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Breast Cancer among Young Women in Douala, Cameroon: Epidemiological, Clinical, Behavioural Characteristics and Risk Factors

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

Aims: This study aimed at determining epidemiological, clinical, behavioural and risk factors for breast cancer (BC) among young women living in Cameroon.
Study Design: Cross-sectional case-control study.
Place and Duration of Study: The study took place at the Oncology departments of two reference hospitals in Douala (Littoral Region, Cameroon), from July 2020 to July 2021.
Methodology: An ad hoc questionnaire form was used to collect data of interest. Anthropometric and bioimpedance parameters were measured. The data were keyed, coded, verified for

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consistency, and analysed using StatView v5.0 and GraphPad Prism v5.03. Statistical significance was set at $P < .05$.

Results: Of the 276 women initially approached, 176 (88 cases and 88 controls) were finally recruited. They were mainly aged 41-45 years old with higher proportion in controls (40.9% *vs* 45.4%, $P = .0029$). The proportion of women having had their menarche at advanced age was higher in cases compared to controls (40.9% *vs* 12.5%, $P < .0001$). Visceral adipose tissue (Kg) was significantly higher in cases (8.72 ± 3.04 *vs* 7.43 ± 2.64, $P = .003$). Most of the patients were diagnosed at advanced stage, especially at stage 3 (46.6%), with more than one third of them had metastasis. The risk of BC was reduced by 84% (AOR = 0.16, $P = .001$) in patients having had their menarche after 14 years of age, and 71% (AOR = 0.29, $P = .01$) in those always consuming fruits/vegetables. In contrast, BC risk was increased in women with familial history of BC (AOR = 3.19, $P = .04$). Early and late diagnosed BC women had similar characteristics with the exception of age, stillbirth and body mass index.

Conclusion: BC is prevalent and detected among young women at advanced stage, with protective role of fruits/vegetables consumption and late age of menarche.

Keywords: Breast cancer; young women; epidemiology; determinants; Cameroon.

ABBREVIATIONS

AOR : Adjusted Odds Ratio
BDH : Bonassama District Hospital
BMI : Body Mass Index
CI : Confidence Interval
COR : Crude Odds Ratio
DCIS : Ductal Carcinoma in situ
df : Degree of Freedom
DGH : Douala General Hospital
BC : Breast Cancer
SD : Standard Deviation
WHO : World Health Organisation

1. INTRODUCTION

Breast cancer (BC) is now accounts for over half of global cancer cases and outreaches lung cancer as first cancer cause worldwide [1]. It is a major public health concern, in women around the globe with global incidence of 11.7% during the year 2020 [1]. In its latest report, the World Health organisation (WHO) reported that BC was responsible for ~685000 deaths in 2020 [2]. Several risk factors of BC have been identified these last decades and these include mainly early puberty, late menopause, familial history, obesity and parity [3]. Hereditary transmission occurs in 5-10% and is due to carriage of the breast cancer 1 and 2 genes [3]. The progression to invasive BC is a complex and long process that starts with heterogeneous lesions also known as ductal carcinoma in situ (DCIS). About 14-53% of DCIS cases will not progress to invasive BC, thereby outlining that DCIS is a nonobligate precursor of invasive BC [4].

In developed countries, early detection of BC and its infra-clinical lesions have been greatly improved with the advent of new diagnostic methods. In contrast, such achievements are still challenging in developing countries, especially those in Africa. In Cameroon, it was reported 2.38% and 52.76% of BC were diagnosed at stages I and III, respectively [5]. High BC rates are seen in Africa where raising numbers of young women are diagnosed at advanced stage and constitute a significant fraction of deaths [6]. In Cameroon, an estimated 39906 cases were newly diagnosed these last five years with 34.1% of them reported in 2020 [7].

In young women (i.e., ≤ 45 years old), BC exhibits specific epidemiologic features including high frequency of advanced clinical forms and more unfavourable prognostic [8]. Data on BC in young women are still greatly lacking in Africa, especially in Cameroon where the disease is a cause of concern. Previous reports addressed BC but these were mainly conducted in the Central region of the country and did not exhaustively addressed BC in young women [9-11]. We therefore conducted the present study to determine epidemiological, clinical, behavioural and risk factors of BC, with emphasis of the epidemiology among young women living in the town of Douala, Cameroon. We think that all these factors can influence the natural history of BC in young women.

2. MATERIALS AND METHODS

2.1 Study Sites

The study took place from July 2020 to July 2021 at the Oncology departments of two reference hospitals in the town of Douala (Littoral Region,

Cameroon) viz. Douala General hospital (DGH) and Bonassama District hospital (BDH). These hospitals were selected owing to their strategic location, quality of BC management services and high skills of the medical staff. The two hospitals are two of the main centres for diagnosis and management of cancer patients from Cameroon and other countries in Central Africa.

2.2 Study Populations

The study populations were made up of Cameroonian women, aged ≤ 45 years old, in premenopausal period (woman who reported having seen her menses within the last month, pregnant or breastfeeding), and willing to take part in the study. Several studies defined different age threshold for young women (i.e., 30, 35, 40 and 45 years old) [12]. In this context, we defined young women as those aged ≤ 45 years old. Cases were women diagnosed with BC irrespective of their anti-cancer therapeutic status while controls were recruited among women attending the two hospitals or accompanying cases, aged ≤ 45 years of age, in premenopausal period, with no early menopause, with no history of cancer, and having accepted to participate in the study. Women aged > 45 years old, diagnosed with early menopause, and with concurrent cancers were excluded.

2.3 Study Design

This was a cross-sectional unmatched case-control study conducted at two health facilities (Douala, Cameroon). Convenient sampling was used to recruit cases and controls. Participants were approached at the clinical biology laboratory, and oncology wards of the two hospitals, and thereafter aims and objectives of the study were explained to each of them. Questionnaire was administered to women to collect data of interest. Anthropometric and bioelectrical impedance parameter measurements were performed. Medical records of the BC patients were also reviewed.

