Original Article

Predominant Lifestyle Risk Factors Associated with Breast Cancer: A 5-Year Review of Breast Cancer Patients from Accra, Ghana

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Abstract

Background: Breast cancer; the leading malignancy in Ghana accounts for 15.4 % of all cancer cases and appears to be on the increase. The cause of breast cancer is not known to date but several factors are known to increase the risks of developing this malignancy. All the known and proven risk factors are generally categorized into two main forms: preventable and non-preventable risk factors.

Aim: The study aimed at determining the major preventable risk factors among breast cancer patients in Ghana.

Method: The medical records of thirty breast cancer patients admitted at the Korle-Bu Teaching Hospital were conveniently sampled each year over a 5 year period, from 2006-2010. Self-reported risk factors by patients were recorded. Risk factors considered were smoking, alcohol drinking, family history of cancer, Obesity, overweight, age at having first child, the use of oral contraceptive pills, and null parity. Data were then analyzed using descriptive statistical method under SPSS software: bar charts, line graph and pie chart.

Results: Obesity was consistently the highest risk most patients were exposed to for each of the year under review with an average number of 34.9%. Smoking was the least represented (4.6%).

Conclusions: Obesity was consistently the predominant preventable risk factor for the past five years and is likely to dominate for the next 5-10 years if lifestyles are not adjusted.

Keywords: Malignancy, risk factors, lifestyle, breast cancer, predominant.

Introduction

Cancer is a disease caused by an uncontrollable division of abnormal cells in a part of the body [1]. Cancer causes about 7 million deaths worldwide in a year which is more than deaths caused by malaria, tuberculosis and HIV/AIDS together [2]. It is the second leading cause of death in developed countries and the third leading cause of death in the developing countries [3]. The World Health Organisation estimated that by the year 2030, 13 million people will die from cancer. It further estimated that about 70% of them will come from low and middle income countries. Excluding non melanoma skin cancers, breast cancer is the most common cancer among women in the United States with a life time-risk of 13.4% [4] accounting for 40,500 deaths per year [5].

In Ghana, a West African Country, breast cancer accounts for 15.4% of all cancer cases with a prevalence rate of 19.5% for five years. It is also the second leading cause of cancer mortality estimated at 17.2% after cervical cancer [6, 7].

The actual cause of cancer is unknown but several factors are known to increase the risks of

developing breast cancer [8]. Exposure to one or more risk factors does not necessarily imply that one will definitely get the disease. Even when an individual with a risk factor develops breast cancer, it is hard to determine the percentage of its contribution to the disease [5].

All known risk factors can generally be categorized into two main forms, namely: preventable and non-preventable. Preventable risk factors refer to avoidable lifestyle or habits such as smoking, alcohol drinking, hormone replacement therapy, obesity, overweight, nulliparity, age at first pregnancy and oral contraceptive use [5]. Non-preventable risk factors include risk exposure that cannot be adjusted or controlled such as gender, increasing age, race and ethnicity, mammographic breast density and family history. Other factors with unproven direct effect include use of antiperspirant, wired bras, induced abortion and silicone breast implants [5].

Studies have identified the various risk factors associated with breast cancer. The major non-preventable risk factors have also been investigated to be age [9] and being a female [10]. Preventable risk factors, however varies across race and geographical borders and even from one country to another within the same geographic location. For instance, White women are known to have higher rates of breast cancer compared to women of the same age group in Asia and Africa. However foreign-born Asians who adopt western diet and lifestyle have increasing risk of the disease [11].

Hormone replacement therapy and diet have been identified as the major preventable risk factor among American women [5]. However, no study has been done to identify the predominant preventable risk factor(s) of breast cancer among Ghanaians. The study therefore sought to provide answers to this important question and also to provide a baseline data about the situation in Ghana.

