

Women Breast Cancer: Knowledge, Attitudes, Practices and Factors Associated with Early Screening in the Municipality of Abomey-Calavi in Benin in 2018

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Abstract

Background: Breast cancer is the dominant cancer in women in both developed and developing countries. The objective of this study was to assess the knowledge, attitudes, practices and factors associated with early breast cancer screening among women in the Municipality of Abomey-Calavi in Benin. **Methods:** This was a cross-sectional, descriptive, analytical study with prospective data collection from October 1 to 8, 2018, involving 1740 women in the Municipality of Abomey-Calavi, aged 18 years or older and selected by WHO four-stage random cluster sampling. Consenting women who were mentally competent, 18 years of age or older at the time of the survey, and residing continuously in the Municipality of Abomey-Calavi for the last six months prior to the survey were included. On the other hand, women who belonged to a breast cancer prevention service, women in whom secondary screening was noted, or non-consenting women were not included. The initial minimum size was estimated by the Schwartz formula with a cluster effect of $k = 2$. Information was collected by questionnaire survey, entered with Epidata 3.1. Fr and analyzed with R Studio 3.5.1. software. **Results:** The mean age of the women surveyed was 32.0 ± 11.5 years with a range of 18 and 71

years. Regarding knowledge, the clinical manifestation known by the majority of women was the presence of a nodule (68.50%). In the series, 1308 (75.17%) declared having heard about breast cancer once before, either on the radio, television or from friends and 726 (55.50%) had heard about breast cancer screening. Five hundred and twelve (70.52%) of the 726 who had heard of breast cancer said they knew that breast cancer could be screened earlier. Breast self-examination was the most cited screening method (67.58%). The disease is of natural origin according to 37.84% of them. Regarding attitudes and practices, the prevalence of early breast cancer screening was 12.93%, of which 11.67% declared that they had checked themselves to know whether they were carriers of the disease or not. The main means of the early screening used was breast self-examination (85.78%). Factors associated with early breast cancer screening found in multivariate analysis were age (≤ 50 years), education level (increasingly higher), marital status (married/coupled), place of residence (downtown), and socioeconomic level (average/high). Conclusion: The frequency of early breast cancer screening among women is still low in the municipality of Abomey-Calavi, although they have a good knowledge of the disease. This raises the need to strengthen awareness of early breast cancer screening.

Keywords

Breast Cancer, Early Screening, Knowledge, Practices, Attitudes, Associated Factors

1. Introduction

Breast cancer is the prevailing cancer in women in both developed and developing countries [1]. Its extent in developing countries would be due to the progressive evolution of development towards quick urbanization and the accommodation of Western lifestyles. In fact, African women, and more particularly rural women, are more attached to their socio-cultural practices and therefore tend to give a different interpretation to the disease, which explains the traditional treatments in the first instance. In addition, the financial difficulties give access to health training, the lack of information about the disease and the geographical and economic accessibility to health care units push them to consult a specialist in most cases only when the breast cancer has reached an advanced stage. These elements are sources of late diagnosis and treatment, worsening the vital prognosis [1].

In Benin, breast and cervical cancer are the prevailing cancers in women. According to the Organization for Aid, Health, Information and Awareness (OASIS), breast cancer is 32.5% of the most frequent cancers in women and nine out of ten women (9/10) die from it. In the year 2000, breast cancer was the most common cancer in women (30%) [2]. Between 2000 and 2008, according to a study conducted at the University Clinic of Obstetrics and Gynecology (CUGO) of

the CNHU-HKM and at the Hospital of the Mother and Child Lagoon (HOMEL) of Cotonou, breast cancer was the leading cause of death with 44.3% followed by cervical cancer with 26.7% [2].

There are many risk factors for breast cancer including heredity, early puberty, late menopause and obesity. Also, the low cost of treatment by traditional therapists, which is considered to be affordable and well-received, is an important reason [3] [4].

The situation of cancer care is characterized by a high lethality, low patient survival, a socio-ecological environment favorable to the development of risk factors and a precarious technical platform. The Ministry of Health of Benin has implemented strategies and made pleas to decision-makers and development partners, cancer research, the establishment of an institutional framework, the creation of a cancer institute, the creation of a cancer registry, social mobilization and community participation, the development of resources (human, material and financial) and the introduction of early screening campaigns to reduce the incidence of this disease in the population [5]. In spite of all these measures, breast cancer continues to decimate a large part of the female population due to the low commitment of women to use the various existing means of early screening. And even if the mortality rate of breast cancer is relatively low, the treatment is quite heavy and often involves aesthetic damage if the discovery is late.

The only way to avoid late diagnosis is to prevent it. Thus, breast cancer can be diagnosed early through breast self-examination, clinical breast examination and mammography [6].

This is what prompted us to conduct this research in order to study the knowledge, attitudes, practices and factors associated with breast cancer early screening among women in the Municipality of Abomey-Calavi with the aim of guiding health policy makers to regularly and consciously institute mass screening and awareness campaign days for the early diagnosis of breast cancer in Benin.

2. Methods

2.1. Type and Population of the Study

This was a descriptive and analytical cross-sectional study with data collection conducted over a period of one week from October 1 to October 8, 2018. The study population included women aged 18 years or older on the day of the survey and residing in the Municipality of Abomey-Calavi. In the study, consenting women who were mentally competent, 18 years of age or older at the time of the survey, and residing continuously in the Municipality of Abomey-Calavi for the last six months prior to the survey were included. On the other hand, women who belonged to a breast cancer prevention service, women in whom secondary screening was noted, or non-consenting women were not included.

2.2. Sampling

The minimum sample size was estimated with the Schwartz formula at 1729 par-

ticipants:

$$n = K * Z^2 P(1 - P) / i^2$$

with n , the sample size; K , the cluster effect; Z , the reduced interval corresponding to the 5% risk; $Z = 1.96$; p , prevalence of breast cancer in Tunisia 2009 ($p = 10\%$) and i the desired precision ($i = 2\%$). We used a four-stage WHO random cluster sampling.

2.2.1. First Stage: Selection of Clusters in City Neighbourhoods

This was a random cluster survey following WHO recommendations. The sampling frame was constituted by the list of 71 administrative districts of the Municipality of Abomey-Calavi with their respective populations. We chose 30 clusters by default (WHO recommendation). The size (x) of each cluster is approximately equal to $n/30$ individuals per cluster.

