Histo-clinical and echo-mammographical profile of women's mammary tumours in Bukavu.

(Multicentric transversal study at the "UEA and UCB" CHUs)

Bigabwa Patrick[1], Nyakio Olivier[1], Chentwali Serge[3], Bisimwa Patron[2], Mulinganya Guy[3], Mukanire Bercmans[1], Chasinga[4], Musafiri Justin[1], Mukanga Omar[5], Mukwege Denis[1]

[1] Department of Gynaeco-Obstetrics of the General Referral Hospital of Panzi / Université Evangélique en Afrique
[2] Molecular Biology Service of the Université Evangélique en Afrique
[3] Department of Gynaeco-Obstetrics of the Provincial General Referral Hospital of Bukavu/ Université Catholique de Bukavu
[4] Anatomopathology Service of the General Referral Hospital of Panzi / Université Evangélique en Afrique
[5] Statistics Service at the General Referral Hospital of Panzi

DOI: 10.29322/IJSRP.13.06.2023.p13840
http://dx.doi.org/10.29322/IJSRP.13.06.2023.p13840

Paper Received Date: 14th May 2023
Paper Acceptance Date: 17th June 2023
Paper Publication Date: 21st June 2023

SUMMARY

Introduction: Breast benign and malignant tumour pathologies are a global public health problem. These tumours are a frequent reason for gynaecology consultation: Eight to nine per ten women leave with a benignity diagnosis. However, a cancer is always at this consultation. In Bukavu, their frequencies are not precise; so is it for the most common risk factors for breast cancer in women.

Patients and methods: This was a multicentric, cross-sectional study of 12 months (January to December 2022), for analytical purposes. Conducted by prospective collection on a pre-established survey sheet, it concerned women who had consulted for breast tumour in gynaecology and whose diagnosis was confirmed in the anatomopathology service of the Panzi/UEA hospital and/or the provincial hospital of Bukavu/UCB.

Results: Breast tumours accounted for **43%**, or 86 cases out of the 200 gynaecological tumour pathologies listed in these two structures. The proportion of patients with mammary tumours who consented to the study was 24% (12/50) of the Bukavu HPGR and 76% (38/50) of the Panzi HGR. There were 58 (67.44%) benign tumours and 28 (32.55%) malignant tumours according to the pathology department.

The univariate and bivariate analyses noted:

(1) Sociodemographic parameters: Average age of 40.50 years (Number ↑ between 16-30 years for benign tumors and 46-60 years for cancer), married marital status (74.0%), household household (44%) and secondary education (52.0%).

(2) Histo-radiological signs: - The histological diagnosis noted a predominance of malignant tumors at 56%. But, is not negligible the number of benign tumors where fibroadenoma dominates with 45%. For malignant tumors, predominated the ductal type (invasive ductal carcinomas, advanced stage and prognosis reserved) at 68.8%, followed by lobular type at 28.5%.

- The echo-mammographical diagnosis noted a predominance of tumors of poor prognosis: 22% classified BI-RADS IV and 6% BI-RADS V.

Analysis by single and multiple logistic regression selected statistically significant associated factors include: patient age { [A0R 78 (3.94-156.42) with p=0.004]; with mean age 40.50 years (±14.74)}, marital status or celibacy [A0R 10.22 (1.75-59.44) with p=0.010], parity [A0R 21.99 (2.27-212.81) with p=0.008], breastfeeding [A0R 6.16 (1.03-36.88) with p=0.046] and menopausal age [A0R 4.01 (1.97-16.50) with p=0.044].

Conclusion: The majority of breast cancer patients, consulted late, made previous use of indigenous treatments, had a late diagnosis and late treatment administered. These facts would have justified their poor state objectified during the study. If the diagnosis is early and accurate, these tumors would have a favourable prognosis after treatment. Early follow-up and detection of breast cancer is a serious problem in this resource-limited environment. Poverty prevents access to quality care to expect a better prognosis with ideal follow-up.

These challenges suggest a large-scale study of breast cancer risk factors in Bukavu; as well as advocacy to initiate its screening.

Keywords: breast cancer, epidemio-clinical, histopathology, mass awareness.

I. INTRODUCTION

The breast is a precious organ of the woman by its aesthetic, erotic and breastfeeding role. It is a frequent occurrence of benign and malignant tumor pathologies, of which cancer is a public health problem worldwide and in the DRC in particular.

These tumors are a frequent reason for gynecology consultation: Eight to nine out of ten women leave with a diagnosis of benignity [1] and 8 out of 10 breast cancers occur after the age of 50 [2]. Benign tumors predominate in adolescence and premenopause, while cancers in older ages [1]. Benign tumors are one of the risk factors for cancers [2]. They are thus a potential precursor to breast cancer.

According to the WHO, breast cancer is a disease to be fought to ensure the well-being of women and reduce their mortality. Being multifactorial, cancer statistics vary in time and space. It varies according to lifestyle, social factors and the degree of economic development [3].

GLOBOCAN in 2018 noted the magnitude of breast cancer in Africa from 92,600 cases and 50,000 deaths in 2008, to 168,690 cases and 74,072 deaths in 2018 [4]. GLOBOCAN of March 2021, ranked it in first place in incidence (2,261,419 cases or 11.7% for both sexes, or 24.5% for the female sex alone) and prevalence (7,790,717 cases) as well as fourth by its mortality (684,996 or 6.9% for both sexes, or 15.5% for women) [5].

Except, the benign character of benign tumors; Breast cancer is a crucial problem because of its seriousness, in all countries, rich and poor. In terms of mortality rates, women in poor countries bear a relatively higher burden of breast cancer mortality, especially women under 50 years of age [3,6].

A breast cancer study[2] analyzing its incidence and socioeconomic factors, showed that 1% of the incidence rate increases expected mortality by 0.79% in poor countries, 0.50% in middle-income countries and 0.31% in rich countries.

In Africa, there are several problems. Breast cancer will explode compared to increasing values over time. Cancer statistics are under-reported due to a lack of cancer registries (There is only 2% registry coverage) [7]. In recent times in Africa, increases life expectancy, decreases fertility rates and changes marital behaviors or reproductive patterns [8,9]. This "westernization" of lifestyle promotes a risk of breast cancer in African women [10].

Cancer care ranging from preventive medicine to palliative care is poor in low- and middle-income countries, including Africa [11].

Studies have also identified a younger age profile of breast cancer onset in Africa[12]. Life expectancy, lower for Africans than for developed countries, is one of the reasons. Younger age in African-American breast cancer patients[13] suggests the existence of other explanatory factors. Genetic or environmental factors might predispose women of African descent to breast cancer at an earlier age[12]. It becomes worrying because the young age ($\leq$ 40 years) predisposes to the more aggressive picture with a higher mortality rate than that of older women [14].

In the DRC, the same problems persist that make it difficult to achieve better breast cancer control results. Breast cancer is detected too late [15]; lack of means of prevention (detection and early diagnosis), effective therapy and ignorance in the community. Thus, many women no longer recover from it due to the delay in treatment. The WHO's finding is alarming [16]: "Cancers are claiming more and more victims in the DRC".

In Bukavu, breast tumor pathologies are also frequent; despite the rare isolated report. In Nyakio's study [17], from 2014-2016 to the gynecology department of the HGRP, breast cancer ranked 2nd among gynecological cancers. There is insufficient literature to illustrate the magnitude of breast tumours and the proportion of breast cancers versus benign tumours and their risk factors.

It is in this context that this study aims to analyze the specificity of the magnitude and risk factors of breast cancer in these patients in order to improve its prevention in our environments.

It is in this context that this article aims to describe this histo-radiological profile of breast tumors and illustrate the extent of breast cancer less documented in our resource-limited settings.

II. MATERIALS & METHODS

1. MATERIALS

1.1. FRAMEWORK STUDY

The study took place in Bukavu, the capital of South Kivu province in the Democratic Republic of the Congo; precisely, at the HGRPanzi and the HPGR of Bukavu. Its total population in 2015 was estimated at about 906,940. This city is located on the southwestern shore of Lake Kivu. has three urban health zones: Kadutu, Bagira-Kasha and Ibanda, constituting the BUKAVU health district, spread over an area of about 60 km².

The study took place in 2 hospitals with both the gynaecology and obstetrics department and a pathology department. In terms of skills and technical platform, they are the most important structures in the province that receive the majority of patients from three health zones of the health district of Bukavu, the constituent territories of the province of South Kivu as well as the surrounding provinces and countries.

The two hospital study structures are:

A) HGRPanzi: HGR/Panzi began its activities as a dispensary in 1999 during the war period. In the same year, under the initiative of Prof. Dr Mukwege and the 8°CEPAC, the hospital was built.

