(RESEARCH ARTICLE)

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Breast cancer and prevention perspectives: A public health challenge, Buea regional hospital, Cameroon

Andrew Tassang [1] *, R. Michael Brady [2], Celestina Neh Fru [3], Tosin Yinka [4], Tassang Thierry [5], Ibrahim H. Musa [6], Angwi Enow Tassang [7], Frederick Nchang Cho [8], Folefack Laura [9], Ewane Theophile Pale [9], Ngum Fru Paulette [3] and Lukman O. Afolabi [10]

[1] Faculty of Health Sciences, University of Buea, Cameroon.

[2] Creighton University School of Medicine-Phoenix Arizona, USA.

[3] Faculty of Social and Management Sciences, Department of Sociology and Anthropology, University of Buea, Cameroon.

[4] Department of sociology, School of Public Administration, Hohai University, Nanjing, China.

[5] St. Thierry Higher Institute of Health Sciences and Technology, Bamenda, Cameroon.

[6] Department of Software Engineering, School of Computer Science and Engineering, Southeast University, Nanjing, China.

[7] Hohai University, Department of Sociology, School of Public Administration, Nanjing, Jiangsu, China.

[8] Global Health Systems Solutions, Cameroon.

[9] Buea Regional Hospital, Annex, Cameroon.

[10] Guangdong Immune Cell Therapy Engineering and Technology Research Center, Center for Protein and Cell-Based Drugs, Institute of Biomedicine and Biotechnology, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China.

Abstract

With 2.100.000 cases annually, breast cancer (BC) is the most common gynecological cancer globally; 627.000 of those cases result in death yearly. In the next 20 years, it is anticipated that there will be 14.000.000 cases annually and 8.200.000 fatalities. There are numerous histological subtypes of BC. The various cancers include invasive ductal carcinoma, papilloma, medullary carcinoma, phyllode tumors, ductal carcinoma in situ, lobular carcinoma in situ, and Paget disease. BC is a huge public health concern because of the steadily rising cases in our low-resource environments, thus raising the stakes to develop effective screening and early detection programs to reduce morbidity and mortality.

Breast ultrasonography and clinical examination appear to hold promise for screening campaigns.

Methodology: On the one hand, a descriptive retrospective analysis was conducted based on the pathology laboratory registry of the regional hospital in Buea, Cameroon. The time frame was from March 4, 2016, through May 25, 2019. On the other hand, we appreciate the rising number of women who attended BC screening programs from 2020 to 2022. BC was screened via clinical breast examination and breast ultrasonography before biopsy for confirmation.

Results: In terms of frequency, the following precancerous lesions and cancers were recorded: invasive breast carcinoma, carcinoma in situ, papilloma, inflammatory carcinoma, phyllode tumours, and angiosarcoma. Their respective percentages were; 74.84, 14, 47, 6.92, 1.89, 1.57, and 0.32. The number of women who came for BC screening increased steadily from 123 in 2020 to 266 in 2021 and 552 in 2022. All with positive biopsy results first underwent a clinical examination. In the presence of any suspicious signs, an ultrasound investigation was ordered. A biopsy was requested in case of any image suspicious of BC.

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* Corresponding author: Andrew Tassang

Faculty of Health Sciences, University of Buea, Cameroon.

Response to the cancer screening campaigns in Buea has increased markedly since the project's initiation. **Conclusion**: Breast cancer is a heterogeneous malignancy made of various histological types. Our study identified the following pathologies in order of frequency: invasive breast carcinoma, ductal carcinoma in situ, papilloma, inflammatory carcinoma, phyllode tumours, and angiosarcoma. As awareness grows as years go by, there is a huge public health challenge. For mass screening, Clinical examination of the breasts and breast ultrasound seems to be the way forward in prevention, as recommended by many clinical trials and WHO. Objectives: The study aimed to determine the frequency of various types of breast cancer and find a good grassroots approach to BC screening in low-resource settings like ours.

Keywords: Breast cancer; Histological subtypes; Screening campaign; Low resource setting; Public Health Challenge

1. Introduction

With around 2.1 million incidences and more than 627. 000 fatalities globally, breast cancer (BC) is women's most common gynecological cancer. By the time they are 80 years old, 1 in 8 women will have BC [1, 2, 3, 4, 5, 6, 7]. According to the 2012 World Cancer Report, there will be an enormous rise in cancer diagnoses over the next 20 years, with 14 million new cases and 8.2 million related deaths. The majority of cases will be in middle- and low-income countries [8]. The breast is a modified sebaceous gland between the second and sixth intercostal spaces on the anterior side of the chest. The glandular and stromal tissues make up both types of tissues in the breast. The latter comprises blood arteries, lymphatics, connective tissue, and fat [9, 10]. The glandular tissue includes secreting acini organized into numerous lobules or glands that open into collecting milk ducts. It has a tree-like shape. The breast has 12 to 20 lobules, each empty into a collecting duct. These ducts then combine to form bigger ones, which empty into the nipple [11].