2.2.2. Description of the Technique of the First Stage

A column of cumulative population counts was created and included the cumulative count for each neighborhood. Then the cluster step k_1 ; $k_1 = \text{total cumulative count}/30$ was calculated.

A number d is randomly chosen between 1 and the cluster step k_1 using Epi6 software and was used as the basis for identifying the first cluster from the list of cumulative populations. To the number d , the cluster step k_1 was added each time for the procedure of choosing the other clusters.

2.2.3. Operations of the First Stage

$k_1 = 412,261/30$, meaning $k_1 = 13,742$; $d = 7200$; $x = 1730/30$, meaning $x = 57.66$ or 58 individuals per cluster. The (real) sample size was therefore adjusted to $n = x * 30$; meaning $n = 58 * 30$; $n = 1740$. The study ultimately included 1740 women aged 18 years or older, selected on the basis of our general population eligibility criteria. The target population in 2017 was estimated on the basis of the population projection formula:

$$P = P_0(1 + r)^n$$

with P = population in 2017; P_0 = reference population in 2013 [7]; r = population growth rate = 5.5% [7] and n = period = 4 years. The list of neighborhoods with the number of women to be surveyed respectively is shown in Appendices.

2.2.4. Second Stage: Drawing of Concessions

In each neighborhood, the interviewer was placed in the center of the neighborhood and randomly selected a direction using the pen-and-ink method. In this direction, he entered every other compound, starting on the right side. The first concession to be visited was the second in the chosen direction.

2.2.5. Third Stage: Drawing of Households by Concession

Within each selected concession, numbers were assigned to each household on slips of paper. After mixing the slips of paper into a hat, 50% of the households were drawn at random.

2.2.6. Fourth Degree: Drawing of Individuals by Household

In each selected household, one woman was drawn from the list of eligible individuals present in the household when the collection team visited.

2.2.7. Specific Case

If the expected number of individuals is not reached in that direction, the interviewer returned to the center of the neighborhood and walked in the opposite direction to the first, building the sample in the same way. Likewise, if a household drawn did not have any eligible individuals, he or she would randomly re-draw from among the households not drawn.

2.3. Variables

The dependent variable of the study was breast cancer early screening. It was a composite variable that included the following conditions: having performed breast self-examination in the past 12 months or having been seen for breast cancer early screening in a qualified health care facility in the past 12 months or having had a mammogram in the past 12 months. The independent variables were sociodemographic characteristics, family history, and variables related to knowledge about early breast cancer screening. The socio-economic level was evaluated using the quartile method on the basis of a set of weighted items. The abusive consumption of alcohol was defined as a daily consumption of more than four glasses of 20 g ethanol equivalent per unit. The practice of physical activity was insufficient for moderate physical activity of at least 30 minutes or intense activity of at least 15 minutes during their activities or less than 5 days per week.

2.4. Data Collection and Analysis

Regarding data collection, a questionnaire was developed and then pretested and validated prior to the multiplication of the collection forms. The questionnaire was administered during an individual face-to-face interview. The data collected was checked at the end of the day to ensure the quality of the information collected. The data collected were entered using Epidata 3.1. Fr. They were then cleaned and analyzed with R Studio 3.5.1. The qualitative variables were expressed as proportions and the quantitative variables as mean \pm standard deviation after verification of their normality by the Shapiro-wilk test. The comparison of proportions was done with the chi-square test or Fisher's exact test, depending on whether the theoretical number of participants was less than 5 or not. Univariate and multivariate analyses were performed to identify factors associated with early breast cancer screening. For all comparisons, a difference at the p-value threshold $< 5\%$ was considered statistically significant. The initial model for the multivariate analysis included variables associated in univariate, variables not associated in univariate but at the p-value threshold of less than 20%, and variables known in the literature to be associated with breast cancer early screening (forced variables) but that did not meet either of the previous

conditions. All these variables were entered into an initial top-down binary stepwise logistic regression model. Interactions were checked. The Akaike Information Criterion (AIC) was used to select the model that best fit the data. A significance level at the p -value $< 5\%$ was applied to retain the associated factors after adjustment for the other variables in the final multivariate analysis model.

2.5. Ethical Considerations and Authorization

This study was based on declarative information about breast cancer in women. However, free and informed consent in written form with the respondents' signature was systematically requested by the investigators before the questionnaire was administered. The data collected during the survey were strictly confidential and treated anonymously. In addition, this study received the agreement of the Abomey-Calavi communal authority under n°01024/C-AC/DC/SG/DRH/SAC before the data collection.

3. Results

The study was conducted on 1740 women surveyed in the general population in the Municipality of Abomey-Calavi on the basis of our selection criteria.

3.1. Socio-Demographic and Economic Characteristics

The mean age of the women surveyed was 32.0 ± 11.5 years with a range of 18 and 71 years. Women between the ages of 25 and 34 represented 33.97% of the sample. **Table 1** presents the socio-demographic and economic characteristics of the respondents.

3.2. Gyneco-Obstetrical History

Table 2 presents the gyneco-obstetrical history of the women surveyed.

3.3. Behavioral Risk Factors for Cancer

The average age of onset of menarche was 14.8 ± 1.7 years with extreme values of 9 and 18 years for all the total of 1740 women included in this study. In addition, 268 (15.40%) reported having had their first sexual intercourse before the age of 15 and 1258 (72.30%) reported having become pregnant at least once during their lifetime. Alcohol consumption was reported by 145 women (8.33%) and the majority did not practice enough physical activity (82.24%) (**Table 3**).

Regarding their eating habits, 90.86% did not eat enough fruit and vegetables, 75.75% ate fast food, 41.15% said they liked to eat too much sugar, 27.13% too much fat and more than one in four liked to eat too much salt (**Figure 1**).

3.4. Awareness and Early Screening of Breast Cancer

The majority of respondents knew about breast cancer through several information channels (**Figure 2**).

Table 1. Distribution of surveyed women according to socio-demographic and economic characteristics in Municipality of Abomey-Calavi in 2018 (N = 1740).

