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Determinants of Early Survival of Breast Cancer Patients in Yaoundé-Cameroon

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Abstract

Introduction: Breast cancer is one of the leading causes of death worldwide. We carried out this study with the aim of evaluating the determinants of early survival of women with breast cancer in two hospitals in the city of Yaoundé. **Methodology:** This was an analytical cross-sectional study with retrospective and prospective data collection of breast cancer patients during 6 years in two Hospitals of Yaoundé from January 2017 to December 2022. We consulted the files in search of epidemiological, clinical, paraclinical, therapeutic and survival variables. We completed the survival data directly from the patients or their relatives after their consent. We analyzed the data using SPSS version 23.0 software. Survival analysis was done using the Kaplan-Meier method and survival curves were compared using the Log Rank test. Factors influencing survival were evaluated using the Cox model. The significance threshold (P value) was set at 0.05 at 95% confidence interval. The study was approved by the ethics committees. **Results:** We included 500 patients whose ages varied between 22 and 83 years with a mean age of 47.19 ± 11.61 years. The most represented age group was 30 to 45 years old (45.8%). Less than half (41.6%) were postmenopausal. The most frequent reason for consultation was a breast lump (79.9%). The most common clinical stage at presentation was stage-3 (47.6%). Infiltrating ductal carcinoma was the most represented histological type (84.7%). The most represented histological grade was grade 2 (40.2%). Immunohistochemistry was performed in 34.20% of cases. The most represented molecular subtype was triple negative (41.8%) followed by Luminal A (30%). Concerning treatment, 17.2% did not receive any, 45% had surgery, 79.4% had chemotherapy, 34.2% hormone therapy, and 14.6% radi-

otherapy. The survival of patients with breast cancer at 1, 2, 3, 4 and 5 years was respectively 90.6%; 83.1%; 74.2%; 69.8% and 59.2%. The median survival was not reached; however, the first quartile (Q1) was 36 months (3 years). Independent factors associated with reduced survival were breast ulceration (aHR = 3.23; p = 0.002), bilateral tumor location (aHR = 9.2; p < 0.001) and clinical stage 3 (aHR = 1.72; p = 0.010) while patients classified ACR3 on imaging (aHR = 0.19; p = 0.005) had improved survival. **Conclusion:** Breast cancer survival from 1 to 5 years decrease from 90 to 59%. Mortality was highest in the first 40 months. Independent factors associated with reduced survival were breast ulceration, bilateral tumor location and clinical stage 3 while patients classified ACR3 on imaging had improved survival.

Keywords

Determinants, Early Survival, Breast Cancer, Yaoundé

1. Introduction

Breast cancer is the most common cancer in the world with a global prevalence of 7.79 million. There were 2.26 million new cases (11.7%) and 684,996 deaths (6.6%) in 2020 [1]. Breast cancer is a multifactorial disease with diverse risk factors. Its global incidence, mortality and survival rates are variable [2]. From 2008 to 2020, we note an increase of more than 50% in the number of new cases in the world due to improvements of screening techniques, diagnosis and treatment methods on the one hand, and the increase in life expectancy, demographic growth, urbanization, and the adoption of predisposing lifestyles on the other hand. Accordingly, global mortality due to breast cancer has increased over the last ten years, from 458,000 deaths in 2008 to 684,996 deaths in 2020 [1] [3].

In Africa, despite the fact that screening, diagnosis and treatment resources are limited, the incidence of breast cancer has practically doubled; from 92,600 new cases in 2008 to 186,598 new cases in 2020 [1] [4]. This cancer, just like in the world, occupies first place in Africa with a prevalence of 429,220 cases and a mortality of 85,787 deaths in 2020 [1]. In Cameroon, the global trend is seen, with increasing incidence. Some 4,170 new cases of breast cancer (20.1%) were recorded in 2020, with a mortality of 2,108 deaths (16.9%) and a prevalence of 8,150 over five years [1].

Despite the increasing incidence and mortality of breast cancer, overall survival has significantly improved due to early diagnosis and constant improvement in therapeutic strategies [5] [6]. However, 5-year survival varies considerably around the world, with better figures reported in developed countries. In Cameroon in 2022, Noa *et al.* reported the overall survival at two, three and five years of 79.4%, 73.4% and 62% respectively [7]. Additionally, a recent study, conducted by Mapoko *et al.* on the determinants of prolonged survival after di-

agnosis of breast cancer at the Yaoundé General Hospital, estimated the survival rate at 3 years, 5 years and 9 years, respectively at 65.11%; 58.6% and 39% [8]. As determinants of survival, the completion of chemotherapy and hormone therapy was associated with prolonged survival, while the occurrence of disease progression with this treatment was associated with a reduction in survival. These two studies give us better results than figures reported from other countries in sub-Saharan Africa. This could be the impact of several measures taken to fight against cancer, and breast cancer in particular. These include the creation of a national committee for the fight against cancer and cancer care services, the training of health personnel in the fight against cancer, the setting up of screening activities, early treatment and curative care; and the establishment of research activities.