Objectives

1. To identify and rank the preventable risk factors according to their contribution to breast cancer for each year under review
2. To determine the consistency of each preventable risk factor for the 5years under review
3. To determine the overall risk factor/lifestyle that exist among breast cancer patients

Patients and Methods

A quantitative retrospective s research design was used. Data were obtained from objective analysis of the past medical records of pathologically diagnosed breast cancer patients at the Korlebu teaching hospital. Convenient sampling method was used in selecting patients data from readily available patient medical records over a five year period, from 2006 – 2010. Information was gathered under the following headings: Vital Signs, which provided information about the weight and height of patient and hence, an indication of the BMI; Social history, which provided data on alcohol and smoking status; Drug History, which gave an indication as to whether or not, the patient had used oral contraceptive pills or hormonal replacement therapy; Obstetric and Gynaecological history, where the age at first full term pregnancy was recorded and the family history of breast, ovarian or any other cancer.

Out of an average of 256 breast cancer patients who reported each year to the hospital, thirty breast cancer patients for each year under review were sampled; with a total of 150 cases obtained under the 5 years under review. The history of individual patients was reviewed and the obvious risk factor(s) were recorded. Where more than one obvious risk factor is indicated, all risk factors were recorded independent of the others. Risk factors which were considered are as follows: smoking, alcohol drinking, Obesity (BMI>29.9kg/m^2), overweight (BMI=25-29.9kg/m^2), oral contraceptive use, hormone replacement therapy and nulliparity.

The study included patient from all parts of Ghana who are Ghanaians. This was because the study aimed at determining the major preventable risk factor in Ghana only. The study excluded patients who were foreigners at the time whether referred from their respective countries or resident in Ghana at the time of the study. Patients who had reported any history of exposure to a non-preventable risk factor were also excluded. These non-preventable factors include clients representing with late menopause or early menstrual period, patients with history of a relative (i.e. mother, sister, grandmother, etc) having the disease and lastly being a woman as whole significantly increases one's risk. This was because the study focused on acquiring data on only preventable risk factors.

Categorical data were analyzed using univariate descriptive statistics; mean, standard deviation, frequency distributions, percentages, bar chart, pie chart and line chart were used to present the data. Ethical approval was sought from the Research and Ethical Review Committee of the School of the Allied Health Sciences as well as the Head of Oncology Unit for the furtherance of this study.

Result

From January 2006 to December 2011, 150 patient medical records were gathered and recorded and analyzed. The age range of patients in 2006 was 42-63 years, 2007 was 41-71 years, 2008 was 40-71, 2009 was 39-70 years and 2010 was 41-70 years. Overall, the mean age of all was 39.6-69.6 years. Of these, there were no male breast cancer patient records, 96 had exposure to various non-preventable risk factors, while 11 patients did not report any of the two categories of risk factors.

In 2006 and 2007, two-thirds of the patients were exposed to only 1 preventable risk factor, (that is obesity, alcohol or overweight). A similar trend (73.4%) was seen in 2008 and 2009. However in 2010, half of the patients were exposed to one risk. Obesity remained the highest risk among the breast cancer population in all the years under review.

In terms of the total number of breast cancer patient exposed to each risk factor over the five year period, null parity and the use of oral contraceptive pill were the least consistent with an average of 12.1% (S.D=38.8%) and 7.4% (S.D= 44.1%) respectively. Obesity recorded the highest precision with an overall average of 34.9% (S.D=1.1%). In the regression analyses, the mean square of the obesity over the five years period was 1.894.

Discussion

This study was gender specific; all the sampled data recorded were those of only females as