	Frequency (N = 1740)	Percentage (%)
Age (years)		
<25	536	30.80
25 - 34	591	33.97
35 - 44	362	20.81
45 - 54	157	9.02
≥55	94	5.40
Education level		
None	687	39.48
Primary	408	23.45
Secondary	528	30.34
Higher	117	6.73
Socio-economic level		
Low	578	33.22
Average	849	48.79
High	313	17.99
Residence		
Out of town	998	57.36
Downtown	742	42.64
Marital status		
Married/In couple	1053	60.52
Not in couple	687	39.48

Table 2. Distribution of surveyed women according to obstetrical history in the Municipality of Abomey-Calavi in 2018 (N = 1740).

	Frequency (N = 1740)	Percentage (%)
Gestivity		
Nulligest	482	27.70
Primigest	210	12.07
Paucigest	467	26.84
Multigest	364	20.92
Large multigest	217	12.47

Continued

Parity	(N = 1740)	
Nullipare	547	31.44
Primipare	235	13.50
Paucipare	502	28.85
Multipare	325	18.68
Large multipare	131	7.53
Number of miscarriages	(N = 1740)	
0	1281	73.62
1	278	15.98
>1	181	10.40
Number of living children	(N = 1193)^a	
0	17	1.42
1 - 3	749	62.78
>3	427	35.80
Exclusive Breastfeeding	(N = 1193)	
Yes	70	5.87
No	1123	94.13

a: Primipare at least.

Table 3. Distribution of surveyed women according to behavioral risk factors for cancer in the Municipality of Abomey-Calavi in 2018 (N = 1740).

	Frequency (N = 1740)	Percentage (%)
Alcohol consumption		
Not abusive	1595	91.67
Abusive	145	8.33
Tobacco consumption		
No	1589	91.32
Passive	107	6.15
Active	44	2.53
Chicha/other drug use		
No	1577	90.63
Yes	163	9.37
Physical activity		
Insufficient	1431	82.24
Sufficient	309	17.76

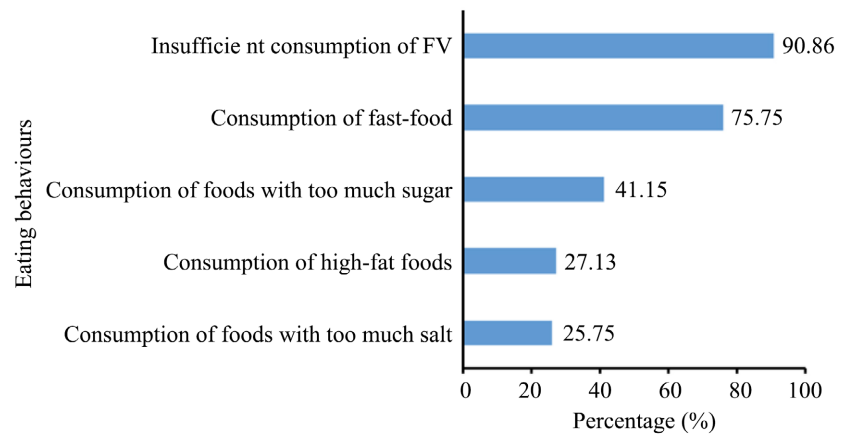


Figure 1. Distribution of surveyed women according to eating behaviors in the Municipality of Abomey-Calavi in 2018 (N = 1740). Figure caption: FV = Fruits and Vegetables.

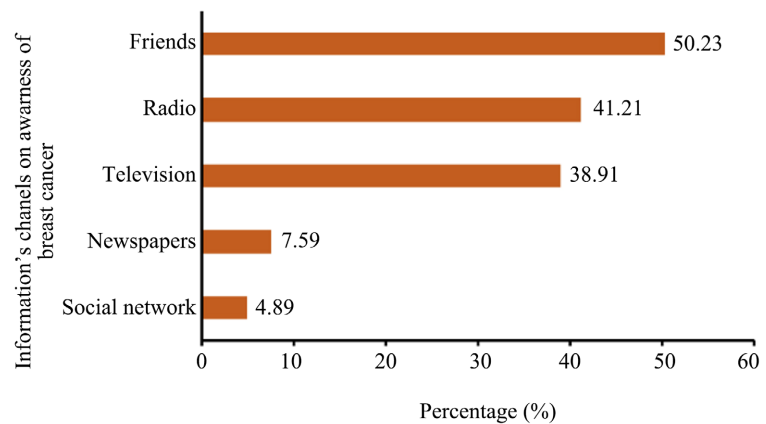


Figure 2. Distribution of surveyed women according to channels of information on awareness of breast cancer in the municipality of Abomey-Calavi in 2018 (N = 1 308).

The proportion of women who said they had heard about breast cancer once was 75.17%, meaning 1308 of all women surveyed. According to the majority of them (68.50%), breast cancer is mainly manifested by the presence of a nodule (**Figure 3**).

Of the 1308 patients who had heard of breast cancer once, 726 (55.50%) said they had heard of breast cancer screening at least once (**Figure 4**).

The breast cancer is detectable early according to 512 meaning 70.52% of them (**Figure 5**).

3.5. Attitudes and Practices of Early Breast Cancer Screening

The proportion of women who had ever been screened for breast cancer in the overall sample was 12.93%, meaning 225 women out of the 1740 surveyed. In addition, 203 (11.67%) reported that this screening was on their own initiative.

About the main means of early breast cancer screening used:

Our study reported that breast self-examination was the most commonly used method of early cancer screening in the last 12 months (85.78%) (**Figure 6**).

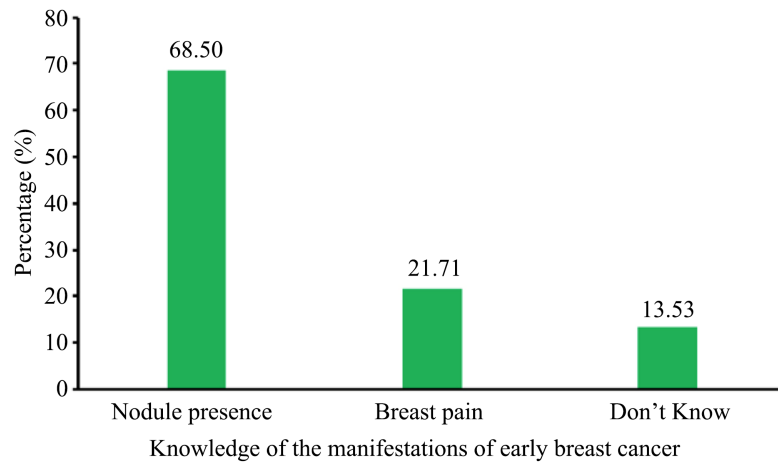


Figure 3. Distribution of surveyed women according to their knowledge of the manifestations of early breast cancer in the municipality of Abomey-Calavi in 2108 (N = 1308).