It is located in the commune of Ibanda, more precisely in the Panzi district, on Mushununu Avenue. It is 8 km from the city center, towards the road connecting Bukavu to Uvira.

This hospital is the CHU of the Evangelical University in Africa which trains general practitioners and specialists. It has a capacity of 650 beds, distributed among the four ordinary departments of a general referral hospital and their related services.

Currently, he is internationally recognized for his expertise in the holistic care of victims of sexual and gender-based violence as well as uro-gynecological surgery.

B) HPRBukavu. Created in colonial times in 1929, it served as a Provincial Hospital of the former Kivu (Maniema-North and South Kivu). It was extended by the White Sisters and the Société Chemin des Fer de l'Est before being put back under the direction of the colonial state. In 1995, it was ceded to the management of the Archdiocese of Bukavu until today.

Located towards the north-west of the city of Bukavu, on the borders of the health zones of Kadutu and Ibanda, it is 500 meters from Independence Square, on the road to Bagira and Kavumu Airport. According to the provincial health division, it is currently the health reference for the province of South Kivu.

This hospital is the CHU of the Catholic University of Bukavu which trains general practitioners and specialists. It has a capacity of 500 beds, distributed among the four ordinary departments of a general referral hospital and their related services. They are organized into two main services: "medical" and "support".

Its choice is consistent with the presence of well-equipped gynecology and pathology departments as well as its rank as a university clinic, the best academic research environment.

1.2. STUDY PERIOD

It was twelve months, from January 1st to December 31st, 2022.

1.3. STUDY POPULATION

All patients consulted in gynaecology of the Panzi Hospital and the HPGR of Bukavu during the study period; in whom the clinical diagnosis of gynaecological tumors has been made and specified in the anatomopathology service.

1.4. SAMPLE TYPE

a) The sampling technique is *probabilistic of convenience.*

b) Inclusion criterion: Any patient of any age with clinical and histological diagnoses of breast tumors, who **"consents to participate in the study".**

c) Exclusion criteria: - Any patient who does not meet the above criterion.

- Non-solid tumor pathologies, infectious diseases (mastitis, abscesses, etc.) and breast cysts as well as breast dermatoses are excluded.

2. METHODS

This study was carried out in a context of insufficient resources and difficulties in having all the conventional paraclinical exploration data planned during the study of breast tumors.

2.1. Study type : It is a cross-sectional study for analytical purposes with prospective collection.

2.2. Techniques and data collection tools

- **Data were both collected by :**

- *"use of a pre-established collection file (see annexes)"* for clinical (subjective and objective) as well as paraclinical information (echography, mammography, biopsy and genetic test as well as NFS and X-ray depending on the particularity of the case).
- "samples": in the operating room, biopsy tissues for the anatomopathology analysis of one of the two CHU selected under study.

These data were supplemented by:

The technique of **"documentary"** data collection on study **variable** collection sheets, registers of anamopathology services and global input at the reception of gynaecological consultation.

- **These are :**

=> Dependent variables: Benign breast tumours and malignant breast tumours

=> **Independent** Variables

(1) **Socio-demographic variables**

(2) **Clinical aspects (Some particular health history)**

(3) **Paraclinical aspects (echography, mammography and histopathologies).**

2.3. Statistical data processing

The data collected were entered using MS Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 23. The quantitative variables were summarized by the mean and its deviation standard as well as the median and its deviation domain depending on whether the distribution is symmetric or not. The qualitative variables were presented in the form of frequency tables and their percentages. The proportion comparison was made thanks to Pearson's chi-square test or to Fisher's exact test. The p-value was significant at the 5% level.

3. ETHICAL CONSIDERATIONS

This study was conducted respecting the principles of human dignity and confidentiality of the information collected. Informed consent was given by all participants in this study, registered with the ethics committee under number 0016-4125001-118-2022.

III. RESULTS AND COMMENTS

1. PROPORTIONS OF MAMMARY TUMOURS COMPARED TO GYNAECOLOGICAL TUMOURS IN TWO STUDY HOSPITALS.

In 2022, eighty-six breast tumours were diagnosed by the two selected study hospitals in Bukavu: 33 cases at the HPGR of Bukavu/UCB and 53 cases at the HGR of Panzi/UEA. In each of these two structures, they occupied the first position. They accounted for 43%, or 86 cases out of the 200 gynaecological tumour pathologies listed. According to data compiled in pathology registries, there were 58 (67.44%) benign tumors and 28 (32.55%) malignancies.

For the participation rate, the proportion of patients with mammary tumours who consented to the study was 58.13% (5O/86) including 24% (12/50) from the HPGR of Bukavu and 76% (38/50) from the HGR of Panzi.

2. ANALYSE UNIVARIEE DES VARIABLES SELON DIFFERENTS PARAMETRES

2.1. PARAMETRES SOCIODEMOGRAPHIQUES DES PATIENTES

Table1 : Socio-demographic characteristics of the patients

Features	N=50 (%)
Age categories (years). Average (±SD)	40,50 (±14,74)
<=15	1 (2,0)
16-30	14 (28,0)
31-45	13 (26,0)
46-60	16 (32,0)
>=61	6 (12,0)
Profession	
Health worker	2 (4,0)
Merchant	8 (16,0)
Teacher	1 (2,0)
Farmer	4 (8,0)
Student	11 (22,0)
Public Administrative Official	2 (4,0)
Housewife	22 (44,0)
School level	
Unschooled	5 (10,0)
Primary	9 (18,0)
High school	26 (52,0)
Higher academic	10 (20,0)
Civil status	
Single	11 (22,0)
Married	37 (74,0)
Widow	2 (4,0)
Origin	
Bagira	2 (4,0)
Outside Bukavu town	16 (32,0)
Ibanda	28 (56,0)
Kadutu	4 (8,0)
Territory of origin	
Outside South-Kivu	7 (14,0)
Idjwi	1 (2,0)
Kabare	8 (16,0)
Kalehe	2 (4,0)
Mwenga	8 (16,0)
Shabunda	5 (10,0)
Uvira	4 (8,0)
Walikale	1 (2,0)
Walungu	14 (28,0)
Religion	
Catholic	27 (54,0)
Neo-apostolic	1 (2,0)
Protestant	21 (42,0)
Others (to precise)	1 (2,0)
Tribe	
Shi	25 (50,0)
Rega	13 (24,0)
Mufulero	3 (6,0)
Muhavu	2 (4,0)
Munyindu	1 (2,0)
Muvira	1 (2,0)
Others	5 (10,0)

The results in table 1 present the socio-demographic profiles of the patients. The average age was 40.50 (±14.74) years and 32% of them were between 46-60 years old.

Regarding the profession, we noted that 44% of women were housewives, 22% were students and 16% were shopkeepers. We found that more than half (52%) of women had a secondary education, the majority (74%) were married.

The majority of women came from within Ibanda Health Zone and 32% from outside the city. In the territory of origin, 28.0% were from Walungu territory, 16% from Mwenga and Kabare. More than half of the women were Catholic (54%) and 42% of Protestant women. Half of the women (50%) were from the Shi tribe.

2.1 Notion of screening or breast tumour in the past of patients and familiars

Table 2 : Concept of screening or previous and familiar breast tumour

Features	N=50 (%)	
Mammary surgery ATCD		
None	47	(94,0)
Breast surgery (abscess incision, nodulectomy …)	3	(6,0)
ATCD of breast cancer screening		
Yes	1	(2,0)
None	49	(98,0)
Breast cancers (or ovarian/endometrious/colorectal)		
Yes	5	(10,0)
Number and category of relatives affected (n=5)		
First degree	1	(20,0)
Second degree	4	(80,0)

This table 2 shows the history of surgery of benign tumors (anterior nodules, cyst, abscess…) and malignant reported in 3% of patients; And for those screening for breast cancer, 98% knew nothing about it, only one was able to do it in her life. He notes five cases (10%) of breast cancers in the familiar.

2.3. RADIOLOGICAL AND HISTO-CLINICAL PARAMETERS
2.3.1. ECHO-MAMMOGRAPHIC CLASSIFICATION

Table 3: Types of tumours according to the patients' echo-mammographic results

Features	n=50 (%)
Tumour types	
BIRADS I	2 (4,0)
BIRADS II	7 (14,0)
BIRADS III	7 (14,0)
BIRADS IV	11(22,0)
BIRADS V	3 (6,0)
Undetermined (Patient not consenting to make the requested assessment)	20 (40,0)

This table 3 shows that 20% of patients did not consent to ultrasound. Of those that did, suspicious tumours predominated: 22% were classified as BI-RADS IV and 6% as BI-RADS V.