2.4 Data Collection

A structured pre-tested questionnaire was used to document characteristics of the participants. The first section of the questionnaire captured sociodemographic information including age, level of education, marital status, employment, age at menarche, and parity. The second part was designed to collect behavioural characteristics (alcohol consumption, smoking, fruits/vegetable consumption, physical activity, breastfeeding, usage of contraception). Anthropometric parameters (body mass index – BMI, body mass, body fat, and visceral adipose tissues) were measured and reported in the third part of the questionnaire. In the last part, clinical characteristics of the BC were captured and these included familial history, breast site, stage, type of anti-cancer therapy, and presence of metastasis.

2.5 Body Mass Index Assessment and Categorization

Weight (W) and height (H) were measured using a digital scale a standard measuring tape, respectively. The BMI (Kg/m^2) was determined using the Quetelet's formula: $BMI = W/H^2$, and then used for classifying women as underweight (<18.5 Kg/m^2), normal (18.5 – 24.9 Kg/m^2), overweight (25.0 – 29.9 Kg/m^2), obese (30.0 – 34.9 Kg/m^2), and morbid obese (≥ 35 Kg/m^2) as described elsewhere [13].

2.6 Bioelectrical Impedance Analysis

Bioimpedance parameters (lean body mass, body fat and visceral adipose tissue) were measured using a smart wireless body fat scale coupled with an Android 11.1.1 smartphone. The scale uses bioelectrical impedance analysis to measure the above mentioned parameters. Briefly, each patient took off their shoes and climbed on the scale which thereafter send a low intensity and frequency electrical impulse (10-100 KHz) through the body in order to measure the resistance/impedance of tissues. Results were transferred to the smartphone for analysis using the New iwellness application v3.0.

2.7 Ethical Statements

This study was carried out according to the guidelines for human experimental models in clinical research as stated by the Cameroon Ministry of Public Health. Again, ethical and administrative clearances were issued by the institutional review boards of the University of Douala (N° 2198CEI-UDo/02/2020/M) and Douala General Hospital (N° 254 AR/MINSANTE/HGD/DM/07/2020). The aim and objectives of the study were explained to participants in the language they understood best (French or English). Only women who signed an informed consent form for their participation were enrolled. Participation in the study was strictly

voluntary and women were free to decline answering any question or totally withdraw if they so wished at any time. Furthermore, there was no difference in the cancer related care provided to women who accepted to participate and those who did not. Each woman received sensitization on BC prevention.

2.8 Statistical Analysis

Data were keyed in an Excel spreadsheet, coded, verified for consistency and then exported to StatView v5.0 (SAS Institute, Chicago, Inc., Illinois, USA) and GraphPad v5.03 (GraphPad PRISM, San Diego, Inc., California, USA) for statistical analysis. Variables were summarized as mean ± standard deviation (SD) and percentages with confidence intervals at 95% (95%CI). Pearson's chi square and Fisher's exact tests were used to compare proportions while Student, Mann-Whitney, and Kruskal-Wallis tests were used to compare mean values between groups. Univariate and multivariate logistic regression analyses were used to identify factors associated with BC and its early detection, through determination of crude and adjusted odds ratio (COR and AOR), 95%CI, and level of probability. Statistical significance was set at $P < 0.05$.

3. RESULTS

3.1 Selection Process of the Study Populations

A total of 276 women were approached at the DGH and BDH during the study. One hundred women were excluded based on the exclusion criteria (i.e., age > 45 years, early menopause). Finally, 176 women (88 cases and 88 controls) were included (Fig. 1).

3.2 Sociodemographic Characteristics of the Populations

Table 1 summarizes sociodemographic information of the study populations. Participants of the both groups were mostly represented by those aged 41-45 years old, with significantly higher proportion in controls (40.9% *vs* 45.4%, *P* = .0029). Again, cancer patients were significantly older than controls (38.4 ± 5.3 years *vs* 36.5 ± 7.4 years, *P* = .045). The proportion of women having completed primary studies was significantly higher in cases compared to controls (19.3% *vs* 8%, *P* = .0019). No statistical significance was found for the rest of sociodemographic variables (Table 1). Patients were coming from the 10 regions of Cameroon for BC diagnosis and cares (Fig. 2).

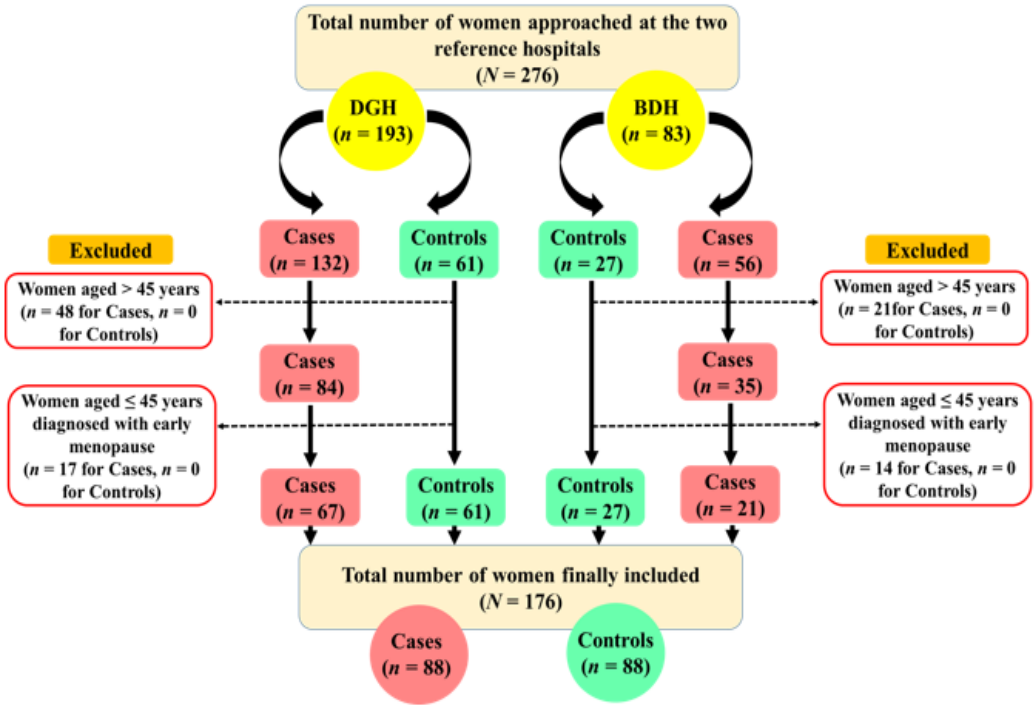


Fig. 1. Flow diagram depicting the selection of cases and controls
DGH: Douala General Hospital, BDH: Bonassama District Hospital