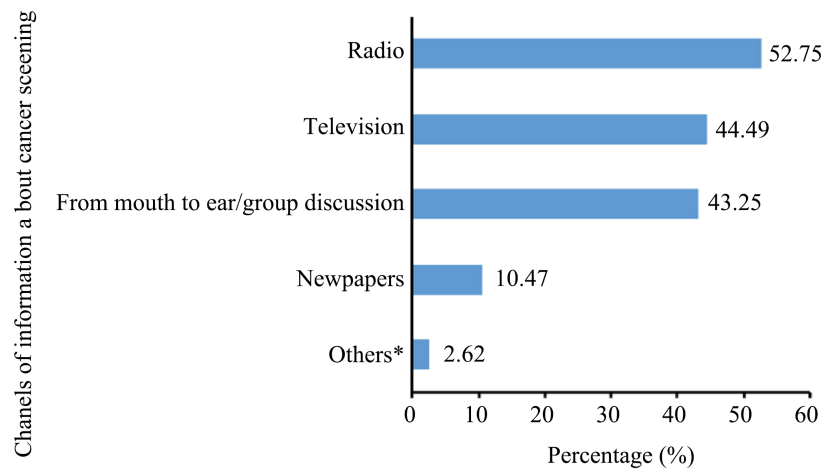


Figure 4. Distribution of surveyed women according to channels of information about cancer screening in the municipality of Abomey-Calavi in 2018 (N = 726). Figure caption: *Social network.

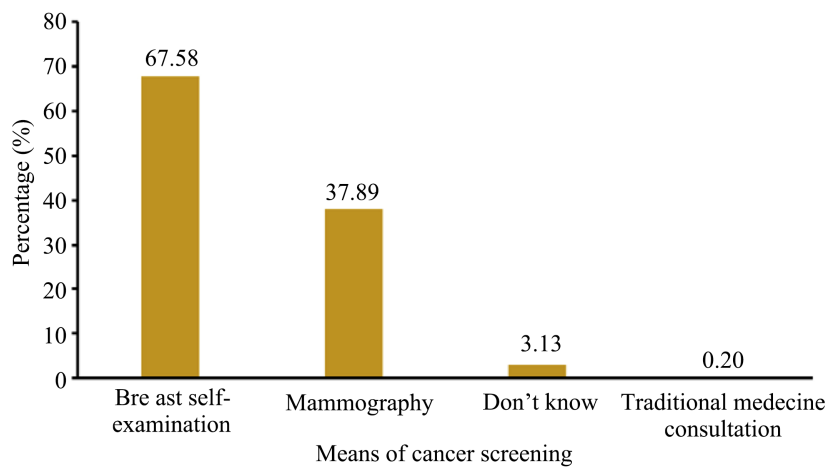


Figure 5. Distribution of surveyed women according to means of cancer screening known in the municipality of Abomey-Calavi in 2018 (N = 512).

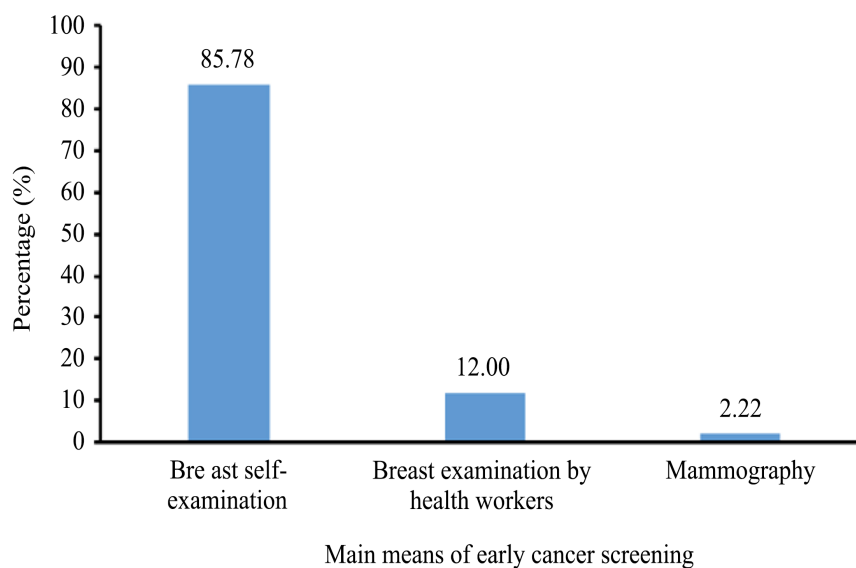


Figure 6. Distribution of surveyed women according to means of cancer screening used in the municipality of Abomey-Calavi in 2018 (N = 225).

This technique was adopted by 193 women as the main means of breast cancer screening. Of these, 50 (25.91%) reported having visited a health facility for confirmatory examination. **Table 4** presents information on breast self-examination.

Mammography is also a means of screening. According to the declarations of the 05 respondents who had undergone mammography in the last 12 months and of whom 03 suspected cases were confirmed and already treated.

3.6. Factors Associated with Early Breast Cancer Screening

After adjustment, factors associated with early breast cancer screening were age ≤ 50 , education level (increasingly higher), socioeconomic level (average/high), residence setting (downtown), and marital status (married/coupled). Indeed, women aged 50 years or older were 2.40 times (AOR CI: 1.10 - 6.35; $p = 0.0015$) more susceptible to breast cancer early screening. Similarly, this susceptibility was 1.67 (AOR CI: 1.04 - 2.68), 3.46 (AOR CI: 2.29 - 5.30) and 9.90 (AOR CI: 5.78 - 17.15) times among women with primary, secondary and tertiary education, respectively, compared to those with no education ($p = 0.0001$). Also, women in couples or married women were 1.76 times (AOR CI: 1.27 - 2.46; $p = 0.0001$) more likely to be screened compared to those not in couples.

