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Epidemiological, Clinical, Radiological and Histopathological Aspects of Female Breast Cancer in the Gbêkê Region (Bouaké)

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Abstract

Breast cancer is the leading cancer among women in Côte d'Ivoire. The majority of studies on female cancer in Côte d'Ivoire have been carried out in Abidjan, the country's economic capital. Existing studies do not include aspects related to the use of hormonal contraceptives or the BIRADS classification in the Gbêkê region, whose capital city is Bouaké. The aim of the work was to determine the epidemiological, radiological and histopathological features of female breast cancer in Bouaké. This cross-sectional study was carried out over a period of 16 months (September 2023-January 2025). The patients came from the five screening and management sites for breast pathologies in the Gbêkê region. These sites were supported by the gynecology, medical oncology, radiology and pathology services of the Teaching Hospital of Bouaké. The study population consisted of 43 patients with breast cancer. The average age was 43.8 ± 11.0 with extremes at 24 and 71 years. The participants were predominantly multiparous (62.8%) and premenopausal (72.1%) women. Nearly half of them were unemployed (46.5%). The frequency of contraceptive use was 9.3%. The radiological data were used to classify breast tumors according to the Breast Imaging Reporting And Data System (BIRADS). The BIRADS 4 group was widely encountered in these patients (79.1%), followed

by BIRADS 5 group (20.9%). The histopathological examination revealed a predominance of non-specific infiltrating carcinomas (95.3%). However, these carcinomas were not statistically related to the menopausal status ($p = 0.368$) of the affected women. The creation of a cancer institute with specialized units in Bouaké would improve patient care.

Keywords

Epidemiology, Pathology, Cancer, Breast, Bouaké

1. Introduction

Breast cancer is a real problem in Africa, and particularly in Côte d'Ivoire, where it is the leading cancer in women [1]. Its incidences vary from 31.9/100,000 in East Africa to 42.1/100,000 in West Africa, from 26.7 - 45.4/100,000 in Asia to 57.2/100,000 in South America; and from 92.6/100,000 in Western Europe to 95.1/100,000 in North America [2]. In 2022, 2,296,840 new cases of breast cancer were recorded worldwide, with 660,103 deaths attributable to it [2]. Mortality from breast cancer has been declining for some thirty years in the most industrialized countries [3]. Unfortunately, in Africa, 50% of women who die from breast cancer do not reach the age of fifty [4]. This finding is attributed partly to early diagnosis and improved treatment in the industrialized countries [3]. In Côte d'Ivoire, 3306 new cases were recorded in 2020, including 1785 deaths [5]. These figures are largely underestimated, due to a lack of resources to diagnose the disease nationwide [6]. Factors associated with late diagnosis include the lack of financial resources (36%), the sociocultural habits of the population (41.1%) and misdiagnosis (7.1%) [5]. The risk of breast cancer is increased by around 25% in women currently using oral contraceptives in Europe and North America [7]. Exogenous hormones and endocrine disruptors have also been implicated in the increased incidence of breast cancer [8] [9]. Genetic factors represented by family history of breast cancer and genetic mutations also play a role in the occurrence of the disease [10]. Available data on female breast cancer in Côte d'Ivoire come mainly from studies carried out in Abidjan, the economic capital city of Côte d'Ivoire. There is very little data concerning people affected by breast cancer living outside Abidjan, notably in Bouaké. The aim of the present study was to determine the epidemiological, radiological and pathological characteristics of female breast cancer in Bouaké.

2. Materials and Methods

2.1. Type, Duration and Scope of Study

This was a cross-sectional study carried out in the Gbêkê region of Côte d'Ivoire, whose capital is Bouaké. It is the country 2nd largest city, located around 350 km from Abidjan and 100 km from Yamoussoukro, the political capital city [11]. This

city has a Teaching Hospital standing as the only one outside Abidjan. The study period was 16 months, starting from September 2023 to January 2025.