Although efforts have been made by the Cameroonian State, breast cancer remains a real public health problem [1] [7] [8]. From the two recent studies by Mapoko *et al*, and Noa Ndoua *et al*, it appeared that mortality was higher in the first three years despite early treatment of cases, including after surgery. This is why we decided to study the determinants of early survival during the first five years following the diagnosis of breast cancer.

2. Methodology

2.1. Study Design and Framework

The study was cross-sectional and analytical, with retrospective and prospective data collection at the oncology departments of the Yaoundé Gyneco-Obstetric and Pediatric Hospital (YGOPH), and the Yaoundé General Hospital (YGH). The study lasted 7 months. The period of study was 06 years, from January 2017 to December 2022.

2.2. Study Population

The study population consisted of patients with breast cancer at the YGOPH and the YGH during the period of study. We consulted the files of these patients and included all cases (non-probabilistic sampling) meeting the inclusion criteria. We excluded patients whose files did not contain the diagnosis, and for whom latest news could not be obtained, because they did not allow survival calculations. We calculated the minimum sample size using the Lorentz formula, considering as the prevalence of the event studied (5-year survival) to be 62%, according to a previous study done in Cameroon in 2022 by Noa *et al*. [7]. This gave us a sample size of 362.

2.3. Data Collection

We used data from all YGOPH and YGH outpatient oncology registers from 2017 to 2022, to have a database of all breast cancer patients seen during this period. Secondly, we keenly searched the archives of the Gynecology-Obstetrics and Oncology departments for the medical files of these patients with breast

cancer in order to collect data. We completed the missing information, and data relating to survival, which did not appear in the files, directly from the patients or their relatives through a telephone conversation. Data collected included sociodemographic/epidemiological, clinical, paraclinical, and therapeutic variables, and data relating to follow-up and survival.

2.4. Definitions

We chose as the original date, the date of diagnosis of breast cancer and as the point date, the end date of the study, that is, May 6, 2023. The date of the latest news was the date on which we last heard from the patient. This date could be the date of death or the date of the last consultation, if the patient did not present the event studied (death), or if the subject was lost to follow-up, and the point date for those who were alive (dated May 6, 2023). The latest news was that the patient could be dead, alive, or lost to follow-up. The follow-up is the time that elapsed between the start date of the study and the end date. Participation time is the time between the original date and the latest news date. If the patient was lost to follow-up at the time point, she was right censored when determining the survival curve.

2.5. Ethical Considerations

We obtained authorization from the YGH(N˚ 137-23/HGY/DG/DPM/APM-TR of February 13, 2023), and from the Institutional Research Ethics Committee for the Human Health (CIERSH) of YGOPH (N˚ 406/CIERSH/DM/2023 of March 3, 2023).We also had ethical clearance from the Institutional Ethics and Research Committee (CIER) of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I (N˚ 0061/UYI/FMSB/VDRC/DAASR/CSD of February 6, 2023).

2.6. Statistical Analyses

We used SPSS software version 23.0 (Statistical Package for Social Sciences) for analyses. Quantitative variables were expressed by the median followed by the range, and the mean followed by the standard deviation. Survival analysis was done with estimated survival curves using the Kaplan-Meier method. Survival curves were compared using the Log Rank test. Factors influencing survival were evaluated using the Cox model, through multivariate analysis. The statistical significance threshold was set at 0.05 and the confidence interval at 95%.

3. Results

From 2017 to 2022, we recorded 1,610 files of patients with breast cancer at the YGH and the YGOPH. Among these files, 539 corresponded to our study period, while 39 files were unusable for our study. We thus retained 500 files for the study. During the follow-up, 98 patients died, 168 were lost to follow-up, and

234 were alive at the closing date of the study.

3.1. Sociodemographic Characteristics

The ages of the 500 patients studied ranged from 22 to 83 years with a mean age of 47.19 ± 11.61 years. The most represented age group was 30 to 45 years old (45.8%) and the median was 46 years. More than half of the patients were single (51.4%) and had attained a higher education level (57.2%). The informal sector of the economy had a high representation (43.6%), while the majority resided in the urban setting (53.8%), and were Christians (94%). The highest presence, with respect to region of origin, was the West (37.4%), followed by the Center (27.8%) regions. We also recorded 29 participants from Chad and Gabon (5.8%).

3.2. Clinical Characteristics of the Study Participants

The average consultation time (between the appearance of the first symptoms and the first consultation) was 10.26 ± 10.62 months with extremes of 1 month and 61 months. In our study population, only 3.8% were diagnosed during a screening campaign or routine visit. The remaining 96.2% were diagnosed following a consultation for symptoms. The most frequent reasons for consultation were the perception of a breast nodule or mass (79.9%) followed by breast pain (14.8%) and skin or nipple abnormalities (4.7%).

