OBCR)

	OBCR, *n*= (%)		Total	Statistical tests
	Average	High		
Number of women	644 (94.7)	36 (5.3)	680 (100.0)	
Accurately perceived true risk[a]	622 (94.8)	2 (8.3)	624 (100.0)	kappa = 0.07
Median Gail score				
Median (range)	0.20 (0.20–1.4)	0.75 (0.20–1.8)		
Place of residence				
Rural	325 (50.5)	15 (41.7)	340 (50.0)	$\chi^2 = 1.06$, $df = 1$
Urban	319 (49.5)	21 (58.3)	340 (50.0)	$p = 0.196$
Knowledge of breast cancer				
Poor knowledge	207 (32.1)	11 (30.6)	218 (32.1)	$\chi^2 = 0.04$, $df = 1$
Good knowledge	437 (67.9)	25 (69.4)	462 (67.9)	$p = 0.502$
Attitude to BSE				
Positive attitude	310 (48.1)	21 (58.3)	331 (48.7)	$\chi^2 = 1.42$, $df = 1$
Negative attitude	334 (51.9)	15 (41.7)	349 (51.3)	$p = 0.234$
Family history of any cancer				
Positive	43 (6.7)	11 (30.6)	54 (7.9)	$\chi^2 = 26.59$, $df = 1$
Negative	601 (93.3)	25 (69.4)	626 (92.1)	$p = 0.0001$**
Family history of breast cancer				
Positive	20 (3.1)	10 (27.8)	30 (4.4)	$\chi^2 = 49.21$, $df = 1$
Negative	624 (96.9)	26 (72.2)	650 (95.6)	$p = 0.0001$**
BMI				
Normal	347 (53.9)	8 (22.2)	335 (52.2)	$\chi^2 = 13.69$, $df = 1$
Overweight	297 (46.1)	28 (77.8)	325 (47.8)	$p = 0.001$*

[a]Accurately perceived true risk, *Statistically significant at p value < 0.05; ** statistically significant at p value < 0.001.

Table 5: Performance of Gail's model in detection of high-risk individual against objective breast cancer risks (OBCR) among respondents

Objective risk using Gail's criterion	OBCR			Performance indices
	High, *n* (%)	Average, *n* (%)	Total	
High	2 (5.6)	0 (0.0)	2 (0.3)	Sensitivity = 5.56%; Specificity = 100%; Positive predictive value = 100%; Negative predictive value = 94.98%; False negative rate = 94.44%; kappa statistics = 0.066
Average	34 (94.4)	644 (100.0)	678 (99.7)	
Total	36 (100)	644 (100)	680 (100)	

among various ethnic groups and races to assess women's individualized risk of developing breast cancer. However, several authors have reported its tendency to either underestimate or overestimate individual risk.[34,35] Because, BCRT has never been applied to assess breast cancer risk among Nigerian women and considering the reports of its tendency to over- or underestimate breast cancer risk, this study applied its own criteria for the objective assessment of breast cancer risk among the respondents. Using these criteria, about one in 20 respondents were assessed to have HOBCR. These estimates are similar to reports from a survey (SEER Cancer Statistics Review) by the United States National Cancer Institute.[36] Hence, this implies that OBCR has a potential of being used as a high-risk screening tool for breast cancer in middle- or low-resource setting. Clients who screen positively as HOBCR can subsequently be offered targeted screening. Women with HOBCR will also be offered intensive health education and counseling on various risk-reducing options.