Table 1. Sociodemographic information of the study populations

Variables	Cases (N = 88)		Controls (N = 88)		Total (N = 176)		χ^2 (df)	*P*
	n	%	*n*	%	*N*	%		
Age (years)								
[20-25]	2	2.3	5	5.7	7	4.0	16.1 (4)	.0029*
[26-30]	7	8.0	18	20.5	25	14.2		
[31-35]	15	17.0	16	18.2	31	17.6		
[36-40]	28	31.8	9	10.2	37	21.0		
[41-45]	36	40.9	40	45.4	76	43.2		
Mean age (years)	38.4 ± 5.3		36.5 ± 7.4		37.5 ± 6.5		2.01	.045*
Level of education								
Primary	17	19.3	7	8.0	24	13.7	12.31 (3)	.0019*
Secondary	43	48.9	31	35.2	74	42.0		
University	28	31.8	52	56.8	78	44.3		
Marital status								
Married	49	55.7	34	38.6	3	47.2	7.57 (3)	.05
Single	31	35.3	49	55.7	80	45.5		
Divorced	4	4.5	2	2.3	6	3.4		
Widow	4	4.5	3	3.4	7	4.0		
Stable occupation								
No	42	47.7	48	54.5	90	51.1	-	.45[#]
Yes	46	52.3	40	45.5	86	48.9		
Occupation sector								
Formal	16	18.2	22	25.0	38	21.6	5.59 (2)	.06
Informal	39	44.3	24	27.3	63	35.8		
Unemployed	33	37.5	42	47.7	75	42.6		

*df = Degree of freedom; Data are presented as frequency and percentage (%); Pearson's independence chi square test was used to compare percentage; [#]Fisher's exact test was used as alternative; *Statistically significant at P < .05*

Table 2. Distribution of study populations by gynaecological, obstetrical and clinical parameters

Variables	Cases (N = 88)		Controls (N = 88)		Total (N = 176)		χ^2 (df)	*P*
	n	%	*n*	%	*N*	%		
Age at menarche								
≤ 14 years	52	59.1	77	87.5	129	73.3	18.1 (1)	< .0001*
> 14 years	36	40.9	11	12.5	47	26.7		
Parity								
≤ 4	64	78.0	56	84.8	120	81.1	-	.39[#]
> 4	18	22.0	10	15.2	28	18.9		
Miscarriage								
≤ 2	75	90.4	61	92.4	136	91.3	-	.77[#]
> 2	8	9.6	5	7.6	13	8.7		
Breastfeeding								
No	23	26.1	32	36.8	56	31.4	-	.14[#]
Yes	65	73.9	55	63.2	120	68.6		
Breastfeeding duration								
3 - 6 months	3	4.6	2	3.6	5	4.1	0.90 (2)	.63
6 - 12 months	31	47.7	31	56.4	62	51.7		
12+ months	31	47.7	22	40.0	53	44.2		
Consultation for fertility problems								
No	58	65.9	71	80.7	129	73.3	4.90 (1)	.02*
Yes	30	34.1	17	19.3	47	26.7		

Variables	Cases (N = 88)		Controls (N = 88)		Total (N = 176)		χ^2 (df)	*P*
	n	%	*n*	%	*N*	%		
If *Yes*, Why?								
None	13	43.3	1	5.9	14	29.8	13.81 (6)	.03*
Chlamydia	1	3.3	0	0.0	1	2.1		
Difficulty (Infertility)	9	30.0	8	47.0	17	36.1		
Cyst	0	0.0	2	11.8	2	4.3		
Myoma	2	6.7	0	0.0	2	4.3		
Early disruption of menstruations	0	0.0	1	5.9	1	2.1		
Obstruction of fallopian tubes	5	16.7	5	29.4	10	21.3		
Uptake of drugs for having babies								
No	58	65.9	65	73.9	123	69.9	-	.32#
Yes	30	34.1	23	26.1	53	30.1		
Type of drugs								
Chemical	9	30.0	4	17.4	13	24.5	2.64 (2)	.26
Chemical and traditional	15	50.0	10	43.5	25	47.2		
Traditional	6	20.0	9	39.1	15	28.3		
Contraception								
No	63	71.6	57	64.8	120	68.2	-	.41#
Yes	25	28.4	31	35.2	56	31.8		
Type of contraception								
Implant	0	0.0	2	14.3	2	11.8	-	-
Norplan	1	33.3	4	28.6	5	29.4		
Norvelo	0	0.0	2	14.3	2	11.0		
Pill	1	33.3	4	28.6	5	29.4		
Intrauterine device	1	33.3	2	14.3	3	17.6		
Contraception duration								
≤ 5 years	17	68.0	26	83.9	43	76.8	-	.21#
> 5 years	8	32.0	5	16.1	13	23.2		
Contraception nature								
Hormonal	16	64.0	18	58.1	34	60.7	-	.78#
Mechanical	9	36.0	13	41.9	22	39.3		
Contraception mode								
Continued	16	64.0	13	41.9	29	51.8	-	.11#
Discontinued	9	36.0	18	58.1	27	48.2		
Currently under contraception?								
No	85	96.6	74	84.1	159	90.3	-	.0089#*
Yes	3	3.4	14	15.9	17	9.7		
Medical history								
Hypertension, *Yes*	8	9.1	7	7.9	15	8.5	0.07 (1)	.78
Diabetes, *Yes*	2	2.3	4	4.5	6	3.4	-	.68#
Renal impairment, *Yes*	0	0.0	0	0.0	0	0.0	-	-

*df = Degree of freedom; Data are presented as frequency and percentage (%); Pearson's independence chi square test was used to compare percentage; #Fisher's exact test was used as alternative; *Statistically significant at P < .05*

3.3 Gynaecological, Obstetrical and Clinical Characteristics

The proportion of women having had their menarche at advanced age was significantly higher in cases (40.9% *vs* 12.5%, *P* < .0001). Likewise, BC patients have reported more frequently attending hospitals for fertility problems compared to controls (34.1% *vs* 19.3%, *P* = .02) (Table 2). In contrast, the proportion of women currently under contraceptive methods was lower in cases than that of controls (3.4% *vs* 15.9%, *P* = .0089).