Furthermore, susceptibility to early breast cancer screening increased significantly with socioeconomic level ($p = 0.0015$). Thus, susceptibility ranged from 1.53 times (AOR CI: 1.02 - 2.33) for the middle level to 2.31 times (AOR CI: 1.46 - 3.69) for the high level, compared with the low level. Residence was also significantly associated with early screening of breast cancer in women. Women living downtown were 1.58 times (AOR CI: 1.16 - 2.16) more likely to be screened early for breast cancer compared with those living out of town. **Figure 7** presents the result of the final multivariate analysis model.

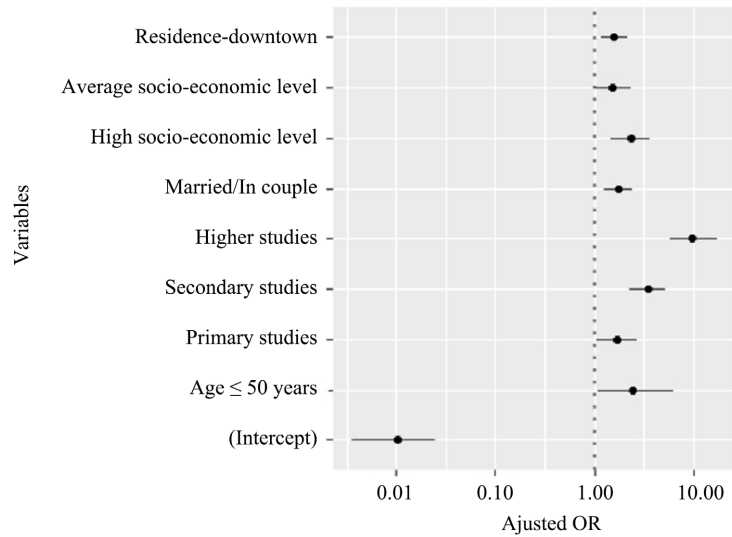


Figure 7. Final multivariate analysis model of factors associated with early breast cancer screening (N = 1740).

Table 4. Distribution of surveyed women according to characteristics of breast self-examination in the Municipality of Abomey-Calavi in 2018.

	Frequency	Percentage (%)
Frequency of breast self-examination (N = 193)		
Once a month	49	25.39
More than once a month	45	23.32
Once a year	12	6.22
More than once a year	87	45.07
Means of learning breast self-examination (N = 193)		
Media	110	56.99
Midwife	36	18.65
General physician	33	17.10
Gynecologist	12	6.22
Radiologist	2	1.04
Usual period of practice (N = 193)		
Beginning of menstruation	58	30.05
Mid-cycle	78	40.42
End of menstruation	57	29.53
Reason for non-practice (N = 32)		
I don't think about it	14	43.75
It bothers me	8	25.00
I don't know	7	21.88
Fear of doing it wrong	2	6.25
Fear of the result	1	3.12

4. Discussion

4.1. Prevalence of Early Breast Cancer Screening

The prevalence of early breast cancer screening among women was 12.93%, meaning 225 women of them. This prevalence is low compared to 16.7% found by Ouédraogo in France in 2013 [8] and the 23.3% revealed by the World Health Organization (WHO) in 2014 in Benin [9]. The difference observed in our study can be explained by the fact that according to the results of our research, 24.83% meaning 432 women have never heard of breast cancer; 13.53% of those who have once heard of it, have no knowledge of its manifestations and 29.48% of those who have heard of its screening, did not know that it can be screened early. Far from these previous figures, a study conducted by the “Association Lalla Salma de Lutte contre le Cancer” in 2006 in Morocco found a prevalence of breast cancer screening that was 40%, higher than ours in the general population similarly [10]. Awareness of early breast cancer screening in the general population is therefore necessary to try to significantly reduce breast cancer morbidity and mortality.

4.2. Women’s Knowledge, Attitudes and Practices Regarding Early Breast Cancer Screening

In our study 75.17% of the women collected had heard about breast cancer at least once and the sources of information were mainly friends 50.23%, radio 41.21% and television 38.91%. This same observation was made respectively by Suh *et al.* In 2012 in Buea, Cameroon, and by Gueye *et al.* in Senegal in 2009, where nearly three quarters (74.17%) of the participants had already heard of breast self-palpation [11], and information on self-care comes mainly from television (52.9%) [12]. In addition, Mahdaoui in his study in Morocco among patients aged 30 to 69 years at the level of 15 health centers and two CRSR of the medical prefectures of Rabat and Skhirat-Témara in 2012 by making known that women declare to have information on breast cancer in 91% of the cases [13]. In contrast, Suh *et al.*, in 2012 and the 13th U.S. referenced study targeting African women who migrated to the U.S. on breast cancer in 2017 conducted by the “Alliance des Ligues Francophones Africaines et Méditerranéennes (ALIAM)”, emphasized that knowledge about self-care or access to screening was low [10] [11].

In the said study, 68.50%, and 21.71% of women said respectively that breast cancer is manifested in the early stage by the presence of nodule and pain in the breast. Mahdaoui in 2012 in Morocco found the same result and mentioned that control of the symptom known by women for breast cancer is the breast mass (97%) [13]. This finding also appears to be similar to Vahabi’s finding in 2011 among immigrant Iranian women in the city of Toronto aged 25 years and older, where 72% of women associated pain with the onset of breast cancer and were unaware of the clinical breast examination or when and how to screen for the disease [14]. On the other hand, Zannou *et al.* in 2015 in Cotonou, Benin, in

their study of patients seen in consultation or hospitalized in the internal medicine-medical oncology and visceral surgery departments for breast cancer, noted that patients who came to the consultation late, did not have any knowledge of the disease and mentioned reasons of absence of pain (55.6%) at the onset of breast symptoms; fear of the diagnosis (12.7%) and the postpartum period which reassured them (4.8%) [4]. Peltzer *et al.* in 2014 in their study to assess awareness of the links between breast cancer and certain factors (heredity, diet, overweight, exercise, alcohol consumption, smoking) in 24 low- and average-income countries on 03 continents (Asia, Africa, and the Americas) also found that 35% of women were unaware that any of these risk factors could influence cancer occurrence [15].