The majority of women had had more than 02 pregnancies (57.4%), and were multiparous (47.4%). Sixteen percent (16%) of women used a modern method of contraception with a predominance of combined oral contraceptives. The average age of first period was 14 ± 1.70 years with extremes of 9 years and 18 years. The most common age group for first pregnancy was 18 to 30 years (74.5%), the average being 22 years. Forty-one percent (41%) of women had reached menopause at the time of diagnosis. In our study population, 17.4% had comorbidities, the most common being hypertension (62.1%). Eight-point six percent of patients had a past history of breast disease, mainly fibrocystic mastopathy. The notion of a history of cancer in a family member was found in 39 patients (7.9%), mainly first degree, and 57 patients had familial breast cancers (11.5%). The nodule was located in the left breast in 58.6%, preferentially in the QSE (58%). The majority of patients were classified as stage 3 at the time of diagnosis (47.6%).

3.3. Paraclinical Characteristics of the Study Population

Infiltrating ductal carcinoma was the most represented histological type (84.7%), while grade 2 of the SBR classification, was the most represented histo-prognostic category (40.2%). Immunohistochemistry was performed by 34.20% of patients and the most represented molecular subtype was triple negative (41.8%) followed by Luminal A (30%). On imaging, the ACR 4 finding was the most common (59.6%) (Table 1).

Table 1. Distribution of the study population with respect to histology, immunohistochemistry and imaging.

Variables	Categories	Number (n)	Proportion (%)
Histologic type	Ductal carcinoma infiltrant	422	84.7
	CIS	29	7.8
	Papillary carcinoma infiltrant	7	1.4
	Lobular carcinoma infiltrant	11	2.2
	Mucinous carcinoma	13	2.6
	Others	16	3.2
Histologic grade (SBR)	Grade 1	139	27.8
	Grade 2	201	40.2
	Grade 3	82	16.4
	Unknown	78	15.6
Molecular classification	Yes	170	34.2
	No	327	65.8
Molecular types (N = 170)	Luminal A	51	30
	Luminal B	34	20
	HER2+	14	8.2
	Triple negative	71	41.8
ACR classification (N=324)	ACR0	0	0
	ACR1 (normal)	0	0
	ACR2 (benign)	10	3.1
	ACR3 (very benign)	44	13.6
	ACR4 (suspicious)	193	59.6
	ACR5 (suggests cancer)	71	21.9
	ACR6 (cancer)	6	1.8

3.4. Therapeutic Characteristics of the Study Population

Surgery was performed in 45% of cases and the majority of operated patients received radical treatment (88.4%). Chemotherapy was administered in 79.4% of cases; the most frequently used chemotherapy regimen was regimen D (1st line FAC/AC, 2nd and 3rd line not received) in 35.5% of cases. Hormone therapy was prescribed in 34.2% of patients while 14.6%received radiotherapy. Of all 500 patients retained, 17.2% received no treatment. In patients, whose assessment was known, partial response was observed in 42.1%, and complete response in 35.4% (Table 2).

Table 2. Distribution of the study population with respect to treatment modalities.

Variables	Number (n)	Proportion (%)
Chemotherapy	397	79.4
Surgery	225	45.0
Radiotherapy	73	14.6
Hormone therapy	171	34.2
No modality	86	17.2
If Surgery (N= 225)		
Conservative	11	11.6
Radical	214	88.4
If Chemotherapy (N = 397)		
Regimen A	16	4.0
Regimen B	30	7.6
Regimen C	123	31
Regimen D	133	33.5
Unknown	95	23.9
Response to chemotherapy (N = 288)		
Complete response	102	35.4
Partial response	121	42.1
Tumor progression	51	17.7
Tumor stable	14	4.9

Regimen A: 1st line (FAC/AC), 2nd line (Taxol/Taxotere), 3rd line (Capecitabine);
Regimen B: 1st line (FAC/AC), 2nd line (Carboplatine + Taxol), 3rd line: (Capecitabine);
Regimen C: 1st line (FAC/AC), 2nd line: (Taxol/Taxotere/Carboplatine + Taxol), 3rd line: not received;
Regimen D: 1st line (FAC/AC), 2nd line: not received/ not known, 3rd line: not received;
Unknown: treatment not initiated or undocumented.

3.5. Evaluation of Survival

The survival of patients with breast cancer at 1, 2, 3, 4, and 5 years was, respectively, 90.6%, 83.1%, 74.2%, 69.8%, and 59.2%. The slope of the survival curve reveals that mortality was higher in the first 40 months (the first three and a half years), before stabilizing and remaining constant after the fifth year. The median survival time was not reached. However, the first quartile (Q1) was 36.00 months (3 years). However, the average survival time of our study sample was 56.91 months (4.74 years). The minimum survival time was 0.73 months (22 days), while the maximum survival time was 76 months or 6.33 years (**Figure 1**).