2.3.2. ANATOMOPATHOLOGIC TYPES

Table 4: Anatomopathologic types of the patients' mammary tumours

Features	n=50 (%)
Tumour types	
Benign	22 (44,0)
Malignant	28 (56,0)
Types of benign tumours (n=22)	
Fibroadenoma	10 (45,5)
MFK simple	6 (27,3)
MFK+ superinfected necrosis	3 (13,6)
Microcalcifications	2 (9,1)
Phyllode tumour (giant mixed AF)	1 (4,5)
Types of malignant tumours (n=28)	
Invasive ductal carcinoma SBR III	9 (32,1)
Invasive ductal carcinoma SBR II	7 (25,0)
Invasive ductal carcinoma SBR I	3 (10,7)
Invasive lobular carcinoma SBR II	3 (10,7)
Invasive lobular carcinoma SBR III	3 (10,7)
MFK + insitu lobular carcinoma	2 (7,1)
Angiosarcoma	1 (3,6)

Table 4 notes a predominance of malignant tumors at 56%. But the number of benign tumours where fibroadenoma dominates in 45% is not negligible.

For malignant tumors, the ductal type predominates at 68.8%, followed by lobular type at 28.5% with one case of angiosarcoma among the 28 cases of cancers.

2.3.3. "T N M'' CLASSIFICATION OF DIAGNOSED MAMMARY CANCERS

Table 5: **TNM classification of 28 cases of carcinomas diagnosed in this sample**

Primary tumour	T0	T1	T2	T3	T 4				Total
Lymphadenopathies					T4a	T4b	T4c	T4d	
No	0	0	0	4	0	0	1	0	5
N1	0	0	0	2	1	0	0	1	4
N2	0	0	0	1	1	0	0	5	7
N3	0	0	0	0	1	0	2	9	12
Total	0	0	0	7	3	0	3	15	28

In this table 5, the 28 diagnosed malignant tumors are classified as follows:

For T(primary tumor dimension) none were classified T0, T1 or T2. Seven cases are T3 and 21 are T4.

For N (lymphadenopathy), 5 are classified N0, 4 are N1, 7 are N2 and 12 were classified N3. Basically, the majority of cancers or 23 cases presented tumors associated with lymphadenopathy classified in one of the following categories: T3N0M0, T3N1M0 and T3N2M0.

For M (metastases): There were also metastases in 8 patients classified "M1".

2.3.4. STAGING IN DEGREE OF SEVERITE & EARLY OR LATE DIAGNOSIS

Based on the elements of the TNM classification, the combination of these types of cancers resulted in their grouping into stages in order to highlight the degree of severity and the notion of early or late diagnosis.

Table 6: UICC and AJCC classifications (severity degree)

Features	n=28(%)
Staging (early or advanced)	
Stage1 (precocious)	0 (0,0)
Stage 2a (precocious)	0 (0,0)
Stage 2b (precocious)	4 (14,3)
Stage 3a (advanced)	3 (7,1)
Stage 3b (advanced)	4 (2,0)
Stage 4 (advanced)	17(42,0)
Categories of severity	
Advanced	24 (85,7)
Precocious	4 (14,3)

After grouping TNM classes, it appears that eighty-five percent of patients with breast cancer consulted at the advanced stage, **only 14.3% did so early.**

3. BIVARIATE ANALYSIS OF FACTORS ASSOCIATED WITH TUMOUR TYPES

Table 7: Bivariate analysis of factors associated with mammary tumours

Features	Mammary tumours		p-Value
	Benign (n=22)	Malignant (n=28)	
Age Group (years)			**< 0,001**
<=15	1 (100,0)	0 (0,0)	
16-30	13 (92,9)	1 (7,1)	
31-45	4 (30,8)	9 (69,2)	
48-60	4 (25,0)	12 (75,0)	
>=61	0 (0,0)	6 (100,0)	
Profession			**0,001**
Health worker	0 (0,0)	2 (100,0)	
Merchant	4 (50,0)	4 (50,0)	
Farmer	0 (0,0)	4 (100,0)	

Teacher	0 (0,0)	1 (100,0)	
Student	11 (100,0)	0 (0,0)	
Public Administrative Official	0 (0,0)	2 (100,0)	
Housewife	7 (31,8)	15 (68,2)	
School level			0,124
Unschooled	0 (0,0)	5 (100,0)	
Primary	3 (33,3)	6 (66,7)	
High school	13 (50,0)	13 (50,0)	
Higher academic	6 (60,0)	4 (40,0)	
Civil status			**<0,001**
Single	11 (100,0)	0 (0,0)	
Married	11 (29,7)	26 (70,3)	
Widow	0 (0,0)	2 (100,0)	
Infertility (n=39)	**n=11**	**n=28**	**<0,001**
Non	8 (29,6)	19 (70,4)	
Oui	3 (25,0)	9 (75,0)	
Gravidity			**0,001**
Nulligravida	11 (91,7)	1 (8,3)	
Primigravida	2 (66,7)	1 (33,3)	
Multigravida	4 (33,3)	8 (66,7)	
Grandmultigravida	5 (21,7)	18 (78,3)	
Parity			**<0,001**
Nulliparous	11 (91,7)	1 (8,3)	
Pauciparous	2 (100,0)	0 (0,0)	
Primiparous	2 (66,7)	1 (33,3)	
Multiparous	2 (13,3)	13 (86,7)	
Grandmultiparous	5 (27,8)	13 (72,2)	
Age at first pregnancy (years)			0,899
< 30	11 (30,6)	25 (69,4)	
>=30	0 (0,0)	2 (100,0)	
Abortion ATCD			**0,049**
No	17 (54,8)	14 (45,2)	
Yes	5 (26,3)	14 (73 7)	

Breastfeeding			**0,002**
No	10 (83,3)	2 (16,7)	
Yes	12 (31,6)	26 (68,4)	
Age of menarches (years)			0,861
<=11	1 (50,0)	1 (50,0)	
>=12	21 (43,8)	27 (56,3)	
First menstrual disorders			0,254
No	13 (52,0)	12 (48,0)	
Yes	9 (36,0)	16 (64,0)	
Period duration			0,425
Normal	21 (45,7)	25 (54,3)	
Abnormal	1 (75,0)	3 (25,0)	
Cycle of menstrual period			0,050
Regular	14 (58,3)	10 (41,7)	
Irregular	8 (30,8)	18 (69,0)	
Dysmenorrhea			0,945
No	12 (44,4)	15 (55,6)	
Yes	10 (43,5)	13 (56,5)	
Menopause			**<0,001**
No	19 (65,5)	10 (34,5)	
Yes	3 (14,3)	18 (85,7)	
Late menopause (n=21)			0,553
No	3 (15,3)	16 (84,2)	
Yes	0 (0,0)	2 (100,0)	
Hormone substitutive therapy			0,371
No	22 (44,9)	27 (55,1)	
Yes	0 (0,0)	1 (100,0)	
Hormonotherapy (Contraceptive)			**0,016**
No	20 (54,1)	17 (45,9)	
Yes	2 (15,4)	11 (84,6)	
HTA			0,146
No	20 (48,8)	21 (51,2)	
Yes	2 (22,2)	7 (77,8)	

Diabetes			0,103
No	20 (41,7)	28 (58,3)	
Yes	2 (100,0)	0 (0,0)	
HIV/AIDS			0,201
No	22 (45,8)	26 (54,2)	
Yes	0 (0,0)	2 (100,0)	
Smoking			0,861
No	21 (43,8)	27 (56,2)	
Yes	1 (50,0)	1 (50,0)	
Alcoholism			0,462
No	17 (47,2)	19 (52,8)	
Yes	5 (35,7)	9 (64,3)	
Physical activities			0,310
No	11 (52,4)	10 (47,6)	
Yes	11 (37,9)	18 (62,1)	
Radiation exposure			0,776
No	18 (45,0)	22 (55,0)	
Yes	4 (40,0)	6 (60,0)	
BMI			**0,055**
<18,5	0 (0,0)	7 (100,0)	
18,5-24,99	10 (43,5)	13 (56,5)	
25,00-29,99	4 (57,1)	3 (42,9)	
>=30	8 (61,5)	5 (38,5)	
Period of time from discovery to current consultation			0,797
<=1	2 (33,3)	4 (66,7)	
2-3	6 (50,0)	6 (50,0)	
>=4	14 (43,8)	18 (56,3)	

This Table 7 noted statistically significant associations between tumour types with age group, occupation, marital status, infertility, gestation, parity, abortion history and breastfeeding. In addition, there is an association with the age of menopause and the use of hormone therapy (especially contraceptive).

All other factors are not statistically significant with mammary tumours, except for weight status (reflecting BMI) which is close to the p-value.

Also, it emerges from the bivariate analysis, the presence of malignant tumors in *38.5%* of obese, *42.9%* of overweight women and *all* women in thinness. This cachexia occurred in cases of advanced breast cancer almost always.