Among the 1308 patients who had heard of breast cancer once, 726 meaning 55.50% reported having heard of breast cancer screening and 512 meaning 70.52% knew that breast cancer can be screened early; and the main means of screening mentioned were breast self-palpation (67.58%) and mammography (37.89%). A similar finding to ours was made by Suh *et al.* in 2012, where 95% of women believed that breast cancer was preventable, but only 37% knew that breast self-examination could be a screening method [11]. In addition, Mahdaoui in 2012 showed in his research work that women know and practice breast self-examination in 95% of cases [13]. In contrast, Vahabi in Toronto in 2015 in his study showed that lack of knowledge is a barrier to mammography; he found that the majority of women were unaware that the risk of breast cancer increases with age and didn't know the difference between mammography and other cancer prevention or screening methods [14]. Zannou *et al.* in Benin were of the same opinion, mentioning that 58 of the 63 patients (92.1%) did not perform breast self-examination and only 5 patients (7.9%) did so [4]. These results highlight the gap between theoretical knowledge and practice [16]. A real breast cancer awareness and screening campaign would be ideal to improve women's knowledge and practices.

4.3. Factors Associated with Early Breast Cancer Screening

The age of the respondents was significantly associated with early breast cancer screening ($p = 0.0015$). Indeed, women of 50 years of age or less had 2.4 times the chance of being screened early for breast cancer, compared to those over 50 years. Pujol *et al.* in 2008 in France made the same observation, as for the majority of cancers, the risk of being affected increases with age. They added that less than 10% of breast cancers occur before the age of 40 and the incidence then increases steadily until the age of 65. This, combined with the fact that the density of the mammary gland is less important at this age, justifies the choice of the age range of 50 to 74 years chosen for screening by mammography [3]. In addition, Mawadzoue in 2011 in Mali in a case-control study showed a significant association between late age at first menarche and an increased risk of developing breast cancer in premenopausal women versus a decreased risk in postmeno-

pausal women (not significant) [17].

The educational level of the women collected was statistically associated with early breast cancer screening ($p < 0.0001$). Our study showed that as the level of education increased, so did the percentage of early breast cancer screening in women increase also. Gueye *et al.*, in 2009 in Senegal, made a remark almost identical to ours where knowledge and practices on breast self-examination are strongly influenced by the level of education and the level of financial income ($p = 0.02$) [12]. The level of education would therefore be a factor favorable to the adherence and periodic practice of early breast cancer screening among women. Accessibility to information on early breast cancer screening should be targeted at all segments of the population, especially those with lower levels of education and financial income, through communication in various local languages.

The marital status of the women investigated was significantly associated with early breast cancer screening ($p < 0.0001$). Married or partnered women were 1.76 times more likely to be screened for early breast cancer than unmarried women. Indeed, married women or women in couples are more likely to perform breast self-examination since, being in a household, they are more likely to have their breasts palpated by themselves or by their spouse, for example during sexual intercourse, or to perform it on gynecological advice in case of pregnancy or other gynecological consultations. It is important to intensify communication on early screening methods and in particular on self-care.

Women's place of residence had a significant impact on early breast cancer screening ($p = 0.0001$). Indeed, women living in downtown were 1.58 times more likely to undergo early breast cancer screening, compared to those living out of town. Zannou *et al.* reported a finding almost similar to ours, in which patients' difficult geographic accessibility to referral care sites would explain the use of alternative therapies within reach [4]. The more a woman lives in an urban area, the more likely she is to undergo early breast cancer screening, since she is in constant contact with the media, health care facilities and others. The implementation of a policy of accessibility to information on breast cancer screening and prevention in rural areas would be welcome.

The frequency of early breast cancer screening increased significantly with women's socioeconomic level ($p < 0.0015$). This result seems to be consistent with that of ALIAM in 2017 where financial reasons occupy an important place in the process of early breast cancer screening in women; because the cost of consultations, complementary examinations and treatments in a context of lack of social coverage, remains prohibitive for many families; associated with breast cancer screening [10]. This result is reinforced by Elkaou in Morocco in 2014, in his study on the determinants associated with screening and diagnosis evoked during the national program of early breast cancer screening: case of the region of greater Casablanca, indicated respectively the fear of being positive, poverty, lack of financial means, social stigmatization, delay of care as reasons [18].

To solve this problem, it would be preferable to encourage breast self-examina-

tion, to carry out mass screening campaigns, to communicate on the possibility of curing this disease if it is screened early and to think about the implementation of a policy of free treatment.

4.4. Strengths and Limitations of the Study

The objectives of the study were achieved through a cross-sectional, descriptive and analytical observational study using a probability sampling technique (four-stage cluster survey according to WHO) that allowed for the inclusion of a reasonable sample of women (1740) in order to obtain reliable results.

Women's knowledge, attitudes and practices regarding early breast cancer screening were described. The frequency of early breast cancer screening among women was determined (12.93% *i.e.* 225 women/1740). Factors associated with early breast cancer screening in women were identified. They were: age (≤ 50 years), educational level (increasingly higher), marital status (married/coupled), residence area (downtown), and socioeconomic level (average/high).

The data collection tool used was well adapted to the target group, using everyday language to facilitate understanding and limit information bias. The questionnaire interview has its limitations, as do all data collection techniques, because when it comes to women's knowledge, attitudes, and practices regarding early breast cancer screening, a slight discrepancy could be observed between the actual response and the woman's behavior. However, steps have been taken to address this and to ensure the validity of the results.

5. Conclusion

Breast cancer remains a public health concern due to its high mortality rate worldwide and in Sub-Saharan Africa in particular. The frequency of early breast cancer screening is still low in our female populations while the main strategy for effective control of this disease remains its early diagnosis. In view of the results of our research, it appears important, even essential, to improve attitudes to early breast cancer screening in women through awareness, information and communication activities. The organization of mass screening campaigns for breast cancer can help to reduce the prevalence of this disease, its complications, and its lethality, particularly among women. Factors such as age, level of education, marital status, occupation, place of residence, and socioeconomic level are determinants in the use of early breast cancer screening among women. In addition, awareness of cancer risk factors is important in primary prevention.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendices

Table A1. Summary table of the cluster survey technique showing the selected neighborhoods.