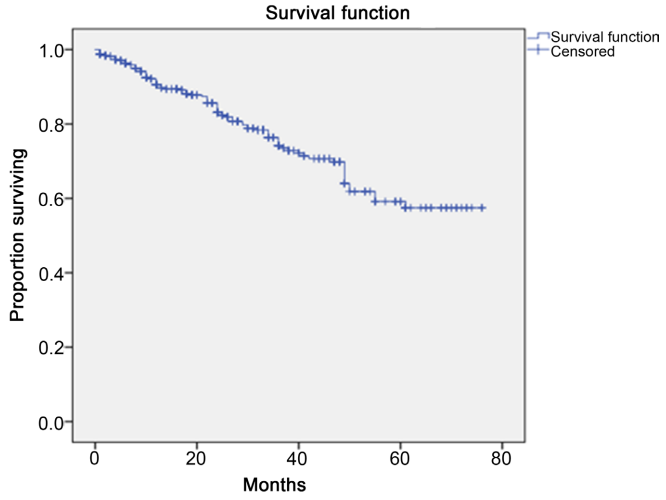

Figure 1. Survival curve of population according to the Kaplan Meier method.

3.6. Factors Associated with Survival

Identification of factors associated with the death of patients with breast cancer was sought through univariate analysis among epidemiological factors (age, level of education, profession, marital status, religion), clinical factors (reasons for consultations, clinical signs, tumor location, clinical stage), paraclinical characteristics (histological type, differentiation grade, hormonal receptors, Her-2) and therapeutic variables (type of surgery, chemotherapy, radiotherapy, hormonal therapy). Multivariate analysis of the determinants of survival of patients with breast cancer, according to the Cox model, made it possible to identify independent factors associated with a reduction in survival. These include breast ulceration, presence of bilateral tumor, and clinical stage 3 disease. Meanwhile, the ACR3 classification on imaging was associated with improved patient survival.

Table 3 reveals that patients with ulcerated cancer are three times more likely

Table 3. Multivariate analysisof factors associated with survival following the Cox model.

Variables	Death		Adjusted P value	Adjusted HR (95% CI)
	Yes	No		
Married	59 (11.8)	197 (39.4)	0.365	1.57 (0.91 - 2.47)
Diabetes	7 (1.4)	8 (1.6)	0.129	3.74 (0.70 - 10.58)
Breast pain	22 (4.5)	51 (10.3)	0.071	1.95 (0.99 - 3.41)
Vegetative ulceration	**8 (1.6)**	**9 (1.8)**	**0.002**	**3.23 (1.51 - 6.89)**
Bilateral breast lesion	**5 (1.0)**	**4 (0.8)**	**0.001**	**9.152 (3.52 - 23.85)**
Stage 3	**58 (11.6)**	**180 (36.0)**	**0.010**	**1.72 (1.14 - 2.56)**
ACR3	**3 (0.6)**	**44 (8.8)**	**0.005**	**0.19 (0.59 - 5.98)**
CIS carcinoma	0	29 (5.8)	0.955	0.79 (0.76 - 1.83)
Luminal A	4 (0.8)	47 (9.4)	0.078	0.32 (0.11 - 1.92)

to die early (aHR = 3.23; p = 0.002). Mortality is nine times higher in breast cancer patients with bilateral involvement (aHR = 9.2; p<0.001). Mortality is twice as high (1.72 times) in the group presenting clinical stage 3, in a statistically significant manner (aHR = 1.72; p = 0.010). On the other hand, the survival of patients with breast cancer is significantly improved for those whose imaging results classified their lesion as ACR 3 (aHR = 0.19; p = 0.005).

4. Discussion

4.1. Epidemiological, Clinical and Paraclinical Characteristics

4.1.1. Age

The ages of patients in our sample ranged from 22 to 83 years with a mean age of 47.19 ± 11.61 years. These results corroborate finding in Cameroon by Kemfang *et al.* in 2020, and Kodoume *et al.* in 2023, which were 48.62 and 48.27 years, respectively [9] [10]. This mean age is also close to the 48 years average reported by Diallo *et al.* (2022) in Senegal [11]. However, our results contrast with those reported in South Africa, in Soweto, and in England by Morra *et al.* where the average age at diagnosis was 54.4 years [12] and 57 years [13] respectively. This can be due to the higher life expectancy in the latter settings, but may also suggest an earlier occurrence of breast cancer in our setting.

4.1.2. Parity

Most of the participants had had more than 02 pregnancies (57.4%), and 47.4% were multiparous. These values are comparable to those obtained by Kodoume *et al* in 2023 [10], who found that 53.0% of breast cancer patients were multiparous, with an average parity of 3.9 ± 2.1 children [14]. This result is slightly higher than that of Ogundiran *et al.* in Nigeria where the average parity among women was 3 children [15]. In Eastern Indonesia, a study found that 87% were multiparous or had given birth at least once [16]. However, nulliparity is a recognized risk factor for breast cancer.