Apart from BMI, other associated factors note the following particularities:

- high proportions of malignant neoplasms (60%) among subjects who have been exposed to ionizing irradiation,

- malignant tumors represent 47.6% among women who did not practice physical activities;

- more than 85.7% of patients consulted the gynecologist leading to the histo-clinical diagnosis of cancer after more than two years of existence of the "palpable tumor" (diameter greater than 1cm).

4. LOGISTIC REGRESSION ANALYSES OF ASSOCIATED FACTORS

Table 8: Simple and multiple regression of factors associated with mammary tumours

Features	COR (IC à 95%)	p-Value	AOR (IC à 95%)	p-Value
Age group (years)				
16-30	1 (reference)		1 (reference)	
31-45	31,5 (3,01-328,92)	0,004	**24,13 (2,21-263,13)**	**0,009**
48-60	60,66 (5,58-659,28)	0,001	**47,12 (4,19-528,87)**	**0,002**
>=61	70 (3,64-132,66)	0,005	**78 (3,94-156,42)**	**0,004**
Profession				
With	1 (reference)		1 (reference)	
Without	3,55 (1,07-11,80)	0,038	2,34 (0,48-11,41)	0,292
Civil status				
Single	13,0 (2,46-68,60)	0,003	**10,22 (1,75-59,44)**	**0,010**
Married	1 (reference)		1 (reference)	
Infertility				
No	1 (reference)			
Yes	2,5 (0,44-13,90)	0,295		
Parity				
Nulliparous	1 (reference)		1 (reference)	
Pauciparous	22 (0,93-515,87)	0,055	21,99 (0,93-514,75)	0,065
Primiparous	71,5 (5,68-898,64)	0,001	6,34 (0,11-3,54)	0,994
Grandmultiparous	22 (2,27-212,85)	0,005	**21,99 (2,27-212,81)**	**0,008**
Abortion ATCD				
No	1 (reference)			
Yes	2,31 (0,69-7,64)	0,170		
Breastfeeding				
No	10,83 (2,04-57,27)	0,005	**6,16 (1,03-36,88)**	**0,046**
Yes	1 (reference)		1 (reference)	
Cycle of menstrual period				

Regular	1 (reference)			
Irregular	2,23 (0,71-6,97)	0,167		
Menopause (Age)				
No	1 (reference)		1 (reference)	
Yes	6,95 (1,85-26,09)	0,004	**4,01 (1,97-16,50)**	**0,044**
Hormonotherapy				
No	1 (reference)		1 (reference)	
Yes	3,51 (0,83-14,88)	0,055	2,01 (0,42-9,63)	0,381
BMI				
18,5 -24,99	1 (reference)			
<18,5	0,96 (0,31-2,94)	0,945		
>= 25,00	0,96 (0,31-2,94)	0,945		

***COR** = Crudes odds ratios**,**AOR**=Adjusted Odds ratios**, ***BMI** = Body mass index

This Table 8 shows the unadjusted odds ratios (COR) and adjusted odds ratios (AOR).

It was noted a high probability of malignancies in women aged 31-45 years (AOR=24.13; 95% CI: 2.21-263.13; p=0.009), those aged 48-60 years (AOR=47.12; 95% CI: 4.19-528.87; p=0.002), and those with an age greater than or equal to 61 years (AOR=78; 95% CI: 3.94-156.42; p=0.004).

Unmarried women have a tenfold increased risk (AOR=10.22; 95% CI: 1.75-59.44; p=0.010) to have malignant neoplasms than married women.

The risk of malignancies was higher among large multiparous (AOR=21.99; 95% CI: 2.27-212.81; p=0.008).

Not breastfeeding increases the risk of having this pathology by 6.16 (AOR=6.16; 95% CI: 1.03-36.88; p=0.046),

Being menopausal multiplies the risk of having this pathology by 4 (AOR = 4.01; 95% CI: 1.97-16.50; p=0.044).

II. DISCUSSION AND INTERPRETATION OF RESULTS

1. FREQUENCE /PROPORTIONS DES TUMEURS MAMMAIRES PAR RAPPORT AUX TUMEURS GYNECOLOGIQUES AU SEIN DE DEUX HOPITAUX D'ETUDE.

In this study, the hospital incidence of breast tumors was found in first place among gynaecological tumour pathologies diagnosed in these two health facilities. They accounted for **43%**, or 86 cases out of the 200 gynaecological tumour pathologies listed. Depending on the pathological type, there were 58 (67.44%) benign tumours and 28 (32.55%) malignant tumours during the 12 months of study.

Statistics for benign mammary tumours are rarely described and less detailed than those for malignant tumours in the literature. The clinical severity and poor prognosis of breast cancer attract more curiosity from authors in most countries where studies have been done and/or the cancer registry exists.

According to WHO, by the end of 2020, 7.8 million living women had been diagnosed with breast cancer in the past five years, making breast cancer the most common cancer worldwide and the number one cancer in women [5].

In Senegal, among tumor pathologies in gynecology, benign breast tumors accounted for 58.2% versus 41.8% of cancers [18].
In Mali, a 2002 study reported 91 breast tumors, 39.56% of which were benign, 19.78% malignant and 43.66% dystrophic and inflammatory lesions [19].
In Mali, cancers in women accounted for 51% of all cancers. Breast cancer ranked 1st with 2121 cases or 23.9% of all cancers, according to data from the 2017 National Cancer Registry.

In the author's environment, RDC, there is no accurate reporting, nor a cancer registry [15]. Only one-off studies exist: In 2019, **Mbala** [20]found in Kinshasa 24% prevalence of breast cancer and in 2018, **Nyakio** [17] notes breast cancer in Bukavu in second place after cervical cancer.

It appears from this literature review that breast tumor pathology has a significant frequency, despite the lack of sufficient publications in our circles to illustrate the fact of being a community health problem to be combated.

2. UNIVARIATE AND BIVARIATE ANALYSES

2.1. PATIENT SOCIODEMOGRAPHIC PARAMETERS

In this study, according to Table 1, the average age of mammary tumors is 40.50 years with the highest number of 32% in the 46-60 age group.

These values are similar to those of **Soumaila A.T.**[21] who found the age group of 40-49 years with 31.4% of population, divided into malignant tumors of average age being 47.20 ± 10.20 years with a modal class of 40-49 years and for benign tumors being 28.02 ± 11.70 years with a modal class of 20-29 years.

In the DRC, **Mbala** [20], who studied only breast cancers, also found the average age of 48.5±10.2 years in the 35-49 age group with the most numbers.

In addition, in this series, married women (74.0%), housewives (44%) and those with secondary education (52.0%) were in the majority.

These characteristics were identical in the studies of **Soumaila A.T.**[21] and **Mbala**[20] for the first characteristics. This attests to the similarities between African peoples despite the few minor differences.

Studies in Morocco [22]**,** Japan [23] and France [24] have shown the place of the impact of sociodemographic factors (intellectual and socio-economic levels, disparity between urban and rural areas, etc.) on breast cancer and its severity. They influence the delay in consultation, diagnosis of cancer to initiate early effective treatment. They are pejorative prognostic factors on survival even with appropriate treatment, especially if the cancer is already in the advanced stage.

As for the specific origins of South Kivu, the Shi tribe dominated at 50%, Walungu territory at 28% and Ibanda commune at 56% of the total number of patients who agreed to participate in the study.

2.2. PATIENT CLINICAL PARAMETERS

2.2.1. Gynaeco-obstetric health history

This history is part of risk factors for tumour pathologies of the breast; while recognizing that they may be different depending on the histological type of tumours. Without alluding to this difference, these backgrounds are grouped according to:

A. Hormonal factors

a- Endogenous: (1) Menarche : Menstruation occurs at 96**% after 12 years** with *a median of 14 (9-18);* knowing when they are precocious, they would promote the occurrence of breast cancer. Only two patients had it early. In this sample, it was found that half of these patients had menstrual disorders, especially cycle irregularities (52**%)** followed by dysmenorrhea (46**%**) and rarely abnormalities in menstrual duration (4**%**).

Henaoui L. and **Meguenni K.** have also noted these period disorders with a significant positive value, especially at irregularly long cycles [25]. This would be justified by the present hyperestrogenism in the etiopathogenesis classically described for mammary tumours.

(2) Menopause: present in 42% of patients and only 9.5% presented late menopause being one of the risk factors for cancer, by prolonged exposure to hyperestrogenism.

Authors have studied the risk factors for menarche and menopause according to changes in risk over time: Before menopause, the risk of cancer decreases by 9% for each year more in the age of onset of the first menstrual period and by 4% per year for cancers occurring after menopause[26]**.**

b- Exogenous: Few women reported hormone therapy; Only 26% took oral hormonal contraception and 1% took postmenopausal hormone therapy.