Table 1: Consistency of each risk factor in terms of precision

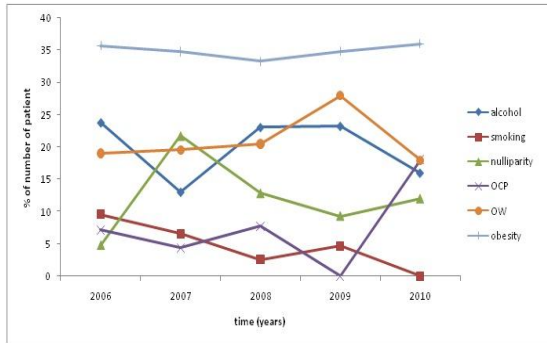| Risk factor	Year /percentage of patients (%)					Average (%)
	2006	2007	2008	2009	2010	
Alcohol	23.8	13.0	23.1	23.3	16.0	19.8
Smoking	9.5	6.5	2.6	4.6	0.0	4.6
Null parity	4.8	21.7	12.8	9.3	12.0	12.1
Oral conceptive pill (OCP)	7.1	4.3	7.7	0.0	18.0	7.4
Overweight (OW)	19.0	19.6	20.5	27.9	18.0	15.4
Obesity	35.7	34.8	33.3	34.9	36.0	34.9

Figure 1: Consistency of the various risk factors

breast cancer in males is different. However, the study did not take into account the individual ages of the selected patients but it was noted that the overall minimum age recorded for the period of the study was 41years with most of the patients in their early fifties.

Risk factors and lifestyles of participants

The study focuses on the preventable risk factors, their consistency and dominance over a 5 year period (2006-2010). Lifestyles included in this study were smoking, alcohol drinking, obesity, overweight, null parity, and the use of oral contraceptive pills. These lifestyles were chosen because even though they are common, they vary across race and geographical borders and even from one country to another within the same geographic location [11]. The data shows that 23.8% of breast cancer patients, who were diagnosed in 2006, drank alcohol. This number declined in 2007 to 13.0% but increase in 2008 and further in 2009 by 23.1% and 23.3% respectively.

There was however a reduction (16%) in 2010 as illustrated in Figure 1. Alcohol drinking was however not dominant in any of the periods under study, contributing a total of 19% to the disease with respect to preventable risk factors. Thus alcohol is not the most significant and major preventable risk factor in Ghana. This may be due to the fact that most Ghanaian women do not drink alcohol as confirmed in a study by Martinez, *et al.*, [12] which showed that approximately two-

thirds of women in Ghana were lifetime abstainers of alcohol.

Smoking

There was a consistent decline in the number of breast cancer patients who smoked, from 9.5% in 2006 to 6.5% in 2008 and 0.0% in 2010. There was however a relative increment in the number of smokers in 2009 (4.6%) as shown in Figure 1. The relatively low mean recorded was due to the consistent low number of breast cancer patients who smoked. There was however no record of smoking in 2010. The consistent decline in number of patients who smoked obviously means that smoking was not dominant in any of the year under review. Also the data indicated that smoking was the second least contributor among breast cancer patient during the years under review (Table 1 and Figure 1). This is in line with a study showing a wide disparity in the ratio of men to women who smoke over the past three decades in Ghana and the consistent decline in the number of women who actually smoke [13]. This may partly be as a result of the fact that most societies and cultures in Ghana persistently abhor smoking of cigarette and tobacco among the female gender [10].

Nulli parity and oral contraceptive pills

There is a sharp increase of nulliparous clients with breast cancer in 2006, from 4.8% to 21.7% in 2007 and then declined again to 12.8% and 9.3% in 2008 and 2009 respectively. The relatively high deviation in the recorded data is a clear indication of inconsistency in terms of precision. Despite the increment of nulliparous women in 2007, there was no dominance of null parity among breast cancer patients between 2008 and 2010.

Similarly, inconsistent prevalence was noticed from 2006 to 2010 with respect to patients who had used oral contraceptive pills as illustrated in Figure 1, with an average of 7.4 (S.D= 44.1%). Once again, a relatively large deviation was recorded demonstrating the inconsistencies in the use of oral contraceptive pills among breast
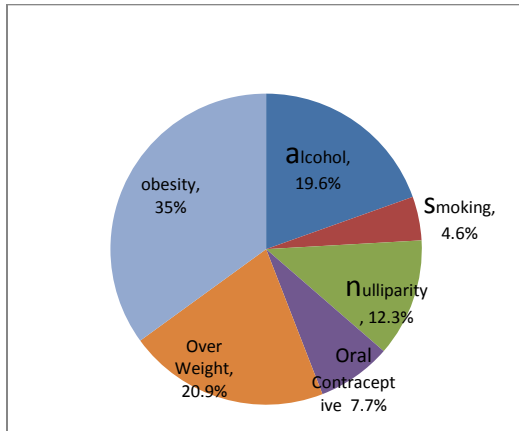
Figure 2: The total risk factors patients were exposed to over the 5 year period

cancer patients for the five year period. No dominance was recorded over the five year period.