4.1.3. Menstruation Status

The 41.6% proportion of postmenopausal women is similar to the 43.16% reported by Kemfang *et al.* in the same setting [17], and the 42.4% reported by Ogundiran *et al.* in Nigeria. It is also only slightly higher than the 39% reported in 2021 in Madagascar by Ranaivomanana [18]. This further suggests that in Africa breast cancer affects younger women.

4.1.4. Time Taken to Consult

A delay in consultation was observed in our study population. The average time to the first gynecology consultation was 10.26 months. This result is similar to the 9.9 months reported by Mapoko *et al.* in 2023 [8]. However, these values are higher than that reported in Morocco by 6 months [19]. This can be explained by the fact that many patients in our setting seek care from alternative medicine first before they consult providers of modern medicine.

4.1.5. Presenting Complaint

The most frequent reasons for consultation were the perception of a breast lump (79.9%), and breast pain (14.8%). This is also reported in the Cameroonian literature [10] [14] [17]. In contrast, in Mali, Togo *et al*. found breast pruritus as the most frequent reason for consultation (35%), followed by pain and breast discharge [20].

4.1.6. Presence of Comorbidities

The 17.4% prevalence of comorbidities (62.1% due to high blood pressure, and 29.9% due to HIV), is only slightly lower than the 24% reported by Mapoko *et al*., in the same setting. High blood pressure was also the most common comorbidity, followed by HIV and diabetes in the latter study [8]. Cubash *et al*. reported that 15-20% of breast cancer patients were HIV positive in South Africa [12].

4.1.7. Clinical Stage of Breast Cancer

Stage 3 was the most observed clinical stage (47.6%) [21]. This is similar to the figures of Ranaivomanana *et al*. in 2021 in Madagascar [18], and Galukande *et al* [22] where stage 3 represented 40.1%. On the other hand, the study carried out by Balawardena *et al* in India [23] found that stage 2 was in the majority (56%). This further suggests that our patients report later for consultation.

4.1.8. Paraclinical Characteristics

The most common histological type was invasive ductal carcinoma (84.8%), while grade II was the most represented (40.2%) as described in the literature [10] [11] [19] [24] [25]. Approximately 34.20% of patients performed immunohistochemistry, and the most represented molecular subtype was triple negative (41.8%), followed by Luminal A (30%). This frequency of triple negative is close to the 37.98% reported by Atangana *et al*. in 2017 in the cities of Douala and Yaoundé [26].

4.2. Treatment modalities

4.2.1. Surgery

Conservative surgery was adopted in 11.6% of patients and in 88.4% the surgery was radical. This is similar to the proportions of radical surgery of 88.08% and 92% observed by Kemfang *et al*. in 2020 [9], and Noa *et al*. in 2022 [7], respectively. Other studies have found a slightly higher prevalence of conservative treatments in developed countries. This could be due to late presentation and poor availability of radiotherapy in poorer settings.

4.2.2. Chemotherapy

The majority of patients in our study (79.4%) had received chemotherapy because advanced stages were more common. However, our result is lower than 97% chemotherapy rate reported by Noa *et al*. [7] at YGOPH and it is lower than 97.5% reported by Mapoko *et al*. [8] at YGH. These studies had smaller sample sizes, 204 and 166 patients, respectively. However, the difference could also translate an improvement stage of disease at presentation. In Ethiopia this value was 83% [27].

4.2.3. Hormone Therapy

Hormone therapy was prescribed in 34.2% of cases, a figure similar to that reported in 2022 by Noa *et al*. (37.3%). However, a much lower figure (19.9%) was observed by Kemfang *et al*. in 2015 in a survival cohort [9]. This could be explained by the fact that our studies are more recent, with the popularization of hormone therapy.

4.2.4. Radiotherapy

Radiotherapy sessions were completed in 14.6% of cases. Our results are lower than the 62% of patients who underwent radiotherapy sessions in the study by Noa *et al*. [7]. This difference could be explained by the fact that they had studied operated patients, among whom those presenting at stages T4 and T3, with lymph node involvement, were the majority and therefore eligible for radiotherapy.