In Algeria in the case-control study of **Henaoui L. and Meguenni K**., these two factors are not associated with the risk of breast cancer [27]**.**
A meta-analysis of 40 studies [28] found associations with cancer risk by adding nuances on dosage (dose, duration, types of hormones combined or isolated...)**.** However, our study has limitations. Details about the dosage were ignored and less specified by our respondents.
These 40 studies confirm the promoting effect of certain HRT on pre-existing subclinical breast cancers and that there is no excess risk of breast cancer caused by estrogen + progesterone combinations.
In addition, some patients have mentioned taking indigenous treatments (medicinal plants) for contraceptive purposes, unknown compositions that would contain hormonal substances probably promoting mammary tumours..

c- Reproductive related: (1) Pregnancy:

=>*Age of first pregnancy:* There was a *median of 19.5 (14-31) with 36 (94.7%)* first pregnancies occurring before thirty years and two cases after 30 years of age with breast cancer at a young age (Less than 35 years). Despite the rarity of the latter in this sample, this variable is a preponderant risk factor in terms of the influence of this disease according to the literature.

Mathelin C, Youssef C & all. explain the paradoxical interaction of the first late pregnancy (at more than 30 years) which increases the risk by hormonal stimulation of mammary cells initiated and modification of the extracellular membrane [29].

=> *Number of pregnancies*: A large proportion of patients were multiparous (68% for gestity and 66% for parity) facing a significant percentage of nulliparity (24% are nulligeste and 24 nulliparous).

This observation can be confusing: increasing the number of pregnancies should reduce the risk. This is probably justified by the interaction between the small sample size with age and the obstetric formula of the patients studied.

Classically, the risk is high for nulliparity due to lack of differentiation and mammaryt involution; and it is reduced for multiparity by differentiation activation and rhythmic involution during the alternation of pregnancies with non-pregnancy periods [29]**.**
=> *Number of miscarriages:* The majority (62%) of cases did not have the notion of abortion in their obstetric formula.
KAKANOU Y & al. found no notion of abortion among the patients in their sample[30].

A meticulous analysis of 53 "EPIC" studies involving 4805 patients confirmed that there is no increased risk related to abortion, nor to spontaneous miscarriages [28]**.**

(2) Breastfeeding: 24% of patients did not breastfeed children. Despite the presence of breastfeeding for 76%, the protective effect of breastfeeding is not guaranteed if the duration of breastfeeding is very short.

Grosso modo, all three groups of hormonal factors have intrigued mechanisms, sometimes opposite effects depending on the time of genital life and other factors favouring this or that other type of mammary tumours.

Classically, it is known that multiparity is an important protective factor: pregnant hormonal biology promotes the differentiation of epithelial cells by reducing the number of undifferentiated cells that are potentially very susceptible to initiation of carcinogenic alterations of the mammary gland [31–33].

What influences more is the age of onset of the first pregnancy. Thus, for a woman who has carried a pregnancy to term at a young age (there are almost no undifferentiated cells yet, nor cells initiated into carcinogenesis!), she sees her risk decreased. Example before 19 years, it decreases by 50% compared to a nulliparous [28]**.**

However, this risk is significantly increased (relative risk: 1.72) in women who had used oral contraception for at least four years before the first full-term pregnancy. Meta-analysis of 47 studies states that the risk decreases by 7% for each birth (apart from the risk reduction related to breastfeeding). The younger the woman is during her pregnancies, the lower the risk (3% per year younger [28].

B. <u>Notion of screening and breast tumours in patients and relatives</u>

In this work, the health history of **surgery of benign (anterior nodules, cyst, abscess .. .) and malignant tumours** were reported in 3% of patients; And for those about **breast cancer screening** 98% knew nothing about it, only one was able to do it in her lifetime according to Table 3

Nadia Frikha et al. estimate the risk levels of benign breast disease according to histological components (degree of cell proliferation and presence of atypia) to prove that they should be considered as a risk factor for breast cancer [2]**.**

Histologically, two groups can be distinguished:
• **proliferative lesions**: Proliferative lesions without atypia that double the risk, while hyperplastic lesions with atypia increase this risk by at least four times;
• **non-proliferative** lesions with or without atypia: Generally, these lesions are not associated with an increased risk of breast cancer or, if they are, the risk is very low [34,35]**.**

However, in **Sancho-Garnier H**.'s article on cancer epidemiology, authors estimate that the highest risk (RR~5) corresponds to fibrocystic diseases associated with proliferative hyperplasia and a high degree of cellular atypia. Isolated fibroadenoma does not appear to be a risk factor. In addition, its relative risk increases by 1 to 5 when breast density on mammography falls within the Canadian BI-RADS classification from 0 to 75 [34]. **Hafssa ELHADRI** found 17.2% of mastopathies among which cancer represented 4**%** [25]**.**
In this study, the frequency of elements of suspicion of genetic defect in the family of patients developing cancers was 10% for the history of familial breast **cancers.**

This history, despite its low frequency, should be investigated for the genetic factor according to the literature [36,37]**.**

Thera F [38] found 9%, value almost identical to ours. In Mali, **KAKANOU Y.** [30] found very high values 41.7% of patients with a family history of breast cancer. But they did not investigate the genetic factor in etiopathogenesis.

2.2.2. <u>Comorbidities and lifestyle</u>

- **Metabolic syndrome** associating HTA, diabetes and obesity was suspected in history only in two patients with benign tumours. Despite the rarity of this syndrome in this study and the lack of assay of markers of its components, it is a significant risk factor.

By studying breast cancer, body mass index and some of the components of metabolic syndrome (hypertension, diabetes, hypercholesterolemia, hypertriglyceridemia), **Boivin L et al.** found statistically significant values ($p \leq 0.05$) for any BMI value in 1682 breast cancer patients [39]**.**

- **HIV:** All two HIV-positive patients in our sample were carriers of breast cancer. In Guinea,

Bangaly T. et al. found: unlike other cancers, HIV infection does not seem to increase the risk of breast cancer [40]. Studies in Africa [41] and the USA[42] have estimated that the risk of breast cancer in PLA is lower than in the general population.

- **Digestive cancer:** No history of gynecological cancers associated with digestive cancer has been reported by patients.

What our study did not illustrate: Lynch syndrome is a common field of familial breast cancer.

- **Smoking:** Only two patients admitted to being smokers: 1 case of benign tumor and another of cancer. But, the remaining 96% are not exempt from this factor because they could be passive smokers out of ignorance.

This is the case of **Henaoui L. and Meguenni K**. who found in Algeria a strong association of passive smoking with cancer [27]**.**
Elhadri H. explains the mechanism and even distinguishes the corresponding risks [25]: Carcinogenic substances (mainly nicotine) from smoke accumulate in breast adipose tissue. "**Active**" smoking increases the risk of breast cancer by 1.44 to 3.01 times and "**passive**" smoking increases it by an average of 1.90 times compared to women never exposed to tobacco.
In this regard, there was publication in 2017 of a British cohort study of 102,927 women followed 7.7 years (on average) where 1815 breast cancers appeared. She added aggravating circumstances of active smoking [43]:
- The onset of intoxication before 20 years,
- The onset of intoxication at least 5 years before the first full-term pregnancy.
- Smoking after treatment leads to an increase in distant metastases and deaths from breast cancer

- **Alcoholism:** 14 patients, or 28%, were predominant in 64.3% in cancer patients. This result is consistent with the classical theory linking alcoholism with all human cancers, despite its influence varying according to the type of cancer.

According to **Tina Charlotte Kiae**r in WHO/Europe press releases [44]: **"The risk of breast cancer increases with each unit of alcohol consumed per day".** A daily consumption of just 1 bottle of beer (500 ml) or 2 small glasses of wine (100 ml each) is enough to cause 7 to 10% of alcohol-related cancer cases. The literature explains this effect by talking about the increased production of IGFs. They are mitogenic, inhibit apoptosis, and interact with estrogens[25]

- **Indigenous treatment** was taken by 28 (or 56%) patients, cases of advanced breast cancer probably aggravated by this unknown product due to prejudice and ignorance of the diagnosis.

The active ingredient used should not be considered as an inert substance without toxic risk, before its further study to exclude it from the group of risk factors.

- **Exposure to recognized radiation** is noted in 10 (20%) patients, 60% of whom had cancer and were unable to specify the exposure content.

This is one of the most dangerous factors: **Nadia Frikha et al**. show that the risk of developing radiation-induced cancer is approximately ten times higher for breast and thyroid irradiation than for irradiation of the colon and rectum [2]. Same opinion given by **Sancho-Garnier** which compares the risk of radiation with the value of the risks of other etiological factors [34]

- **Physical activities** were performed regularly by 58% of patients at various intensities difficult to quantify. Walking (28%) and farming (22%) took the top positions in terms of frequency. The more the activity is performed, the more it has a protective effect.