3.4 Anthropometric Characteristics of the Women

The analysis of anthropometric parameters is presented in Fig. 3. Higher proportions of overweight, obese and morbid obese were found in cancer patients (*P* = .0019) (Fig. 3a). No difference was found between the clinical groups

for lean and body fat (*P* > .05) (Fig. 3b & 3c), but in contrast, visceral adipose tissue was significantly higher in cases (8.72 ± 3.04 Kg *vs* 7.43 ± 2.64 Kg, *P* = .003) (Fig. 3d).

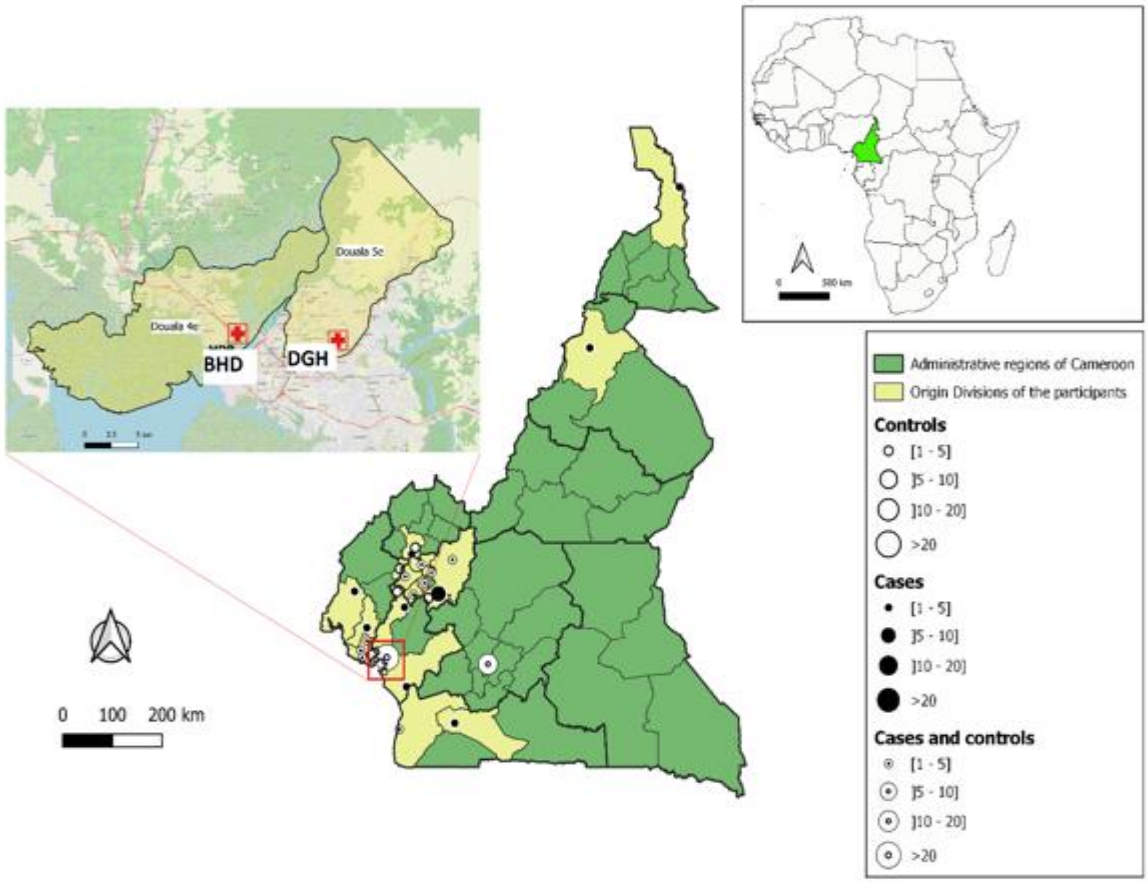
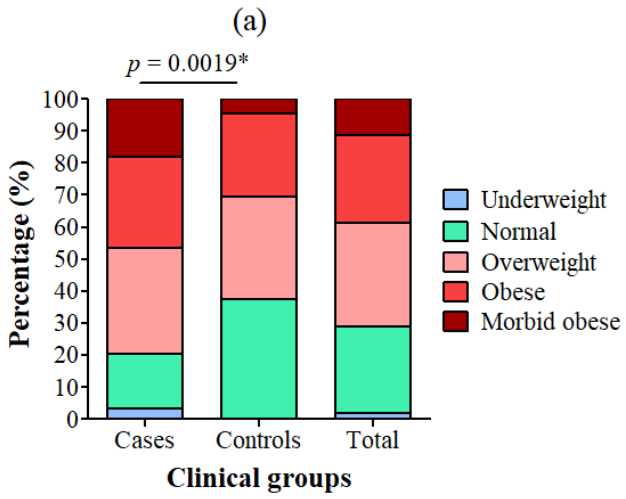


Fig. 2. Study sites and geographical distribution of the participants in Cameroon
Map was created using the QGIS software v3.10
The circles correspond to towns where cases and controls were living permanently
BHD: Bonassama District Hospital, DGH: Douala General Hospital