4.3. Evaluation of Survival

The survival of patients with breast cancer at 1, 2, 3, 4 and 5 years was respectively 90.6%, 83.1%, 74.2%, 69.8, and 59.2%. Mortality was higher in the first three years. The median survival in our study population was not reached. However, the first quartile was Q1 = 36 months (or 3 years). This means that the death rate in our population did not reach 50% during the follow-up period. However, 25% of patients died before 3 years. These results are similar to those observed in Cameroon by Noa *et al*. and Mapoko *et al*. The study conducted by Noa *et al*. in 2022 [7] showed 2, 3 and 5 year survival of 79.4%, 73.3% and 62% of patients operated on for breast cancer. In 2023, Mapoko *et al*. had found respectively at 3 and 5 years 65.11% and 58.6% [8]. In Africa, in general, and sub-Saharan Africa in particular, low 5-year survival rates close to 50% have been reported. South Africa in 2018 reported a 5-year survival of 61%. On the other hand, this rate is twice higher than that found by Kemfang *et al* in 2015 in Cameroon, in a study carried out over the period from 1995 to 2007, where 5-year survival was 30% [9]. This difference could be explained by the fact that our study focused on patients whose follow-up is recent from 2017 to 2022, and suggests that therapeutic advances have improved survival. However, our 5-year survival is still low compared to those observed in Japan and Sweden, where survival rates of around 80% are reported for women with breast cancer [28]. The 5-year survival was 73% and 85% in African American and White American women respectively [29]. In 2016 in France, the 5-year survival rate for breast cancer was 88% [30]. These variabilities in survival observed in Africa and elsewhere could be explained by the fact that in African countries, more than half of the patients had advanced stages at diagnosis, as in our study population. Furthermore, financial, geographical and therapeutic accessibility are limited, and the use of alternative therapies and problems with therapeutic compliance are significant [17].

4.4. Factors Associated with Survival

After multivariate analysis, the independent factors associated with a reduction in

survival were breast ulceration (aHR = 3.23; p = 0.002), bilateral location of the tumor (aHR = 9.2; p < 0.001) and clinical stage 3 (aHR = 1.72; p = 0.010) while ACR3 classification on imaging (aHR = 0.19; p = 0.005) improves patient survival. However, many other factors were not associated with survival despite the fact that they were shown to be in many other studies. These include age, histological type, receptor expression, hormonal and Her-2 receptors, and treatment modalities.

- Breast ulceration: Breast ulceration (aHR = 3.23; p = 0.002) reduced survival. This is explained by the fact that skin involvement in breast cancer classifies the lesion as stage T4b. This underscores why the ulcerated state is considered an indication of advanced disease.
- Bilateral location of the lesion: It was associated with poor survival (aHR = 9.2; p < 0.001). As observed in a study conducted in China in 2021 by Haaron *et al*, the bilaterality of the breast lesion (p = 0.01) was a significant prognostic parameter reducing the overall survival of breast cancer [31].
- Clinical stage 3: It was associated with reduced survival (aHR = 1.72; p = 0.010). These results are similar to those observed in Tunisia in 2021 where clinical stage 3 (p=0.016) was associated with a reduction in survival [25].
- The ACR 3 classification: Patients whose imaging classification ACR3 (aHR = 0.19; p = 0.005) had better survival. This could be explained by the fact that they were going to consult early and that the diagnosis could have been made early during the monitoring of the ACR3 lesion and treatment accordingly started earlier.

4.5. Limitations

These were mainly due to missing data, either due to incomplete or unfound files, or to patient loss to follow-up.

5. Conclusions

Our study population consisted of 500 patients and was young. Most of the cancers were diagnosed at an advanced stage. The most frequent histological type was invasive ductal carcinoma, grade II was the most represented, while the triple negative was the predominant molecular subtype. Surgery was done in 45% of cases, chemotherapy in 79.4%, hormone therapy in 37.3%, and radiotherapy in 14.6%. The survival of patients with breast cancer at 1, 2, 3, 4 and 5 years was 90.6%, 83.1%, 74.2%, 69.8%, and 59.2%, respectively.

Mortality was higher in the first three years and independent factors associated with reduced survival were breast ulceration, bilateral tumor location and clinical stage 3, while absence of pain and ACR3 classification on imaging were associated with improved patient survival.

Conflicts of Interest

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

References

[1] Sung, H., Ferlay, J., Siegel, R.L., Laversanne, M., Soerjomataram, I., Jemal, A., *et al*. (2021) Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA*: *A Cancer Journal for Clinicians*, **71**, 209-249. https://doi.org/10.3322/caac.21660

[2] Momenimovahed, Z. and Salehiniya, H. (2019) Epidemiological Characteristics of and Risk Factors for Breast Cancer in the World. *Breast Cancer*: *Targets and Therapy*, **11**, 151-164. https://doi.org/10.2147/BCTT.S176070

[3] Pilleron, S., Sarfati, D., Janssen-Heijnen, M., Vignat, J., Ferlay, J., Bray, F., *et al*. (2019) Global Cancer Incidence in Older Adults, 2012 and 2035: A Population-Based Study. *International Journal of Cancer*, **144**, 49-58. https://doi.org/10.1002/ijc.31664

[4] Ferlay, J., Shin, H.-R., Bray, F., Forman, D., Mathers, C. and Parkin, D.M. (2010) Estimates of Worldwide Burden of Cancer in 2008: GLOBOCAN 2008. *International Journal of Cancer*, **127**, 2893-2917. https://doi.org/10.1002/ijc.25516

[5] Sankaranarayanan, R., Swaminathan, R., Jayant, K. and Brenner, H. (2011) An Overview of Cancer Survival in Africa, Asia, the Caribbean and Central America: The Case for Investment in Cancer Health Services. *IARC Scientific Publications*, **162**, 257-291.