According to **Nadia Frikha et al**, physical activity reduces the risk of developing breast cancer by 15 to 20%. Physical activity decreases the risk of death or recurrence of breast cancer [2].
Yili Wu [45] in a metanalysis of 31 studies from 2013 and **Hmwe H Kyu** [46]] in 2016 explained the proponents of the effects of physical activity on reducing cancer risk by emphasizing the intensity of exercise, BMI, histological type and age of genital activity of the woman (menopausal or not).

2.2.3. Mode of discovery and consultation time of mammary tumour pathology.

In this work, the main mode of tumour discovery was self-palpation (84%). But the majority of the medical consultation was too late (86%) within 2 to 3 years after self-discovery.

This observation of respect for the practice of self-palpation was also noted **by Kakanou Y** [30], at 66.8% as the first mode of discovery of the tumor. The majority of consultation time was 0 to 6 months for 50% of patients and rarely greater than 2 years for 6.9% of patients; In short, it is less exaggerated than ours.
Is this positive fact the result of the existence of an improved culture of community awareness on mammary tumor screening by self-examination and the attitude of consulting the gynaecologist and pathologist early?
This consultation deadline has also been reduced elsewhere by awareness-raising strategies: In Mali in 2002, **Soumaila** [21]found 55.4% and in 2007, 71.7% for **DIALLO S**. [47] within ≤ 1 year.

2.2.4. Weight Status

Body mass index was normal in 46% of cases. The 7 cases of cachexia were advanced cancer. But, excess weight was noted at 40% with predominance to benign tumors. **Excess weight** (obesity) is classically known as a protective factor for certain benign tumors (fibroadenomas) and a risk factor for malignant tumours.

In this study, bivariate analysis reported no association of this factor with breast tumors. However, a Moroccan study in 2019 suggests that a risk of breast cancer is positively associated with abdominal adiposity [48]. Notions of periods and other associated factors contribute to these implications of overweight.

In the pre-menopausal period, being overweight tends to reduce the risk of breast cancer. Unlike the post-menopausal period, where its excess increases it with its complications [49]**.**

In a meta-analysis of 25 studies, **Renehan et al.** showed that a 5 kg/m2 increase in body mass index (BMI) led to a 12% increase in breast cancer risk in postmenopausal patients. Other studies have shown an association between obesity and the development of more aggressive or advanced tumors [50]**.**

2.3. HISTO-CLINICAL AND RADIOLOGICAL PARAMETERS

2.3.1. Echo-mammographic classification

The current protocol of radiologists prefers to combine echography with mammography for correctly visualizing these breast lesions [51]**.**

The echo-mammography couple also helped to detect sub-clinical lesions and to categorise them: "Benign", "suspicious" or "malignant" lesions, according to the **BIRADS** classification (**ACR** grades).

In this sample, 20% of patients did not consent to this examination. Among the others, there was a predominance of so-called "probably malignant" tumors, of which 22% were classified **BIRADS IV** and 6% **BIRADS V.**

Kakanou Y. [30] also found high proportions: 45.5% BIRADS IV and 36% BIRADS V.

Keita K. [52]found results dissimilar to ours: 4% ACR IV and 1% ACR V. Is it a coincidence or a positive impact of awareness-raising by government support screening strategies, precocious diagnosis!

2.3.2. Anatomopathologic types

Histology made it possible to distinguish two categories of breast tumours, benign (22 cases or 44%) and malignant (28 cases or 56%) with predominance of malignant tumours.

For benign tumours, fibroadenoma (10 cases or 45.5%) occupied the 1st place, followed by MFK (9 cases or 40.9%). **Modou-Kane & al.** found at Dantec a similar result 86.3% adenofibroma and 5.9% MFK [53].

For malignant tumours, the invasive ductal type SBR III predominated (9 cases or 32.1%). This result of having in 1st place invasive ductal carcinoma was identical for **Mbala** in Kinshasa [20], **Charlotte** in Paris [54], **Kakanou Y** [30] in Bamako, **ELHADRI** [25] in Rabat.

2.3.3. Classification «T N M» of diagnosed mammary cancers

In this study, 28 malignant tumours were diagnosed: none were classified as T0, T1 or T2; only T3 and T4 exist, i.e. all have dimensions greater than or equal to 3 cm in diameter.

For N lymphadenopathies, only five patients had none. The remaining 23 cases had tumours associated with lymphadenopathy: T3N0M0, T3N1M0, T3N2M0. There were also metastases in 8 patients classified as "M1".

Kakanou Y [30] found in Bamako, almost similar results. Only 19.6% of cancers were classified as T0, T1 and T2; class T4d tumour was the most frequent (30.4% of patients). 40.2% of cancers were accompanied by lymphadenopathies and 28.9% were associated with metastasis.

ELHADRI found in Rabat tumours were classified T4 with 80% of cases having lymphadenopathies and 51.43% of metastases [25] .

2.3.4. Staging by Severity: Precocious or Late Diagnosis

Based on the elements of the TNM classification, the combination of these types of cancers has led to their staging in order to highlight the degree of severity and the notion of precocious or late diagnosis.

After grouping, it appears that eighty-five percent of patients with breast cancer were consulted at the advanced stage. **Only 14.3% arranged it prematurely in this multicentric study**.

Kakanou Y [30] made groupings of TNMs that resulted in results almost similar to ours: 87.2% of these patients consulted at an advanced stage (stage III-IV), compared to 13.8% at the early stage.

A meta-analysis on breast cancer presentation in Africa by **Jedy-Agba *et al***. [55] found advanced cases ranging from 30% in South Africa to 98% in Nigeria and the clinical picture also differed in black and non-black women.

According to **Abdulrahman et Rahman** [16] 50 to 75 % of African women have advanced disease, while only 11% of breast cancer patients have advanced disease (stage III or IV) in the United States .

Late onset of the disease is a feature of the breast cancer burden in Africa.This is the major problem of late diagnosis of breast cancers being also at the root of problems of:

(1) treatments: At the advanced stage, very complex therapies are required, special being expensive and rare in these low-income environments;

(2) post-treatment prognosis: This is always reserved because the treatment administered is rarely the one that would be indicated according to the protocols of international oncologic centres.

Thus, before thinking about the contribution of anticancer drugs, old and recent by international and / or national (government) support, the encouragement of primary prevention, developing community awareness strategies would be the best attitude in this context.

2.3.5. Summary of univariate & bivariate analyses

Among the 21 associated factors analysed, twelve yielded statistically significant values (p-value ≤ 0.05).

These are: (1) the patient's age at diagnosis ($p<0.001$),

(2) profession ($p=0.001$),

(3) civil status ($p<0.001$),

(4) the notion of fertility disorders (p<0.001),

(5) gestationity (p=0.001),

(6) parity (p<0.001),

(7) the notion of abortion (p=0.049),

(8) breastfeeding (p=0.002),

(9) menstrual cycle abnormalities (p=0.050),

(10) menopause (p<0.001),

(11) contraceptive hormone therapy (p=0.016),

(12) weight status (p=0.055).

In breast tumour prevention strategies, these factors must be taken into account. To highlight the strength of their association with the explained variables, simple and multiple logistic regression seemed essential to do.

3. SINGLE AND MULTIPLE LOGISTIC REGRESSION ANALYSIS

To eliminate confounders, logistic regression resulted by calculating odds ratios:

A) First, cumulative odds ratio to analyse the association of the risk factor and the variable explained

Seven factors analysed resulted in statistically significant "unadjusted odds ratio and p" values:

1) *the patient's age* at the diagnosis time:

- between 31-45years: **COR 31,5 (3,01-328,92) with p=0,004**,

- between 48-60 years : **COR 60,66 (5,58-659,28) with p=0,001,**

- and for the age >=61years : **COR 70 (3,64-132,66) with p=0,005**;

2) the *profession* multiplies the risk **COR 3,55 (1,07-11,80) avec p=0,038** ;

3) the *civil status* multiplies the risk **COR 13 (2,46-68,60) with p=0,003** ;

4) the *parity* multiplies the risk :

- for the nulliparous : by 1,

- for the primiparous : **COR** 71,5 (5,68-898,64) with **p**=0,001;

- for the pauciparous : **COR** 22(0,93-515,87) with **p**=0,055;

-and multiparous : **COR** 22 (2,27-212,85) with **p**=0,005;

5) *breastfeeding* multiplies the risk **COR** 10,83 (2,04-57,27) with **p**=0,005;

6) *menopause* multiplies the risk **COR** 6,95(1,85-26,09) with **p**=0,004;

7) *hormonotherapy* multiplies the risk **COR** 3,51(0,83-14,88) with **p**=0,055.