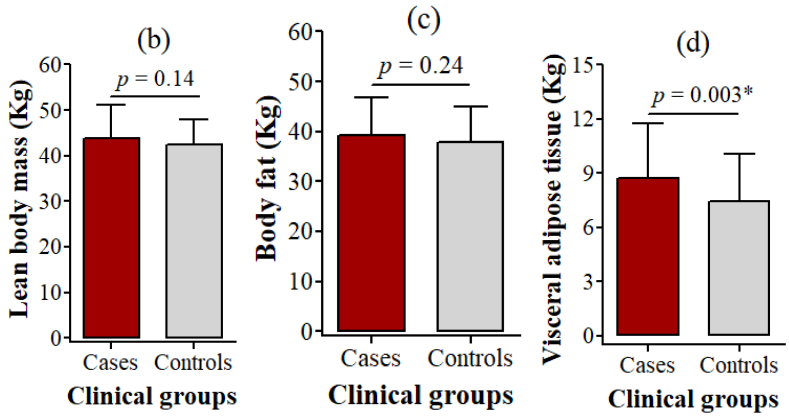


Fig. 3. Comparison of anthropometric parameters between cases and controls (a) Body mass index, (b) Lean body mass, (c) Body fat, and (d) Visceral adipose tissue

Pearson's independence chi square and Student tests were used
#Fisher's exact test was used as alternative
**Statistically significant at P < .05*

Table 3. Behavioural information of the study populations

Variables	Cases (N = 88)		Controls (N = 88)		Total (N = 176)		χ^2 (df)	*P*
	n	%	*n*	%	*N*	%		
Fruit/Vegetable uptake								
Rarely	20	22.7	20	22.7	40	22.7	8.82 (2)	.01*
Occasionally	19	21.6	36	40.9	55	31.3		
Always	49	55.7	32	36.4	81	46.0		
Alcoholic beverage uptake								
No	22	25.0	23	26.1	45	25.6	-	.91#
Yes	66	75.0	65	73.9	131	74.4		
Smoking								
Never	85	96.6	81	92.0	166	94.3	1.71 (2)	.42
Rarely	2	2.3	5	5.7	7	4.0		
Regularly	1	1.1	2	2.3	3	1.7		
Smoking by relatives								
No	50	56.8	62	70.5	112	63.6	-	.08#
Yes	38	43.2	26	29.5	64	36.4		
Physical activity								
Low	18	20.5	27	30.7	45	25.5	3.07 (2)	.21
Moderate	25	28.4	26	29.5	51	29.0		
Intense	45	51.1	35	39.8	80	45.5		

*df = Degree of freedom; Data are presented as frequency and percentage (%); Pearson's independence chi square test was used to compare percentage; #Fisher's exact test was used as alternative; *Statistically significant at P < .05*

3.5 Behavioural Characteristics of the Populations

Behaviour of participants regarding smoking, physical activity, and uptake of fruit/vegetable and alcohol is summarized in Table 3. Nearly 50% of the total participants were always consuming fruits and vegetables, with higher proportion in BC patients (55.7% *vs* 36.4%, *P* = .01). No significant difference was found for remaining behavioural variables (Table 3).

3.6 Characteristics of the Breast Cancer Disease

On analysis, 50% of the cases had tumour located in the left breast (Fig. 4a). Most of the cancer patients were diagnosed at advanced stage, especially at stage 3 (46.6%), with more than one third of them had metastasis associated with their cancer (Figs. 4b & 4c). Seventy percent of the patients were under anti-cancer therapy which was mainly represented by

chemotherapy (50%) and radiotherapy (6.8%) (Fig. 4d).

3.7 Impact of Staging and Therapy on Lean Body Mass, Muscle Fat and Visceral Adipose Tissue

We evaluated the effect of severity of the BC disease and anti-cancer therapy on lean body mass, muscle fat and visceral adipose tissue. No statistically significant difference was found (Fig. 5).

3.8 Determinants of Breast Cancer Disease

A total of three factors were found associated the risk of BC namely age at menarche, familial history of BC, and fruit/vegetable uptake (Table 4). Based on multivariate analysis, the risk of BC was reduced by 84% (AOR = 0.16, 95%CI 0.05 – 0.47, *P* = .001) in patients having had their menarche after 14 years of age compared to their counterparts in whom menarche happened earlier. Women consuming regularly fruits and vegetables had 0.29 times less chances to develop BC compared to those consuming them rarely (95%CI 0.10 – 0.82, *P* = .01). In contrast, the odds of BC were 3.19 times (95%CI 1.03 – 9.83, *P* = .04) higher in women with familial history of BC (Table 4).

3.9 Proportion and Factors Associated with Early Detected BC Cancers

During the study, we found BC patients diagnosed at early stage of the disease, and the proportion was 33% (29/59, 95%CI 24.0 – 43.3%). By comparing their characteristics with those of women diagnosed at late stage, we found similar characteristics with the exception of age, stillbirth and BMI (Table 5). Indeed, higher proportion of the different age groups were found in women diagnosed lately (*P* = .002). The proportion of stillbirths was significantly higher in early diagnosed women (23.1% *vs* 3.5%, *P* = .0051). Contrasted observations were found for BMI as the proportion of overweight women was higher in early diagnosed patients (13.8% *vs* 42.3%, *P* = .03), but conversely, the proportion of women with morbid obesity was higher in early diagnosed patients (24.1% *vs* 15.3%, *P* = .03) (Table 5).