Neighborhoods by arrondissement	Female population in 2013	Female projected population in 2017	Female projected cumulative population in 2017	Number of clusters per selected neighbourhood	Number of individuals to be surveyed per neighborhood
Arrondissement of Abomey-Calavi					
Agamandin	4805	5953	5,953		
Agori	29,843	36,970	42,923	XXX	174
Gbodjo	2375	2942	45,865		
Kansoukpa	6343	7858	53,723	X	58
Sèmè	11,667	14,453	68,176	X	58
Tokpa Zoungo	2977	3688	71,864		
Adjagbo	4080	5054	76,919	X	58
Arrondissement of Akassato					
Agassa Godomey	1992	2468	79,386		
Agonsoudja	1804	2235	81,621		
Akassato-centre	3629	4496	86,117		
Gbétagbo	6786	8407	94,524	X	58
Glo Tokpa	1274	1578	96,102		
Houékégbo	4360	5401	101,503		
Houékéhonou	2644	3275	104,779	X	58
Missinsinto	3509	4347	109,126		
Kpodji Lèmon	1216	1506	110,632		
Arrondissement of Godomey					
Cocodji	17,524	21,709	132,341	XX	116
Cocotomey	16,098	19,943	152,284	X	58
Dékoungbé	9160	11,348	163,631	X	58
Godomey Gare	11,058	13,699	177,330	X	58
Houalacomey	4853	6012	183,342		
Salamey	18,118	22,445	205,787	XX	116
Togbin	9024	11,179	216,967	X	58
Godomey Togoudo	38,384	47,551	264,518	XXX	174
Ylomahouto	5210	6454	270,972	X	58
Arrondissement of Ouedo					
Adjagbo	4251	5266	276,238		
Ahouato	1830	2267	278,505		

Continued

Allansacomé	960	1189	279,694		
Dessacomé	898	1112	280,807		
Kpossidja	1286	1593	282,400	X	58
Ouèdo	4708	5832	288,232		
Arrondissement of Glodjigbé					
Agongbé	1020	1264	289,496		
Djissoukpa	1175	1456	290,952		
Domégbo	2799	3467	294,419		
Glodjigbé (Yovossinza)	2019	2501	296,920	X	58
Glofanto	1182	1464	298,385		
Lohoussa	891	1104	299,488		
Yèkon Aga	1959	2427	301,915		
Yèkon Do	1261	1562	303,477		
Glo Missèbo	2081	2578	306,055		
Arrondissement of Hèvié					
Adovié	13,349	16,537	322,592	X	58
Akossavié	6896	8543	331,135	X	58
Dossounou	1411	1748	332,883		
Houinmé	7647	9473	342,357	X	58
Zoungo	5112	6333	348,689		
Arrondissement of Togba					
Ahossou Gbéta	4837	5992	354,682	X	58
Drabo	1036	1283	355,965		
Houèto	15,749	19,510	375,475	X	58
Houéga agué	3710	4596	380,071	X	58
Houéga Tokpa	2929	3629	383,700		
Somé	3385	4193	387,893		
Tokan	5315	6584	394,478	X	58
Arrondissement of Zinvié					
Adjoganssa	732	907	395,385		
Dangbodji	384	476	395,860		
Dokomey	878	1088	396,948		
Gbodjè	222	275	397,223		
Gbodjoko	839	1039	398,262		
Kpotomey	373	462	398,724		
Sokan	1230	1524	400,248		

Continued

Wawata	1081	1339	401,587		
Yèvié	1514	1876	403,463		
Zinvié	1439	1783	405,246		
Zinvié zounmé	709	878	406,124	X	58
Arrondissement of Kpanrou					
Anagbo	545	675	406,799		
Avagbé	834	1033	407,832		
Wagnizoun	264	327	408,159		
Djigbo	292	362	408,521		
Avogniko	379	470	408,991		
Kpanrou-centre	1064	1318	410,309		
Kpaviédja	681	844	411,152		
Zoungbo	895	1109	412,261		
Total	332,784	412,261	-	30	1740

Table A2. Final multivariate analysis model of factors associated with early breast cancer screening (N = 1740).

Variables	Final multivariate analysis model		
	AOR	AOR [IC _{95%}]	p-value
Age (year)			<0.0015
≤50	2.40	[1010 - 6.35]	
>50	[Reference]	-	
Education level			<0.0001
None	[Reference]	-	
Primary	1.67	[1.04 - 2.68]	
Secondary	3.46	[2.29 - 5.30]	
Higher	9.90	[5.78 - 17.15]	
Marital status			<0.0001
Not in couple	[Reference]	-	
Married/In couple	1.76	[1.27 - 2.46]	
Socio-economic level			0.0015
Low	[Reference]	-	
Average	1.53	[1.02 - 2.33]	
High	2.31	[1.46 - 3.69]	
Residence			0.0001
Out of town	[Reference]	-	
Downtown	1.58	[1.16 - 2.16]	

Table A3. Questionnaire “Knowledge, attitudes, practices and factors associated with early breast cancer screening among women in the general population in the municipality of Abomey-Calavi in 2018”.

N°	Questions/keyword for the variable	Answers/methods	Codes
General information			
1	Identify number	/____/____/____/____/	Id
2	District name		District
3	Neighbourhood name		Qart
4	Address/telephone		Tel
5	Collection date	/____/____/ /____/____/ 2018	Datecol
Socio-demographic information			
6	Age of respondent (in years)	/____/____/ years	sd1
7	Level of education	1 = None 2 = Primary 3 = Secondary 4 = Higher education	sd2
8	Nationality	1 = Beninese 2 = Foreign (please specify) ...	sd3
9	Ethnic group	1 = Fon and related 2 = Adja and related 3 = Nago/Yoruba and related 4 = Dendi 5 = Bariba 6 = Lokpa/Yom/Pila-pila 7 = Ditamari 8 = Peulh 9 = Other ...	sd4
10	Religion	1 = Christian 2 = Muslim 3 = Endogenous 4 = Atheist	sd5
11	Marital status	1 = Single 2 = Married/couple 3 = Divorced/separated 4 = Widow	sd6
12	Profession/status	1 = Civil servant 2 = Retailer 3 = Pupil/student 4 = Craftswoman 5 = Grower 6 = Retired 7 = Housewife/unemployed	sd7
13	Area of residence	1 = Outside the city centre 2 = In the city centre	sd8