B) Then, adjusted odds ratio to analyse the share of each modality of the factor and all the factors associated with the variable explained:

Five of these 7 associated factors resulted in statistically significant "adjusted odds ratio and p" values:

1-The age of the patient exposes the latter increasingly up to multiplying 78 times the risk when the woman reaches beyond 61 years [A0R 78 (3.94-156.42) with p = 0.004]; with an average age of 40.50 (±14.74).

Henaoui L. and **K. Meguenni** [27] did not analyse the variability of the association between breast cancer and age bracket. But they found the median age of 50 and the average age of 51.28 ± 12.16 years that are far higher than ours. Cancer diagnosed at a young age is classically known as an indicator to suggest the genetic factor.

2- Civil status (celibacy influences) multiplies the risk 10 times [A0R10.22 (1.75-59.44) with p=0.010];

Henaoui L. and K. Meguenni found a positive and significant association: Women who were "married or having been married" appeared to be protected against breast cancer compared to single women OR = 0,21[IC 95 % (0,09–0,47)]. They found no association between breast cancer and reproductive factors [27]**.**

3-Parity multiplies 21.99 times the risk [A0R 21.99 (2.27-212.81) with p=0.008];

4- Breastfeeding multiplies 6.16 times the risk in women who do not breastfeed [**A0R 6,16 (1,03-36,88) with p=0,046]**

Henaoui L. and K. Meguenni found no association between breast cancer and reproductive factors [27]**.**

5-The menopause age multiplies 4,01 times the risk **[A0R (1,97-16,50) with p=0,044]**.**Henaoui L.** and **K. Meguenni** also found a positive and significant association between the occurrence of menopause and breast cancer [OR = 2,84 ; IC 95 % (1,11–7,21)] [27].

III. CONCLUSION AND RECOMMENDATIONS

This study entitled **"HISTO-CLINICAL AND ECHO-MAMMOGRAPHICAL PROFILES OF BREAST TUMOURS IN WOMEN IN BUKAVU"** was descriptive for analytical purposes and conducted in a context of low-income country. Being transversal over 12 months (January 1, 2022 to December 31, 2022) and multicentric, this study was carried out by prospective collection in two hospitals, HospitalUniversity Centers (UEA and UCB) of in Bukavu. The latter were chosen according to the criterion of having both a gynaecology department and an anatomopathology service competent to diagnose breast tumours.

This study aims to help to improve the prevention and precocious diagnosis of breast cancer in Bukavu. It answers the question of the existence of peculiarities of mammary tumours diagnosed in Bukavu, especially the most frequent risk factors. In addition, the hypothesis of a significant frequency of cancers among breast tumours was verified. During this period, breast tumours accounted for 43%, or 86 cases out of the 200 gynecological tumor pathologies listed in these two structures. Depending on the pathological type, there were 58 (67.44%) benign tumours and 28 (32.55%) malignancies.

The clinic noted the ineffectiveness of self-examination in this study. There was a paradox between the high percentage of patients who performed self-examination (84%) and that of patients who consulted mostly late (86%). On the other hand, the paraclinic noted a coincidence of radiological diagnosis of poor prognosis and histological diagnosis of poor prognosis, for the majority of advanced breast cancers.

Single and multiple logistic regression analysis was among the statistically significant associated factors: patient's age **{** [A0R 78 (3,94-156,42) with p=0,004]; with average of 40,50 ans (±14,74)**}**, *civil* status or celibacy [A0R 10,22 (1,75-59,44) with p=0,010], *parity* [A0R 21,99 (2,27-212,81) with p=0,008], breastfeeding [A0R 6,16 (1,03-36,88) with p=0,046] and *menopause age* [A0R 4,01 (1,97-16,50) with p=0,044].

The majority of patients with cancer had a late consultation, previous use of indigenous treatments, late positive diagnosis and late treatment, which justified their poor prognosis. If the diagnosis would be early and precise, these tumors would have a favorable prognosis after surgical treatment, easy and available.

Screening poses serious problems due to the lack of organization of effective strategies for the fight against breast cancer in our settings with very limited resources. Poverty prevents early and precise diagnosis as well as access to quality care to expect a better prognosis with ideal follow-up.

This article is an illustration of "patients with malignant tumors, especially at an advanced stage, admitted to hospital after a long journey, by non-professional health care providers, causing late diagnosis:
- either out of ignorance: lack of government policy or institutional community awareness measures for screening for breast cancer and other cancers,

- either by patient vulnerability: lack of financial means,
- or by non-availability of therapies indicated in our settings.

These results argue the reason for initiating future in-depth and large-scale studies to verify the evidence supporting the **"more preventive than curative"** approach in our settings without sufficient means.

Recommendations also follow from these reflections:

(1) Encourage sensitization of the State and/or partners to obtain overall (efficient) support for care, as well as well-trained health providers to make a proper clinical screening examination,

(2) Support good oncology training initiatives to empower gynaecologists in the breast cancer management,

(3) Educate the population to understand the usefulness of breast cancer screening starting with daily self-examination, before considering in-depth screening investigations by echo-mammography or even genetics.

REFERENCES BIBLIOGRAPHIQUES

1. Lansac J, Marret H. Gynécologie pour le praticien. Elsevier Health Sciences; 2018.

2. Frikha N, Chlif M. Un aperçu des facteurs de risque du cancer du sein. Bulletin de l'Académie Nationale de Médecine. Elsevier; 2021;205:519-27.

3. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Erratum: Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. Ca Cancer J Clin. 2020;70:313.

4. Sharma R. Breast cancer burden in Africa: evidence from GLOBOCAN 2018. Journal of Public Health. Oxford University Press; 2021;43:763-71.

5. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: a cancer journal for clinicians. Wiley Online Library; 2021;71:209-49.

6. Bellanger M, Zeinomar N, Tehranifar P, Terry MB. Are global breast cancer incidence and mortality patterns related to country-specific economic development and prevention strategies? Journal of global oncology. American Society of Clinical Oncology; 2018;

7. Dent J, Manner CK, Milner D, Mutebi M, Ng'ang'a A, Olopade OI, et al. Africa's emerging cancer crisis: A call to action. Clin Cancer Genet Glob Heal. 2017;1-8.

8. Dicker D, Nguyen G, Abate D, Abate KH, Abay SM, Abbafati C, et al. Global, regional, and national age-sex-specific mortality and life expectancy, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017. The lancet. Elsevier; 2018;392:1684-735.

9. Murray CJ, Callender CS, Kulikoff XR, Srinivasan V, Abate D, Abate KH, et al. Population and fertility by age and sex for 195 countries and territories, 1950–2017: a systematic analysis for the global burden of disease study 2017. The Lancet. Elsevier; 2018;392:1995-2051.

10. Porter P. "Westernizing" women's risks? Breast cancer in lower-income countries. New England Journal of Medicine. Mass Medical Soc; 2008;358:213-6.

11. Kingham TP, Alatise OI, Vanderpuye V, Casper C, Abantanga FA, Kamara TB, et al. Treatment of cancer in sub-Saharan Africa. The lancet oncology. Elsevier; 2013;14:e158-67.

12. Forouzanfar: Breast and cervical cancer-in 187 countries between 1980 and 2010 Asystematic analysis. Lancet(2011); 378 & 1461-84.Google Scholar [Internet]. [cité 16 avr 2023].

13. Brinton: Recent trends in breast cancer among younger womenin United States. J. Natl Cancer Inst.(2008):100,1643-8- Google Scholar [Internet]. [cité 10 avr 2023].

14. Anders: Breast cancer before age 40 years. Semin Oncol(2009):36; 237-49- Google Scholar [Internet]. [cité 10 avr 2023].

15. Tshimpi A, Ndarabu T. Cancer en République Démocratique du Congo en 2016. Ann Afr Med. Kinshasa (Juin 2016) : 9 (3).

16. Abdulrahman: Epidemiology of breast cancer in Europe and Africa. J Cancer Epidemiol 2012; 915610 - Google Scholar [Internet]. [cité 10 avr 2023].

17. Ngeleza ON et al. Le Profil anatomo-clinique et prise en charge des lésions dysplasiques et du cancer du col utérin au Sud-Kivu (octobre 2012 – janvier 2013) : à propos de 170 cas. Revue Africaine de Médecine et de Santé Publique. 2019;2:80-91.

18. Serigne M,Gueye M.& all Tumeurs bénignes du sein à l'unité de sénologie du Centre Hospitalier Universitaire Aristide Le Dantec de Dakar (Sénégal).Pan African Medical Journal. 2017; 27:251 - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

19. Diarra Y. Corrélation radio clinique et anatomopathologique des nodules du sein [PhD Thesis]. Thèse de médecine, Bamako; 2002.