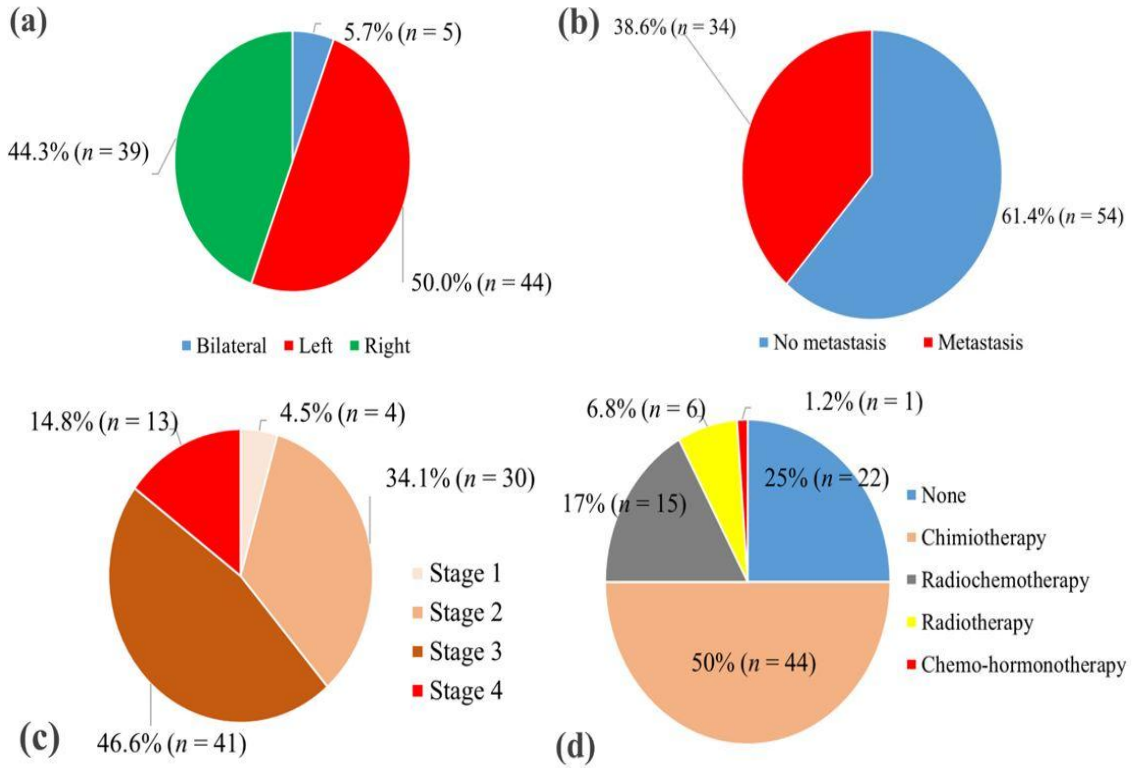


Fig. 4. Location of breast cancer (a), presence of metastasis (b), clinical stage of the disease (c), and anti-cancer therapy (d)

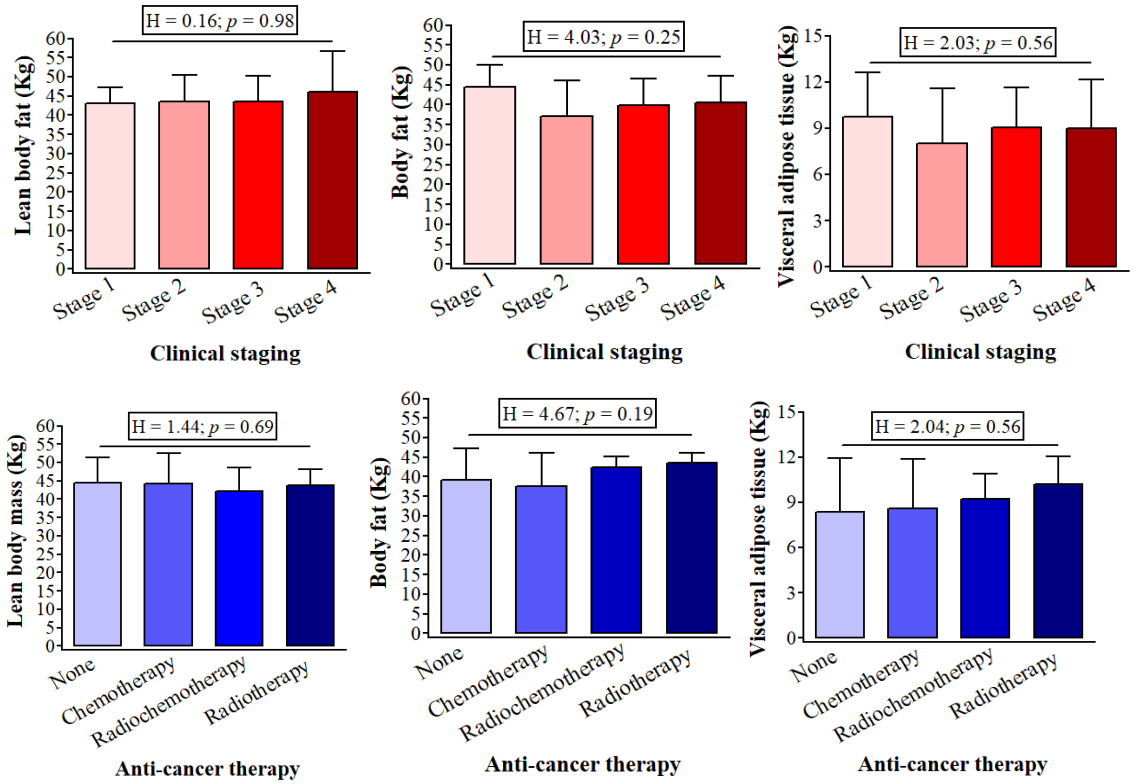


Fig. 5. Variation of lean body mass, muscle fat and visceral adipose tissue with respect to disease staging and anti-cancer therapy

Each bar represents mean with standard deviation
Kruskal-Wallis test was used to compare mean between groups
Statistical significance was set at P < .05

Table 4. Univariate and multivariate logistic analysis of the determinants of breast cancer disease among the study populations

Factors	Univariate analysis		Multivariate analysis	
	COR (95%CI)	*P*	AOR (95%CI)	*P*
Age at menarche				
≤ 14 years	1		1	
> 14 years	0.21 (0.10 - 0.44)	.0001*	0.16 (0.05 - 0.47)	.001*
Stable occupation				
No	1		1	
Yes	0.76 (0.42 – 1.38)	.36	0.65 (0.26 – 1.60)	.34
Mean BMI (Kg/m^2)	0.95 (0.90 - 1.00)	.03*	0.95 (0.88 - 1.03)	.20
Number of stillbirth				
0	1		1	
1	2.14 (0.96 – 4.75)	.06	2.88 (0.99 – 2.37)	.05
2+	0.68 (0.30 – 1.51)	.36	1.13 (0.38 – 3.38)	.83
Parity				
0	1		1	
1	0.37 (0.09 – 1.57)	.17	0.13 (0.01 – 1.23)	.07
2	0.62 (0.14 – 2.66)	.51	0.27 (0.02 – 3.45)	.31
3	0.53 (0.13 – 2.22)	.38	0.16 (0.01 – 2.12)	.16
4	0.37 (0.09 – 1.57)	.17	0.14 (0.01 – 1.53)	.10
5+	0.32 (0.07 – 1.36)	.12	0.10 (0.01 – 1.18)	.06