2.2. Methods

The patients came from five primary healthcare facilities, which were located in the neighborhoods of Sokoura, Diezoukouamekro, Koko, Dar Es Salam and Belleville in Bouaké. The program for breast cancer screening and treatment. They were supported by the Teaching Hospital, which was the central facility for the management of cases referred from the peripheral sites. The referred cases were managed by the gynecology, medical oncology, radiology and pathology services. The therapeutic itinerary of each participant started at the screening sites before heading to the gynecology, then radiology, pathology, and finally medical oncology services. Patients showing up with symptoms of breast disease such as breast nodule and/or breast discharge in these 5 peripheral centers were referred to the Teaching Hospital for a visit at the gynecology ward. At the end of the medical visit, a mammography was carried out, and the Breast Imaging Reporting And Data System (BIRADS) was performed. Participants grouped as BIRADS 4 or 5 underwent micro-biopsy of the affected breast for pathology examination. The biopsies were dehydrated, kerosene embedded, microtome sectioned, hematoxylin-eosin stained and mounted within 36 to 72 hours to avoid the consequences of cold ischemia. Patients free of carcinoma were not included. The data were collected using a survey form. The biological material consisted of several breast micro-biopsies taken from the patients at the Teaching Hospital. The technical equipment included a Histo-Line dehydration machine (Milan, Italy) and a Histo-Line Laboratories (Milan, Italy).

2.3. Statistical Analysis

The data collection and statistical analysis were carried out using Excel 2016 and SPSS 25. The Chi-square test of independence was used to analyze the correlation between the variables studied. A probability value of $p < 0.05$ was considered statistically significant.

3. Results

3.1. Participant Epidemiological Data

The mean age of the patients was 43.8 ± 11.0 years with extremes at 24 and 71 years. The 40 - 55 age group accounted for the largest number of patients (20 out of 43). Nearly half the patients were unemployed (46.5%). Among those who were employed, the informal sector was the most frequent (37.2%). The pre-menopausal status was predominant (72.1%). And the study population consisted mainly of multiparous women (62.8%) (Table 1).

3.2. Clinical Data

None of the patients had a family history of breast cancer, or any known medical

history. One patient had previously undergone mastectomy surgery (2.3%). The frequency of patients with comorbidities was 7%. And four (4) patients had used hormonal contraceptives, representing a frequency of 9.3% (Table 2).

Table 1. Epidemiological data.

Parameters		n (43)	% (100)
Age group	24 - 39	17	39.5
	40 - 55	20	46.5
	56 - 71	6	14.0
Number of pregnancies carried	Nulliparous = 0 (none)	7	16.3
	Primiparous = 1	5	11.6
	Multiparous = 2 to 6	27	62.8
	Large multiparous ≥ 7	4	9.3
Work	Civil servants	3	7.0
	Non Civil servants	20	46.5
	Unemployed	20	46.5
Sector of activity	Informal sector	16	37.2
	Private sector	4	9.3
	Public service	3	7.0
	Unemployed	20	46.5
Menopause	Pre-menopause	31	72.1
	Post-menopause	12	27.9

Table 2. Clinical data.

Parameters		n (43)	% (100)
Family history of breast cancer	No	43	100
	Yes	-	-
Medical history	No	43	100
	Yes	-	-
Surgical history	No	42	97.7
	Yes	1	2.3
Comorbidities	No	40	93.0
	Yes	3	7.0
Use of contraceptive drugs	No	39	90.7
	Yes	4	9.3

3.3. Radiological Classification (BIRADS) and Histological Types

The BIRADS 4 group accounted for the majority (79.1%). And the non-specific infiltrating carcinoma was overwhelmingly the main histological type diagnosed (95.3%) (Table 3).

Table 3. Radiological classification and histological type.

Parameters		n (43)	% (100)
BIRADS Classification	Group 4	34	79.1
	Group 5	9	20.9
Histological type	Non-specific infiltrating carcinoma	41	95.3
	Lobular infiltrating carcinoma	2	4.7
Nottingham grading	Grade I	2	4.7
	Grade II	32	74.4
	Grade III	9	20.9

3.4. Correlation between Carcinoma Type and Menopausal Status

The type of carcinoma was not statistically related to the menopausal status (p = 0.368) or to the use of contraceptive drugs (p = 0.643) (Table 4).

Table 4. Correlation between carcinoma type, menopausal status and contraceptive use.