[6] Daly, B. and Olopade, O.I. (2015) A Perfect Storm: How Tumor Biology, Genomics, and Health Care Delivery Patterns Collide to Create a Racial Survival Disparity in Breast Cancer and Proposed Interventions for Change: Closing the Racial Disparity Gap in Breast Cancer. *CA*: *A Cancer Journal for Clinicians*, **65**, 221-238. https://doi.org/10.3322/caac.21271

[7] Ndoua, C.C.N., Motolouze, K., Etienne, A., Ntsama, J.A.M., Rs, T.N., Tatsipie, W.L., *et al*. (2022) Survival of Patients Operated on for Breast Cancer in Yaounde: A Study of 166 Cases. *Health Sciences and Disease*, **23**, 27-30. https://www.hsd-fmsb.org/index.php/hsd/article/view/3871

[8] Mapoko, B.S.E., Okobalemba, E.A., Mbassi, E.D.B., Sango, A.J.F., Mapenya, R.R.M., Mayeh, A.M.M., *et al*. (2023) Déterminants de la survie prolongée après diagnostic de cancer du sein à l´Hôpital Général de Yaoundé. *Pan African Medical Journal*, **44**, Article No. 1. https://www.panafrican-med-journal.com/content/article/44/1/full

[9] Ngowa, J.D.K., Kabeyene, A., Ngarvounsia, R., Atenguena, E., Tchawe, Y.S.N., Ngassam, A., *et al*. (2020) Consultation, Diagnosis and Treatment Delays for Breast Cancer among Patients Followed up at the Yaoundé General Hospital, Cameroon. *Open Journal of Obstetrics and Gynecology*, **10**, 1580-1589.

[10] Motolouze, K., Ndoua, C.C.N., Okobalemba, E.A., Njassine, R.S.T., Mapoko, B.S.E., Fosso, L.C.F., *et al*. (2023) Profil clinique, paraclinique et thérapeutique des patientes opérées du cancer du sein à l´Hôpital Gynéco-Obstétrique et Pédiatrique de Yaoundé (HGOPY). *Pan African Medical Journal*, **44**, Article No. 2. https://www.panafrican-med-journal.com/content/article/44/2/full

[11] Diallo, M., Fall, D., Mballo, I., Niang, C.I. and Charfi, M.E. (2022) Coûts médicaux directs de traitement du cancer du sein à l'Institut Joliot Curie de l'Hôpital Aristide Le Dantec de Dakar, Sénégal. *Pan African Medical Journal*, **42**, Article 266.

[12] Cubasch, H., Dickens, C., Joffe, M., Duarte, R., Murugan, N., Tsai Chih, M., *et al*. (2018) Breast Cancer Survival in Soweto, Johannesburg, South Africa: A Receptor-Defined Cohort of Women Diagnosed from 2009 to 11. *Cancer Epidemiology*, **52**, 120-127. https://doi.org/10.1016/j.canep.2017.12.007

[13] Morra, A., Jung, A.Y., Behrens, S., Keeman, R., Ahearn, T.U., Anton-Culver, H., *et al*. (2021) Breast Cancer Risk Factors and Survival by Tumor Subtype: Pooled Analyses from the Breast Cancer Association Consortium. *Cancer Epidemiology, Biomarkers & Prevention*, **30**, 623-642. https://doi.org/10.1158/1055-9965.EPI-20-0924

[14] Essiben, F., Foumane, P., Meka, E., Tchakounté, M., Julius Sama, D., Nsahlai, C., *et al*. (2017) Descriptive Analysis of 192 Cases of Breast Cancer Occurring before Age 40 in Yaounde, Cameroon. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, **6**, 2704-2710. https://doi.org/10.18203/2320-1770.ijrcog20172898

[15] Ogundiran, T.O., Ayandipo, O.O., Ademola, A.F. and Adebamowo, C.A. (2013) Mastectomy for Management of Breast Cancer in Ibadan, Nigeria. *BMC Surgery*, **13**, Article No. 59. https://doi.org/10.1186/1471-2482-13-59

[16] Madyaningtias, E.P., Sampepajung, D., Prihantono, P. and Faruk, M. (2021) Epidemiological and Clinicopathological Characteristics of Breast Cancer in Eastern Indonesia. *Journal of Medical & Allied Sciences*, **11**, 27-32. https://doi.org/10.5455/jmas.97327

[17] Kemfang Ngowa, J.D., Yomi, J., Kasia, J.M., Mawamba, Y., Ekortarh, A.C. and Vlastos, G. (2011) Breast Cancer Profile in a Group of Patients Followed up at the Radiation Therapy Unit of the Yaounde General Hospital, Cameroon. *Obstetrics and Gynecology International*, **2011**, Article ID: 143506. https://doi.org/10.1155/2011/143506