The use of oral contraceptive pills (OCP) and nulliparity precedes smoking in their contribution to breast cancer respectively, contributing a total of 7.7% and 12.2% respectively (Table 1). The consistently low values recorded for both nulliparity and OCP over the five year period confirms the perception in the Ghanaian culture that having many children determines how important one is in the society and also religious associations such as being catholic [14]. Most couples in the more remote parts of Ghana are discouraged from the active use of oral contraceptive pills. Even though OCP are available in the country, only a small percentage of Ghanaians use them [14].

Overweight and obesity

There was consistent increment in the number of patients who were overweight from 19.1% in 2006 to 27.9% in 2009. However, there was a decline from 2009 (27.9%) to 2010 (18%). Despite the relatively high value recorded (Figure 1), overweight was not a dominant risk among breast cancer patient in any of the year under review (Figure 1). Obesity was consistently the highest risk most patients were exposed to for each of the year under review with an average number of

34.9% (S.D= 1.1 %). The relatively low deviation recorded indicates a high level of consistency in terms of precision (Figure 2).

Obesity remained the highest preventable risk factor that had existed among the breast cancer population for the past 5 years (2006 - 2010) recording a total of 35%, with overweight recording 20.9% of the total patient population. Obesity has been clearly shown to be positively correlated with breast cancer risk [5], but it appears to influence breast cancer risk predominantly in postmenopausal women [15]. The higher risk of breast cancer with increased BMI in postmenopausal women is likely due to higher levels of estrogens. (Table 2) After menopause, fat tissue becomes the most important source of estrogens instead of the ovaries. Thus, because obese women have more fat tissue, their oestrogen levels are higher, potentially leading to more rapid growth of oestrogen-responsive breast tumours [5]. Dietary factors and lack of physical activities are evidently the major contributing factors to the cause of overweight and obesity with respect to the fact that people who are obese or overweight from childhood (hereditary) do not actually show any increase risk of breast cancer [16].

Strengths and limitations

The study was able to outline dominant lifestyle risk factors associated with breast cancer over the years under review and the most significant contribution to the study was the fact that obesity continues to be the major significant factor over the past years. However, there were some few challenges encountered during the study. These were; information regarding some patient data provided in the patient folder was not complete. For instance, some patient folder gave information on the patient's weight without providing any on Height. Hence, patient BMI could not be calculated. Again, though information regarding patients drinking status was specified in their respective folders, this information was general and not quantified in terms of how much a patient consumes daily.

Table 2: Regression analyses of the years under review and Obesity

A: Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.435[a]	.189	-.081	1.644
a. Predictors: (Constant), Obesity				

B: ANOVA[b]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.894	1	1.894	.701	.464[a]
	Residual	8.106	3	2.702		
	Total	10.000	4			
a. Predictors: (Constant), Obesity b. Dependent Variable: Years under review						

C: Coefficients					
Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2002.167	7.006		285.771	.000
	VAR00007	.379	.452	.435	.837	.464
a. Dependent Variable: Year under review						

Conclusion

For a risk factor to be dominant over the others in relation to lifestyle or preventable risk factor, two (2) criteria must be fulfilled. Firstly, it has to be consistently dominant for each year under review [8]. Secondly, it should represent the highest percentage of the population of the years under review. Table 1 and Figure 1 show vividly the consistencies of the various lifestyles among the breast cancer populace. Obesity was the most significant and major preventable risk factor for the past 5 years and is possibly going to dominate among the breast cancer population for the next 5 years if the general public especially, women are not adequately educated on ways of preventing obesity.