Factors	Univariate analysis		Multivariate analysis	
	COR (95%CI)	*P*	AOR (95%CI)	*P*
Familial BC history				
No	1		1	
Yes	1.62 (0.78 - 3.39)	.19	3.19 (1.03 - 9.83)	.04*
Fruit/Vegetable uptake				
Rarely	1		1	
Occasionally	0.53 (0.23 - 1.21)	.13	0.45 (0.14 - 1.49)	.19
Always	0.34 (0.17 - 0.70)	.003*	0.29 (0.10 - 0.82)	.01*
Alcoholic beverage uptake				
No	1		1	
Yes	0.94 (0.48 - 1.85)	.86	1.19 (0.41 - 3.43)	.74
Smoking				
Never	1		1	
Rarely	2.62 (0.49 - 13.91)	.25	0.52 (0.03 - 8.12)	.64
Regularly	2.10 (0.19 - 23.60)	.54	4.10 (0.24 - 69.58)	.32
Smoking by relatives				
No	1		1	
Yes	0.55 (0.30 - 1.03)	.06	0.49 (0.22 - 1.07)	.07
Contraception				
No	1		1	
Yes	1.37 (0.72 - 2.59)	.33	2.10 (0.79 - 5.54)	.13
Taking drugs for having babies?				
No	1		1	
Yes	0.68 (0.36 – 1.31)	.25	2.71 (0.38 – 25.33)	.36
Uptake of drugs for having babies				
No	1		1	
Yes	0.68 (0.36 - 1.31)	.25	0.70 (0.32 - 1.53)	.37
Breastfeeding				
No	1		1	
Yes	0.61 (0.32 - 1.16)	.13	1.94 (0.41 - 9.09)	.40
Difficulties during breastfeeding				
No	1		1	
Yes	0.59 (0.21 – 1.71)	.33	1.31 (0.31 – 5.51)	.71
Consultation for fertility issues?				
No	1		1	
Yes	0.46 (0.23 – 0.92)	.02*	0.12 (0.01 – 1.27)	.07
Physical activity				
Low	1		1	
Moderate	0.69 (0.31 - 1.56)	.37	0.70 (0.22 - 2.22)	.54
Intense	0.52 (0.25 - 1.09)	.08	0.43 (0.16 - 1.16)	.09

95%CI: Confidence interval at 95%,
AOR: Adjusted odds ratio,
COR: Crude odds ratio, BMI: Body mass index,
BC: Breast cancer
Univariate and multivariate logistic regression analysis was used to identify associated factors
**Statistically significant at P < .05*

Table 5. Comparison of patients with respect to timing of breast cancer detection

Variables	Early diagnosis (*N* = 29)		Late diagnosis (*N* = 59)		Decision	*P*
	n	%	*n*	%		
Sociodemographic factors						
Age (years)						
[20-25]	0	0.0	2	3.4	16.1 (4)	.002†*
[26-30]	7	24.1	0	0.0		
[31-35]	3	10.3	12	20.3		
[36-40]	9	31.0	19	32.2		
[41-45]	10	34.6	26	44.1		
Mean age (years)	37.3 ± 6.1		39.1 ± 4.9		1.41	.16‡
Level of education, *University*	11	37.9	17	28.8	2.1 (2)	.35†
Matrimonial status, *Single*	10	34.5	21	35.6	3.4 (3)	.32†
Stable occupation, *No*	14	48.3	28	47.5	-	.94#
Gynaecological, obstetrical and clinical factors						
Early age of menarche, *Yes*	20	69.0	32	54.2	-	.24#
Stillbirth, *More than 2*	6	23.1	2	3.5	7.8 (1)	.0051†*
Breastfeeding, *Yes*	19	66.5	46	78.0	1.5 (1)	.21†
Under contraception, *Yes*	0	0.0	3	5.1	-	.54#
Hypertension, *Yes*	1	3.4	7	11.9	-	.26#
Diabetes, *Yes*	0	0.0	2	3.4	-	.31#
Behavioural factors						
Fruit/Vegetable uptake, *Always*	4	13.8	15	25.4	3.2 (2)	.21†
Alcohol uptake, *Yes*	22	75.9	44	74.6	0.2 (1)	.89†
Smoking, *Yes*	0	0.0	2	3.4	0.8 (1)	.69†
Physical activity, *Intense*	12	41.4	33	55.9	3.7 (2)	.17†
Clinical and management patterns of the breast cancer disease						
Breast location of the cancer						
Bilateral	2	6.9	3	5.1	0.14 (2)	.93†
Right	13	44.0	26	44.1		
Left	14	48.3	30	50.8		
Anti-cancer therapy						
None	8	27.6	14	24.2	4.67 (3)	.19†
Chemotherapy	18	62.1	26	44.8		
Radiochemotherapy	2	6.9	13	22.4		
Radiotherapy	1	3.4	5	8.6		
Anthropometric factors						
BMI (Kg/m^2)						
Underweight	2	6.9	1	1.7	10.0 (4)	.03†*
Normal	8	27.6	7	11.9		
Overweight	4	13.8	25	42.3		
Obesity	8	27.6	17	28.8		
Morbid obesity	7	24.1	9	15.3		
Mean BMI (Kg/m^2)	29.3 ± 7.8		29.8 ± 5.5		0.35	.72‡
Lean body mass (Kg)	44.1 ± 6.7		43.8 ± 7.7		1.79	.85‡
Muscle fat (Kg)	37.3 ± 9.6		40.2 ± 6.3		1.73	.08‡
Visceral adipose tissue (Kg)	8.1 ± 3.8		9.1 ± 2.6		1.43	.15‡

BMI = Body mass index

Data are presented as frequency (percentage) and mean ± standard deviation

Pearson's independence chi square (†), Fisher's exact test (#) and Mann-Whitney test (‡) were used to compare percentages and mean values between groups

#Fisher's exact test was used as alternative

**Statistically significant at P < .05*

4. DISCUSSION

Breast cancer is a public health concern in Cameroon, especially in young women in whom its burden has increased over these last years. Unfortunately, data on the topic are still greatly needed. In this regard, the present study aimed to determine epidemiological, clinical, behavioural, and risk factors of BC among Cameroonian young women living in Douala, Cameroon.