Continued

Assessment of socio-economic level. NB : Tick only the most valuable: Low; 8 - 19: Medium; 20 - 26: High			
14	Does any member of your household have a stable monthly or annual income?	0 = No 1 = Yes	e1
15	Main wall materials?	0 = Earth/wood/plank/palm/bamboo 1 = Semi-hard/brick	e2
16	Main floor materials	0 = Terracotta 1 = Cement 2 = Tiles	e3
17	Main roof materials	0 = Straw/branches/leaves 1 = Sheet metal/tulle 2 = Slab	e4
18	Number of rooms (e.g. living room = 2 rooms)	0 = One piece 1 = More than one piece	e5
19	Toilet type	0 = None (no WC in the concession) 1 = Ordinary 2 = Sanitary	e6
20	What energy source do you use mainly for lighting?	0 = Kerosene lamp/candle 1 = Electric battery 2 = Electricity (SBEE) 3 = Solar energy and/or SBEE 4 = Generator and/or SBEE	e7
21	How do you travel? (mention only the added value)	0 = None 1 = Bicycle 2 = Motorcycle 3 = Vehicle	e8
22	What household appliances do you have? (mention only the added value)	0 = None 1 = Radio set 2 = Android mobile phone 3 = Television set 4 = Fridge	e9
23	What type of fuel does your household mainly use for cooking?	0 = Wood/branch 1 = Charcoal/steel 2 = Gas/heating plate	e10
24	What is the main source of water in your household?	0 = River/marigot 1 = Well water 2 = Drilling 3 = Tap water (SONEB/AEV)	e11
25	Do you own the house you live in, or do you have a house or plot of land that you pay for yourself?	0 = Yes 1 = No	e12
26	Total household points	/____/____/	e13
Information on sexuality			
27	At what age did you start menstruating?	/____/____/ years	s1
28	Did you have your first sexual intercourse before the age of 15?	0 = No 1 = Yes	s2
29	Have you ever been pregnant?	0 = No 1 = Yes	s3

Continued

**If yes, please answer the following questions about your obstetrical history
Otherwise, go to IV.**

30	Gestivity (number of pregnancies)	/ ____/ ____/	atcd1
31	Number of miscarriages	/ ____/ ____/	atcd2
32	Parity (number of births)	/ ____/ ____/	atcd3
33	Number of living children	/ ____/ ____/	atcd4
34	Have you exclusively breastfed your child (ren)?	0 = No 1 = Yes	atcd5

Social survey

35	Do you drink alcohol daily or often?	0 = No 1 = Yes	es1
36	If so, how many can you estimate in terms of the number of standard glasses per dose?	/ ____/ standard glasses	es2
37	Do you use tobacco (smoked, chewed, snuffed)?	0 = No 1 = Yes	es3
38	Do you often stay with someone who smokes cigarettes or tobacco (pipe)?	0 = No 1 = Yes	es4
39	Do you use chicha or other narcotics?	0 = No 1 = Yes	es5

Eating habits/behaviours

40	Do you eat fruit and/or vegetables?	0 = No 1 = Yes	ha1
41	If so, how many servings per dose?	/ ____/	ha2
42	Specify frequency per week	0 = <3 times/week 1 = ≥3 times/week	ha3
43	How often do you eat fast food?	0 = No 1 = Yes	ha4
44	Do you enjoy consuming too much sugar or sweetened drinks?	0 = No 1 = Yes	ha5
45	Do you enjoy eating foods that are too fatty?	0 = No 1 = Yes	ha6
46	Do you like your food too salty or do you often add salt to the food in your bowl/plate?	0 = No 1 = Yes	ha7

Physical activities

47	Do you do any sport or strenuous physical activity for at least 15 minutes at least three times a week?	0 = No 1 = Yes	prat1
48	Do you walk or do any other moderate physical activity for at least 30 minutes at least three times a week?	0 = No 1 = Yes	prat2

Information on cancer awareness/early detection of breast cancer

49	Have you ever heard of breast cancer?	0 = No 1 = Yes	c1
50	If yes, specify the information channel(s)	1 = Radio 2 = Television 3 = Written diaries 4 = Word of mouth/discussion group 5 = Other...	c2

Continued

51	How do you understand breast cancer (in the asymptomatic stage)?	1 = Presence of stones in the breasts (nodule) 2 = Slight pain in the breasts 3 = Don't know/other answers wrong)	c2
52	Have you ever heard of breast cancer screening?	0 = No 1 = Yes	c3
53	If so, on what occasion(s)? Multiple choices	1 = Radio 2 = Television 3 = Written diaries 4 = Word of mouth/discussion group 5 = Other...	c4
54	Did you know that breast cancer can be detected even at an early stage?	0 = No 1 = Yes	c5
55	If so, what screening methods do you know about?	1 = Autopalpation 2 = Mammography (in hospital) 3 = Don't know 4 = Traditional healers	c6
Information on attitudes and practices relating to early detection of breast cancer			
56	How do you feel about the origin of your breast cancer?	1 = Natural 2 = Organic (disease) 3 = Mystical 4 = Religious	at1
57	In the last twelve months, have you ever tried to find out if you have breast cancer or not?	0 = No 1 = Yes	at2
58	Have you been screened for breast cancer in the last twelve months (self-breast examination/clinical breast examination/mammography)?	0 = No 1 = Yes	at3
59	If yes, by what means mainly (one choice only)	1 = Autopalpation 2 = Breast examination by a health worker (midwife or doctor) 3 = Mammography	at4
60	If self-care, did you go to hospital for examination and confirmation?	0 = No 1 = Yes	at5
61	If self-examination, how often do you do it?	1 = once/month 2 = More than once a month 3 = Once a year 4 = Several times a year	at6
62	If it's self-examination, who taught you how to do it?	1 = Midwife 2 = General practitioner 3 = Gynaecologist 4 = Radiologist 5 = A friend/internet/press	at7
63	At what stage of the cycle do you often do it?	1 = Start 2 = Middle 3 = End	at8

Continued

64	Why don't you do self-examination? (if Answer Q58 = Breast examination/mammography) (one main reason only)	1 = I don't think about it 2 = I wasn't taught that 3 = I'm afraid of doing the wrong thing 4 = I'm afraid of discovering something abnormal 5 = It bothers me 6 = No reason 7 = other...	at9
65	If mammography, do you still have the test results with you?	0 = No 1 = Yes	at10
66	What was your diagnosis in one of the two cases?	1 = Positive 2 = Negative	at11
67	If positive, specify the conduct	1 = Already processed 2 = In process (modern) 3 = Undergoing treatment (traditional/prayer) 4 = No treatment started	at12
68	If no treatment, specify the reason	1 = Lack of financial resources 2 = Voluntarily 3 = Religious (prayers etc.) 4 = Other reasons (please specify)	at13