Breast fibrocystic disease, or adenofibroma, is one example of a benign breast lesion that can evolve into breast cancer [12, 13, 14, 15, 16, 17]. The growth in BC cases is threatening our feeble healthcare system. The breast clinical examination and ultrasound investigations are the tools at our disposal to address this significant public health issue.

1.1. Risk factors

The risk of BC is multifaceted and diverse. Age is any circumstance that subjects breast tissues to extended unopposed estrogen exposure, including early menarche, late menopause, estrogen-based contraception, late first pregnancy (>30 years and above), no full-term pregnancy, and lack of breastfeeding. Personal history of breast, endometrial, ovarian, and colon cancer; first-degree relatives with breast cancer, typically at a young age. Genetic mutation of two breast cancer genes (BRCA 1 and BRCA 2) and other genes. Other risk factors are; high socioeconomic level (western hemisphere), alcohol consumption (dose-dependent), obesity, high dietary fat consumption, radiation exposure, and hormone replacement therapy [18, 19, 20, 21, 22]. Breast cancer is a heterogenous illness that can present itself in various ways, both histologically and clinically [11, 23].

2. Types of Breast Cancers

2.1. Ductal carcinoma in situ

The most prevalent noninvasive form of breast cancer is ductal carcinoma in situ (DCIS). DCIS is characterized by the growth of malignant cells within the ductal system without rupturing the basal membrane. Therefore, there is no stromal invasion, and the malignant cells are confined to the milk duct [24]. This is a mildly treatable early stage of cancer. If unattended, it may invade neighboring tissues and become invasive.

2.2. Invasive ductal carcinoma

When malignant cells from the ductal epithelium breach the ductal basal barrier and enter nearby tissues and other areas of the body, the condition is known as invasive ductal carcinoma or infiltrating carcinoma [24, 25, 26].

2.3. Lobular carcinoma in situ

Lobular carcinoma in situ (LCIS) describes the growth of abnormal cells within the lobules. This cancer is entirely curable and rarely spreads to the tissues around it.

80% of breast cancers are invasive ductal carcinoma and in situ ductal carcinoma [24, 25, 26].

2.4. Invasive lobular carcinoma

When cancerous cells penetrate the stroma and the basement line of the lobules' epithelium, invasive lobular carcinoma results. 5–10% of breast cancers are caused by this malignancy [25, 26, 27].

2.5. Inflammatory breast cancer

Breast cancer with inflammation is a subtype of invasive ductal carcinoma. This form of cancer exhibits all the signs of inflammation, giving the breast a swollen, erythematous appearance. It has an impact on the lymphatic vessels in the breast as well as the skin's blood supply. It might be found in lobules and ducts. In general, it doesn't create any recognizable masses.

This malignancy is quite aggressive and seems to be progressing quickly. About 1–5% of breast cancers are caused by it. These malignancies are more prevalent at a younger age and are more likely to have spread when they are discovered. Their chance of survival is lower than breast tumors without inflammation [28, 29].

2.6. Metastatic carcinoma

Breast cancer at stage 4 is described as metastatic carcinoma. This happens when metastatic cells from the initial breast tumor invade distant tissues. The lungs, liver, bones, and brain are the remote organs affected. [30]

2.7. Medullary carcinoma

Medullary carcinoma is an uncommon subtype of breast cancer that accounts for 3-5% of all cases. It is a well-circumscribed soft meaty tumor. Less than 5% of breast infiltrating cancers are these. It has a better prognosis than DCIS. It typically exhibits no lump and can be found on a mammogram [31, 32].

2.8. Paget disease of the breast

Paget disease of the breast is rare cancer that causes eczematous and scaly skin, areolar, and nipple changes. Typically, there is another cancer below it (DCIS). It accounts for 1-4 percent of breast cancer cases [33, 34, 35, 36, 37]. It is typical among postmenopausal females in their fifth decade and later. Adolescents have been the target of some cases [38].

2.9. Angiosarcomas

Breast angiosarcomas make up just 1 to 2% of all breast malignancies. It forms in the lymphatic system's or blood vessels' epithelium. Usually, it happens between the third and fourth decades of life. It multiplies and is frequently not detected until it has migrated to other bodily organs [39, 40, 41, 42].

2.10. Phyllode tumors

These sarcoma-like tumors grow in the breast's connective tissues. 25% of phyllodes are aggressive and malignant. Although they can affect people of all ages, they typically afflict women in their fourth decade [43, 44, 45]. There are more glandular and stromal structures in the upper external quadrant of the breast than throughout the rest of the tissue. This explains why 50% of all breast cancers are found in this area. Progesterone and estrogen exposure can cause breast cancer. The glandular tissue atrophies, the stroma eventually gives way to fatty tissue, and the breasts become loose with age [46, 47, 48].