20. Kingu M, Rahma T, Nlandu M, Bebele K, Kiyabwe S, Ukundji O. Profil épidemio-clinique et moléculaire du cancer du sein dans les Hôpitaux de la ville Kinshasa-RD Congo. Kisangani Medical. 2019;9:326-32.

21. Soumaila Alama Traoré. Profil épidémiologique et clinique des tumeurs du sein chez la femme. A l'hôpital de Sikasso. Thèse de diplôme universitaire en sénologie. A la faculté de médecine - pharmacie et d'odontostomatologie de Bamako MALI 2002.332-Google Scholar [Internet]. [cité 10 avr. 2023].

22. Benbakhta B.& al. Déterminants des délais de consultation, de diagnostic et d'accès au traitement des femmes atteintes du cancer du sein à l'Institut National d'Oncologie de Rabat. 2013. - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

23. Coccia M. Socioeconomic Analysis of Breast Cancer between Countries, 2012-2018 Period. Quaderni IRCrES 2019; 4: 37—46. - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

24. Julie Gentil & al. Influence des facteurs socio-économiques et géographiques sur l'incidence, l'accès aux soins et la survie des femmes atteintes d'un cancer du sein. Human health and pathology. Université de Bourgogne, 2012. French. - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

25. ELHADRI MH. Les tumeurs évoluées du sein à propos de 35 cas. Etude rétrospective et revue de la littérature. Thèse du doctorat en médecine. Univ; 2018;

26. Clavel-Chapelon F, Gerber M. Reproductive factors and breast cancer risk. Do they differ according to age at diagnosis? Breast cancer research and treatment. Springer; 2002;72:107-15.

27. Henaoui L, Meguenni K. Facteurs de risque du cancer du sein-Étude cas-témoins Wilaya de Tlemcen, 2015–2017. Revue d'Épidémiologie et de Santé Publique. Elsevier; 2020;68:S139.

28. Marc ESPIE-EPIDEMIOLOGIE DU CANCER DU SEIN - Recherche Google [Internet]. 2023 [cité 10 avr 2023]. Disponible sur: https://www.google.com/search?hl=fr&q=Marc+ESPIE-EPIDEMIOLOGIE+DU+CANCER+DU+SEIN

29. Mathelin C, Youssef C & all. Paradoxical interactions between pregnancy and breast cancer. Gynecol Obstet Fertil. 2007 May; 35(5):449-56. - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

30. Kakanou Y, Flore F. Cancer du sein chez les femmes de moins de 40 ans au Mali [Internet] [Thesis]. USTTB; 2022 [cité 10 avr 2023]. Disponible sur: https://www.bibliosante.ml /handle /123456789/5485

31. BOUZAKRAOUI HICHAM et al. CANCER DU SEIN ET GROSSESSE. A propos de 10 cas. THESE B007 A la faculté de médecine et de pharmacie -rabat. Université de mohammed V. Année 2012 - Google Scholar [Internet]. [cité 10 avr 2023].

32. Russo J, Mailo D, Hu Y-F, Balogh G, Sheriff F, Russo IH. Breast differentiation and its implication in cancer prevention. Clinical Cancer Research. AACR; 2005;11:931s-6s.

33. Russo J, Moral R, Balogh GA, Mailo D, Russo IH. The protective role of pregnancy in breast cancer. Breast cancer research. BioMed Central; 2005;7:1-12.

34. Sancho-Garnier H, Colonna M. Épidémiologie des cancers du sein. La Presse Médicale. Elsevier; 2019;48:1076-84.

35. Key TJ, Verkasalo PK & all.Epidemiology of breast cancer. The Lancet Oncology 2001;2:133-40. - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

36. NCCN. NCCN clinical practice guidelines in oncology version 3.2019 genetic/ familial high-risk assessment: breast and ovarian. NCCN Clinical Practice Guidelines (2019) - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

37. Herzog J, Chavarri-Guerra Y & all. Genetic epidemiology of BRCA1- and BRCA2-associated cancer across Latin America. npj Breast Cancer (2021) 7:107 - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

38. Thera F.& al. Fréquence des tumeurs mammaires dans l'aire sanitaire de Sebekoro. Thèse (diplôme de sénologie):Faculté de médecine et d'odontostomatologie du CAPA SENO. Année 2021-2022 - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

39. Boivin L, Diguisto C, Chas M, Bédouet L, Etienne C, Arbion F, et al. Indice de masse corporelle et facteurs pronostiques du cancer du sein. Gynécologie Obstétrique Fertilité & Sénologie. 2017;45:215-23.

40. Traore B, Diane S, Sow MS, Keita M, Conde M, Traore FA, et al. HIV infection in patients with breast cancer in Guinea (West Africa). The Pan African medical journal. 2015;21:261-261.

41. Sasco AJ, Jaquet A, Boidin E, Ekouevi DK, Thouillot F, LeMabec T, et al. The challenge of AIDS-related malignancies in sub-Saharan Africa. PLoS One. Public Library of Science San Francisco, USA; 2010;5:e8621.

42. Goedert JJ, Schairer C, McNeel TS, Hessol NA, Rabkin CS, Engels EA. Risk of breast, ovary, and uterine corpus cancers among 85 268 women with AIDS. British journal of cancer. Nature Publishing Group; 2006;95:642-8.

43. Jones ME, Schoemaker MJ, Wright LB, Ashworth A, Swerdlow AJ. Smoking and risk of breast cancer in the Generations Study cohort. Breast Cancer Research. Springer; 2017;19:1-14.

44. Tina Charlotte Kiaer. L'alcool est l'un des principaux facteurs de risque pour le cancer du sein. Communiqué de presse de l'OMS/Europe du 20 octobre 2021. Lu 708 mots ce 25 février 2023 à 23h00. - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

45. Wu Y, Zhang D, Kang S. Physical activity and risk of breast cancer: a meta-analysis of prospective studies. Breast cancer research and treatment. Springer; 2013;137:869-82.

46. Kyu HH, Bachman VF, Alexander LT, Mumford JE, Afshin A, Estep K, et al. Physical activity and risk of breast cancer, colon cancer, diabetes, ischemic heart disease, and ischemic stroke events: systematic review and dose-response meta-analysis for the Global Burden of Disease Study 2013. bmj. British Medical Journal Publishing Group; 2016;354.

47. DIALLO S. Etude épidémiologique, clinique et histopathologique des cancers du sein diagnostiqué dans les hôpitaux de Bamako ; Thèse Méd. Bamako 2007 - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

48. Khalis M, Dossus L, Rinaldi S, Biessy C, Chajès V, Moskal A, et al. Facteurs anthropométriques et risque de cancer du sein chez les femmes Marocaines: étude cas-témoins dans la région de Fès, Maroc. Revue d'Épidémiologie et de Santé Publique 2019;67:S165 - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

49. Rose DP, Vona-Davis L. Interaction between menopausal status and obesity affecting breast cancer risk. Maturitas 2010;66(1):33–8 - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

50. Renehan AG, Tyson M, Egger M, Heller RF, Zwahlen M. Body-mass index and incidence of cancer: a systematic review and meta-analysis of prospective observational studies. Lancet 2008;371(9612):569–78 - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

51. Ilias Guindo. Apport du couple echographie-mammographie dans le diagnostic des pathologies mammaires au centre d'imagerie diagnostique (cid) « teriya » de bamako. Thèse (Diplôme en sénologie) : Faculté de médecine et d'odonto-stomatologie-Bamako. Soutenu publiquement le 11/03/2022. - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

52. KEITA K. Dépistage des cancers du sein dans le district sanitaire de Sikasso. Mémoire du diplôme en sénologie: Faculté de Médecine et d'Odontostomatologie. Année : 2020-2021. - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

53. Modou KGS, Mamour G, Coulibaly MT, Diana M, Moreau JC. Tumeurs bénignes du sein à l'unité de sénologie du Centre Hospitalier Universitaire Aristide Le Dantec de Dakar (Sénégal). The Pan African Medical Journal. African Field Epidemiology Network; 2017;27.

54. Charlotte Trojani. Le cancer du sein pendant la grossesse : conséquences maternelles, obstétricales, fœtales et néonatales de la prise en charge. Gynécologie et obstétrique. Thèse : Faculté de médecine à l'Université de Paris Descartes. Année 2013. - Recherche Google [Internet]. 2023 [cité 10 avr 2023].

55. Jedy-Agba E & al. Stade au diagnostic du cancer du sein en Afrique subsaharienne: revue systématique et méta-analyse. Lancet Glob Santé 2016;4:e923–35. - Recherche Google [Internet]. [cité 10 avr 2023].

56. Sariego: Sariego: Patterns of breast cancer presentation in the United States does geography matter 2009 Am Surg 75; 545-50- Google Scholar [Internet]. [cité 16 avr 2023]. p