Author's contribution

PA and KAK, carried out the literature and prepared the draft manuscript,

SYO, and WKA carried out the experiment and VV interpreted the results,

KAK and VV designed the study and performed the analyses

SYO concieved the study and participated in the study design and

KAK edited the final manuscript

All authors read the script carefully and approved the final manuscript for submission

Conflict of Interests

The authors declare that there are no conflicts of interests.

Ethical Considerations

The study was approved by the Institute Ethics Committee

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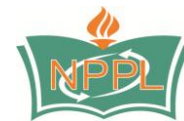## References

[1]. Oxford Concise Medical Dictionary. Britain: Clays Ltd: 2003; 6:103.
[2]. Amporful EO. Cancer Awareness and Screening Programme: Cancer screening- remains the first barrier for cancer prevention. Ghana Institute of Management and Public Administration (GIMPA), Accra: Cancer Society of Ghana, 2010.
[3]. Parkin DM. The Global Health Burden of infection-associated cancers in the year 2002. Int J Cancer 2006; 118: 3030-3044.[pubmed]

[4]. Jabberi S, Park C, Fowble B. Breast Cancer. In: E.K. Hansen and M. Roach, 2nd Ed. (2010). Handbook of Evidence-Based Radiation Oncology, New York; Springer Sciences business media 2010; 17: 263-311.

[5]. American Cancer Society (ACS). Early detection of breast cancer, what is the risk factor 2011; 6:113.

[6]. Wiredu EK, Armah HB. Cancer mortality patterns in Ghana: a 10-year review of autopsies and hospital mortality, BMC Public Health 2006; 6:159.[pubmed]

[7]. Clegg-Lamptey JNA, Hodasi WM. A study of breast cancer in Korle Bu Teaching Hospital: Assessing the impact of health education. Ghana Med. J 2007; 41(2):72-77.[pubmed]

[8]. Baletine JR. Risk factors of Breast Cancer, Breast Cancer
http://medicinenet.com/breastcancer/riskfactor/ 2011.

[9]. Jabberi S, Park C, Fowble B. Breast cancer. In: Hansen EK, Roach M. 2nd Ed. 2010, Handbook of Evidence-Based Radiation Oncology, New York ; Springer Sciences business media 2010; 17:263-311.

[10]. Haffty BG, Buchholz TA, Perez CA. Early stage breast cancer, risk factors. In;. Halperin, EC. Perez CA, Brady LW 5th Ed. 2010. Principles and Practice of Radiation Oncology. New York: Lippincott Williams and Wilkins 2010; 53:1176-1180.

[11]. Deapen D, Lui L, Perkins C, Bernstein, L Ross RK. Rapidly rising breast cancer incidence rates among Asian-American women. Int J cancer 2002; 99: 747-750.[pubmed]

[12]. Martinez P, Røislien J, Naidoo N, Clausen T. Alcohol abstinence and drinking among African women: data from the World Health Surveys, BMC Public Health 2011; 11:160.[pubmed]

[13]. Addo J, Smeeth L, Leon DA. Smoking Patterns in Ghanaian Civil Servants: Changes Over Three Decades. Int J Environ Res Public Health 2009; 6(1): 200–208.[pubmed]

[14]. Fischer M. Childbearing in Ghana: how beliefs affect care, African Diaspora, ISPs African Diaspora collection, Digitalcollections@SIT 2002; 1-23.

[15]. Van den Brandt PA, Spiegelman D, Yaun SS. *et al*. Pooled analysis of prospective cohort studies on height, weight and breast cancer risk. American Journal of Epidemiology 2000; 152:514-527.[pubmed]

[16]. Benkeser RM, Biritwum R, Hill AG. Prevalence of overweight and obesity and the perception of healthy and desirable body size urban, Ghanaian women. Ghana Medical Journal 2012; 46: 2.[pubmed]
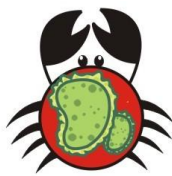
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