Assessing the performance of Gail's BCRT using this study's objective risk assessment as gold standard showed that BCRT performed weakly as a screening tool with a sensitivity of 5.6%, thus limiting its use in the identification of women at high risk. Perhaps, this observation is related to the inability of women to provide responses to two of the seven questions that BCRT uses in risk assessment namely: number of previous breast biopsies and number of breast biopsies that showed abnormality. In addition, this may partly be because of peculiarities with respect to the study area, especially in the rural areas where 60% of respondent completed primary education as the highest level of education attainment and

may be illiterate. Furthermore, almost all the women in this study had menarche after 12 years of age, and this is likely to be marked different from that of women in developed or more industrialized nations where early menarche is more prevalent.[37]

At any age, a woman's breast cancer risk may be higher or lower depending on the presence of other personal risk factors. Studies have shown that the incidence of breast cancer increases linearly with increasing age.[38,39] One of four respondents was of age 40 years or older in this study. The proportion of respondents older than 40 years was about 22% in rural areas compared with 15% in urban areas. This is similar to the previous observation from similar studies in Nigeria and West Africa.[18,40] This affirms findings that most rural populations are vulnerable to a higher incidence of breast cancer, because they are older, poorer, and less educated.[41,42] This may partly explain the disparities in the stages of diagnosis between people living in rural and urban areas, with a greater incidence of late-stage diagnosis generally found in rural areas.[10,13,16] This result implies that breast cancer screening programs and other related interventions should preferentially target more rural and underserved communities.

Studies have shown that a strong family history of breast cancer increases a woman's risk by four to 15 times that of the general population.[43,44] Findings from this study report that about one in 20 women showed a family history of breast cancer. This is comparable with the finding of the Black Women's Health Study on Cancer Causes and Control.[43] In most Nigerian cultures, family history of death can be quite difficult to elicit for several sociocultural reasons. Death, sorrow, and anguish are seldom discussed, and such discussion is frequently seen as a social taboo, even among family members. However, family history can be used as a proxy to identifying individuals with genetic predisposition for breast cancer in our environment as testing for BRCA gene mutation is almost nonexistent.[45] Clinics that pool individuals with a family history of breast cancer can be used for targeted screening and monitoring of this group of persons at supposedly high risk of breast cancer.

Reports have also highlighted the role of prolonged exposure to endogenous estrogen hormones as a risk factor for developing breast cancer.[46] Early menarche at age younger than 12 years may increase a woman's risk of breast cancer by affecting the levels of reproductive hormones produced by her body. Likewise, women who are older than 30 years at first full-term pregnancy have a greater risk of developing breast cancer. Findings of this study revealed that fewer women attained menarche earlier than 12 years in rural areas compared with urban areas. The observation is in keeping with the findings of another study conducted in Benin.[47]

Women at high risk of developing breast cancer need to have an accurate understanding of this risk to make informed decisions about screening for breast cancer and options for risk reduction.[31,48] Women at high risk may benefit from targeted and regular or screening practices. Women at average risk also need to have an accurate understanding of their risk to avoid unnecessary anxiety and treatment. The results of this study suggested that a majority of women did not accurately assess their risk of developing breast cancer, as nine in 10 women at high risk underestimated their true risk of developing breast cancer. This result far overshot the findings from previous works, which suggests a 10%–67% underestimation of risk of developing breast cancer depending on the population.[43,49,50] This is a reflection of sentiments of women in our environment to reject debilitating illnesses and, hence, underestimate their risk.[18,41] The inference from this finding is that women at increased risk who underestimate this risk may unnecessarily defer the use of screening or primary prevention strategies. This may also explain the late-stage presentation of breast cancer cases seen in majority of our health facilities. Therefore increasing women's knowledge to appreciate their true risk of breast cancer should promote access and use of screening or primary prevention strategies.

Conclusion

The study concluded that women in rural areas had poorer knowledge of breast cancer and exhibited a negative attitude toward breast cancer and its preventive practices compared with those in urban areas. The prevalence of risk factors for breast cancer such as age at 40 years or older was higher in rural areas while OBCR was higher in urban compared with rural areas. The prevalence of family history of breast cancer was found to be the same for both rural and urban areas. Women at increased risk in rural areas all underestimated their risk compared with women in urban areas.

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How to cite this article: Aduayi VA, Onayade AA, Aduayi OS, Odu OO. Relating self-perceived with objective risk for breast cancer among women in rural and urban communities in southwestern Nigeria. Int J Med Sci Public Health 2015;4:1449-1456

Source of Support: Nil, **Conflict of Interest:** None declared.