[18] Ranaivomanana, M., Hasiniatsy, N.R.E., Rakotomahenina, H. and Rafaramino, F. (2021) Aspects épidémio-cliniques des cancers du sein au Service d´Oncologie de Fianarantsoa, Madagascar de 2011 à 2018. *Pan African Medical Journal*, **38**, Article 264. https://doi.org/10.11604/pamj.2021.38.264.20031

[19] Fouhi, M.E., Benider, A., Gaëtan, K.Z.A. and Mesfioui, A. (2020) Profil épidémiologique et anatomopathologique du cancer de sein au CHU Ibn Rochd, Casablanca. *Pan African Medical Journal*, **37**, Article No. 41. https://doi.org/10.11604/pamj.2020.37.41.21336

[20] Togo, A., Traoré, A., Traoré, C., Dembélé, B.T., Kanté, L., Diakité, I., *et al*. (2010) Cancer du sein dans deux centres hospitaliers de Bamako (Mali): Aspects diagnostiques et thérapeutiques. *Journal Africain du Cancer/African Journal of Cancer*, **2**, 88-91. https://doi.org/10.1007/s12558-010-0060-x

[21] Reynoso-Noverón, N., Villarreal-Garza, C., Soto-Perez-De-Celis, E., Arce-Salinas, C., Matus-Santos, J., Ramírez-Ugalde, M.T., *et al*. (2017) Clinical and Epidemiological Profile of Breast Cancer in Mexico: Results of the Seguro Popular. *Journal of Global Oncology*, **3**, 757-764. https://doi.org/10.1200/JGO.2016.007377

[22] Galukande, M., Wabinga, H. and Mirembe, F. (2015) Breast Cancer Survival Experiences at a Tertiary Hospital in Sub-Saharan Africa: A Cohort Study. *World Journal of Surgical Oncology*, **13**, Article No. 220. https://doi.org/10.1186/s12957-015-0632-4

[23] Balawardena, J., Skandarajah, T., Rathnayake, W. and Joseph, N. (2020) Breast Cancer Survival in Sri Lanka. *JCO Glob Oncology*, **6**, 589-599. https://doi.org/10.1200/JGO.20.00003

[24] Gnangnon, F., Gbessi, D., Kiki-Migan, Y., Attolou, S., Imorou Souaibou, Y., Denakpo, J., *et al*. (2021) Étude de la survie et des facteurs pronostiques du cancer du sein chez la femme dans deux hôpitaux de référence au Sud du Bénin. *Revue d'Épidémiologie et de Santé Publique*, **69**, S69-S70. https://doi.org/10.1016/j.respe.2021.04.119

[25] Mahjoub, N., Kamel, B.S., Mokrani, A., Mansouri, H., Achour, L., Chraiet, N., *et al*. (2021) Profil épidémiologique et anatomopathologique du cancer du sein dans la région du Nord-Ouest de la Tunisie. *La Tunisie Médicale*, **99**, 441-448.

[26] Atangana, P.J., Nguefack, C.T., Fotsing, C.T., Bell, E.D., Tayou, R., Tomfeu, C.N., *et al*. (2017) Aspects Immunohistochimiques des Cancers du Sein à Douala et à Yaounde. *Health Sciences and Diseases*, **18**, 14-20. https://www.hsd-fmsb.org/index.php/hsd/article/view/859

[27] Kantelhardt, E.J., Zerche, P., Mathewos, A., Trocchi, P., Addissie, A., Aynalem, A., *et al*. (2014) Breast Cancer Survival in Ethiopia: A Cohort Study of 1,070 Women. *International Journal of Cancer*, **135**, 702-709. https://doi.org/10.1002/ijc.28691

[28] Colzani, E., Liljegren, A., Johansson, A.L.V., Adolfsson, J., Hellborg, H., Hall, P.F.L., *et al*. (2011) Prognosis of Patients with Breast Cancer: Causes of Death and Effects of Time since Diagnosis, Age, and Tumor Characteristics. *Journal of Clinical Oncology*, **29**, 4014-4021. https://doi.org/10.1200/JCO.2010.32.6462

[29] Sankaranarayanan, R. (2011) Cancer Survival in Africa, Asia, the Caribbean and Central America. Introduction. *IARC Scientific Publications*, **162**, 1-5.

[30] Cowppli-Bony, A., Colonna, M., Ligier, K., Jooste, V., Defossez, G., Monnereau, A., *et al*. (2019) [Descriptive Epidemiology of Cancer in Metropolitan France: Incidence, Survival and Prevalence]. *Bulletin du Cancer*, **106**, 617-634. https://doi.org/10.1016/j.bulcan.2018.11.016

[31] Haroon, S., Hashmi, A.A., Khurshid, A., Kanpurwala, M.A., Mujtuba, S., Malik, B., *et al*. (2013) Ki67 Index in Breast Cancer: Correlation with Other Prognostic Markers and Potential in Pakistani Patients. *Asian Pacific Journal of Cancer Prevention*, **14**, 4353-4358. https://doi.org/10.7314/APJCP.2013.14.7.4353