The bulk of cancer patients were aged 41-45 years old and this is consistent with findings from previous studies in the town of Yaoundé, Cameroon [14]. In contrast, our results are different from other reports in Cameroon and Morocco [15-17]. This discrepancy could be likely attributable to several factors such as study design and area. We purposely interested in younger BC women while some of these studies were conducted on BC women irrespective of their age.

Sarcopenia has recently appeared as independent risk factor worsening the prognostic of cancer patients. We therefore analysed the impact of changes in body composition with the aim to improve management of cancer patients. On analysis, no statistically significant difference was found for lean body mass and muscle fat results between cases and controls, and this is in line with works of Nathalie et al. in Switzerland [18]. In contrast, visceral adipose tissue was significantly higher in cancer patients compared to their control group counterparts. This finding supports that reported earlier in The United Kingdom by Hannah et al. [19], and could be due to unbalanced alimentation and lack of physical activity. However, we did not find variation in physical activity level between the two clinical groups. In addition, we did not evaluate the nutritional practices of the participants, and thus it is difficult to agree with these reasons given by these authors.

A large proportion of patients were diagnosed at advanced stage of the cancer disease. This fact is extensively reported in the literature, especially in Asia and Africa countries [10,20,21]. In these areas, a cocktail of reasons including predominantly poorly awareness on BC, lack of financial resources, and limited access to high standard care health facilities [20]. This assertion is supported by the fact most of the BC participants in this study had insecure occupations and were coming from various regions of the country.

In this study, the mean age of menarche was 14 years which is in line with previous results in Cameroon [22]. We found that late age of menarche was associated with reduced risk of BC. This is consistent with finding of a meta-analysis of 117 studies which pointed out that a 1-unit reduction of the age at first menstruations was associated with an increased BC risk by 1.05 [23]. The production of oestrogens by ovaries starts at around the time of menarche. In this context, the breast epithelium of women having experienced late menarche is less long exposed to oestrogens, and this could explain why he risk of BC is reduced in these women [24].

Similarly, fruit/vegetable consumption was associated with reduced risk of BC. The same observation was reported in European countries [25], Canada [26] and The USA [27]. In contrast, our observations do no support that of a recent systematic review and meta-analysis which did not find any association between high total fruit and vegetable consumption and BC risk [28]. Fruits and vegetables are diverse in their nutritional composition, and this fact could explain these discrepancies. Also, we did not evaluate the food behaviour of the participants regarding fruits/vegetables. This represents a limitations of the stud which is not frequently addressed in epidemiological studies on BC. This point should be evaluated in further studies in our context.

Finally, this study supports the role of genetic factors in the risk of BC given the fact that we found an increase in the BC risk by more than three times in women with familial history of BC. Our finding is consistent with earlier reports in other settings [29,30]. Carriage of the breast cancer genes 1 and 2 is well known increased the risk of BC [31,32].

Besides, factors were previously identified as reducing the risk of BC by other authors (e.g., breastfeeding, parity) [33,34]. In the present study, we did not find any statistically significant association with BC risk, and this could be due to diverse reasons including mainly low sample size that made difficult to do stratification with regard to confounding parameters (e.g., anti-cancer therapy).

We did not find notable difference between BC women after stratification by timing of the diagnosis, except for few variables such as stillbirth. The link between BC risk and stillbirth is still elusive as the findings of available studies are contradictory [35]. More epidemiological studies are required to investigate this aspect.

This study should be evaluated in light of its limitations. First, the study was conducted in two hospitals in Douala, and the findings could not be generalizable to the whole country. Second, we did not assess psychological status of cancer cases. It is well known that biochemical and behavioural parameters that we measured in the study may be modulated by the psychology of patients, especially cancer patients. Last, the absence of hormonal-based classification of cancer and nutritional information are also important data lacking in the study.

5. CONCLUSION

This study was designed to determine socio-demographic, clinical, behavioural, and risk factors for BC in young women in Cameroon. The study outlines BC is prevalent and mainly diagnosed at advanced stage in this population, and chemotherapy is commonly used as standard treatment. Patients were coming from the 10 regions of Cameroon for BC diagnosis and cares. Higher proportions of overweight, obese and morbid obese were found in cancer patients, but no difference was found for bioelectrical impedance parameters between cases and controls. No difference was found between patients after stratification for timing of BC diagnosis, with the exception for BMI, age and stillbirth. The study also emphasized the protective role of fruits/vegetables consumption and advanced age of menarche against BC risk. It should be interesting to conduct further studies addressing the topic across all regions of Cameroon.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

All authors declare that 'written informed consent was obtained from the patient The aim and objectives of the study were explained to participants in the language they understood best (French or English), and their questions were answered. Only women who signed an informed consent form for their participation were enrolled. Participation in the study was strictly voluntary and women were free to decline answering any question or totally withdraw if they so wished at any time. Furthermore, there was no difference in the cancer related care provided to women who accepted to participate in the study and those who did not. Each woman received sensitization on prevention of BC.

ETHICAL APPROVAL

This study was carried out according to the guidelines for human experimental models in clinical research as stated by the Cameroon Ministry of Public Health. Again, ethical and administrative clearances were issued by the institutional review boards of the University of Douala (N° 2198CEI-UDo/02/2020/M) and Douala General Hospital (N° 254 AR/MINSANTE/HGD/DM/07/2020).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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