Parameters	Carcinoma type			
	Non-specific infiltrating	Lobular	Total	p-value
Post menopausal status	12	-	12	0.368
Pre menopausal status	29	2	31	
No contraceptive use	37	2	39	0.643
Contraceptive use	4	-	4	
Total	41	2	43	

4. Discussion

The mean age of patients in the present study was 43.8 ± 11.0 years, in line with that reported by several authors in Côte d'Ivoire [12]-[14]. Elsewhere in Africa, average ages ranging from 44.1 to 47.8 years have been reported [15]-[17]. The 40 - 55 age group was the most represented, which is in agreement with a previous report from Côte d'Ivoire by Aka *et al.* [14]. Pre-menopausal patients represented almost 3/4 of the study population. This finding is in contrast with data from developed countries, where breast cancer is more often detected at an advanced age or during the post-menopausal period [18]. For instance, in the UK, over 80% of breast cancers are diagnosed in post-menopausal women [19]. This difference may be explained by the race of the patients. Indeed, various studies have highlighted a certain predisposition of black women to develop breast cancer at a young age [20] [21]. This assertion is supported by Pleasant [22] who also revealed an increased risk of endometrial cancer, in addition to the susceptibility of black women to breast cancer. In black Africans, the late onset of breast symptoms would justify the discovery of malignancy at a later age [5]. Very few patients used contraceptive drugs compared to their European counterparts. In Europe, contraception is widely available to all whereas, that is not the case in Côte d'Ivoire is

limited [23] [24]. Previous reports have shown a contraceptive use rate of 14% in 2012, 21% in 2017 and 22.5% in 2020 [23] [24]. As highlighted by Coulibaly *et al.* [25], there remains some sociocultural obstacles to the use of modern contraception in Côte d'Ivoire. These obstacles include the lack of reliable and reassuring information on contraception, the apprehension about its side effects, the illiteracy, the dominant power of the male partner in the decision-making process and the religious prohibitions [25]. These difficulties are also encountered in several other African countries such as the Democratic Republic of the Congo, Morocco, Niger and Senegal [26]-[29]. The BIRADS 4 group was frequently identified among the patients after mammography testing. It corresponds to the presence of suspicious abnormalities with a potential of malignancy ranging from 2% to 95% that require a pathology exploration [30]. Luo *et al.* [31]. have demonstrated the value of mammography in predicting breast cancer in patients grouped into BI-RADS 4 or 5, highlighting the good discriminatory power of that analysis in front of malignant or benign breast tissue lesions. The most frequently diagnosed histological type was the non-specific infiltrating carcinoma. This finding has also been reported in many countries [17], notably in Burkina Faso [16] and Mali [32]. In Côte d'Ivoire, Touré *et al.* [33] also found that 89.3% of breast cancers were non-specific infiltrating carcinomas. The non-specific infiltrating carcinoma is the most common histological type worldwide, with a frequency ranging from 77% to 88% on the African continent [34] as well as Asia with frequencies ranging from 80% to 94.5% [35]. The Nottingham grade II prevailed in this study, as reported by several authors in both developing and developed countries [16] [36] [37]. Once the diagnosis of breast carcinoma has been established, major challenges appear. Indeed, in Africa in general and in Côte d'Ivoire particularly, there are problems related to the geographical and financial access to healthcare. Aka *et al.* [14] investigated the direct economic cost of breast cancer for the patients. They showed that the cost of chemotherapy was on an average estimate of $3121 (US dollars) per patient before radiotherapy cost which stood at $1714 per patient [14]. One of the limitations of the present study is that hormone assays were not carried out, in particular the dosage of the serum levels of estrogen (estradiol II), progesterone, GnRH (gonadotrophin-releasing hormone), FSH (follicle-stimulating hormone), LH (luteinizing hormone) and prolactin. Some studies have found a link between blood levels of estrogen and androgen and the development of breast cancer in pre-menopausal women [38]-[41]. However, no link has been established between the blood levels of progesterone and the development of breast cancer [38] [39].

5. Conclusion

This study describes the epidemiological, radiological and pathological aspects of female breast cancer in Bouaké. The keys features were an affected population with an average age of 43.8 years with a pre-menopausal status that does not contraceptive drugs. The BIRADS 4 group predominated, and the non-specific infiltrating carcinoma was overwhelmingly observed. No statistically significant rela-

tionship was found between the carcinoma type and the menopausal status, nor between the carcinoma type and the use of contraceptive drugs. It is therefore essential to reinforce the city of Bouaké with an independent institution dedicated to the fight against cancer which harbors all the needed specialized services in one place while providing free treatment for the patients.

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Statements

The ethical approval of the protocol and written consent of the participants were secured. All procedures were approved by the National Ethics Committee of Côte d'Ivoire under the authorization number (142-23/MSHPCMU/CNESVS-km). The anonymity and data confidentiality were ensured.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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