2.11. Papilloma

In the milk ducts around the nipple, the papilloma of the breast is an intraductal crest-like growth. 20% of individuals have atypical cells, and 17–20% of cases may be cancerous. Women in the third to fifth decades are the most affected. One of the risk factors for malignant transformation is atypical hyperplasia. A tiny, benign tumor called an intraductal papilloma develops in the breast's milk duct. These tumors are composed of blood veins, fibrous tissue, and glands. Women between the ages of 35 and 55 are more likely to experience them. A risk factor for intraductal papilloma is unknown. There is proof that the Human Papillomavirus (HPV) has a significant role in developing invasive breast cancer [49, 50, 51,52]. There may be a relationship between HPV and BC, as some authors have found the HPV genome in 48.6% of instances of advanced breast cancer [53, 54, 55].

Objectives

This study seeks to analyze the various forms of breast cancer and determine the frequency of occurrence at the pathology laboratory at Buea Regional Hospital from March 4, 2016, through May 25, 2019, on the one hand. On the other hand, find a good grassroots approach to BC screening in low-resource settings like ours

3. The public health challenges

3.1. Clinical examination and ultrasound

While appreciating the rising number in each screening campaign, we are faced with the challenge of how to cope with this more significant trend at each screening BC campaign. Each participant in this study had their breasts clinically examined. If any of the following clinical signs: breast lumps, skin changes, or nipple bloody discharge were discovered on the breast, or skin that is dimpling, erythematous, heated, with nipple retractions or inversions, tissue edema, a peau d'orange appearance, eczematous or ulcerated appearance. They all received an ultrasound referral. A biopsy was asked for in case the ultrasound had suspicious images for BC.

Suspicious lesions may present themselves at ultrasound as hypoechoic lesions with ill-defined borders. They could be nodular, taller than wider; the margins could be speculated with posterior acoustic shadowing, and microcalcifications may present [56].

We are recomforted by the rising number of women who present themselves for BC screening. This number has steadily risen from 123 in 2020 to 266 in 2021 and 552 in 2022. Possible explanations for this increase in number could be some of the reasons evocated by previous studies [57]. The population of Cameroon is young. Buea, an urban area, is the siege of many tertiary institutions. Awareness increases with the level of education. The youths are more inclined to social media, so they are well informed on health issues and advertisements related to screening campaigns. There is peer pressure and its fallouts in this group of persons, urging people to come for screening campaigns [57]. The more people come for screening, the more significant number of persons that could be screened and reduce the incidence of BC in our local community. We are recomforted in this direction by the following trials.

3.2. Clinical trials

3.2.1. The Indian clinical trial

In the Indian study, 275 clusters of 115,652 women between the ages of 30-69 were evaluated solely through clinical breast examination. Clusters of women who completed clinical examinations were matched against controls in this randomized trial. The outcomes were excellent: There were more cancer diagnoses between the studied group and the control (80 vs. 63) [58]

3.2.2. The Chinese clinical trial

The Chinese clinical trial ACRIN 6666 found that cancer detection using mammography and ultrasound was comparable. But more critically, biopsy and recall rates were higher with ultrasound. This suggests the importance of ultrasound in the early detection of BC. Furthermore, clinical breast examination in conjunction with ultrasound greatly improves BC detection [56].

3.3. The stance of the WHO

In women aged 50 to 69, WHO says:

"Early diagnosis of breast cancer through universal access of women with symptomatic lesions to prompt and effective diagnosis and treatment should be high on the public health agenda in settings with limited resources and underdeveloped health systems, where the majority of women with breast cancer are diagnosed in late stages, and mammography screening is not cost-effective and feasible. The low-cost screening method of clinical breast examination appears to be a promising one in these circumstances."

4. Material and methods

4.1. Population, Study Design, and Data Collection

In order to determine the types and prevalence of breast cancers in the Buea Regional Hospital in the South West area of Cameroon (Buea ,Fako), a hospital-based retrospective analysis was carried out. The records from the histology division of the regional hospital in Buea were the source of the data for this descriptive study, which was conducted over three years, from March 4, 2016, through May 25, 2019. We also appreciated the rise in the number of women coming for BC screening for the last three campaigns (2020 to 2022)

4.2. Ethical, consideration

The ethics board approved every method and protocol for this study of the University of Buea's Faculty of Health Sciences.

The Buea Regional Hospital's director gave his approval for the study. The methodology and analysis of the study's data correctly followed the guidelines laid out in the Helsinki Declaration on the proper conduct of human research.

4.3. Data Analysis

An analysis of simple descriptive statistics showed the distribution of the reported breast cancer types. The prevalence and frequency percentages of cancer among hospital patients who had been registered were appropriately presented in tables, charts, and graphs using the demographic variable "age." The increasing number was shown on a chart.

4.4. Clinical examination and ultrasound

Each studied participant had their breasts clinically palpated. Women who had one or more of the following; Breast lumps, skin changes, nipple bloody discharge, Skin dimpling, erythema, heat, retractions or inversions of the nipples, tissue edema, a peau d'orange appearance, eczematous appearance or ulceration, were referred for an ultrasound. If the ultrasound imaging suggested BC, a biopsy was requested to confirm the diagnosis.

At the ultrasound, suspicious lesions may appear as hypoechoic lesions with ill-defined borders. There may be microcalcifications present, they may be nodular, taller than wider, and there may be posterior acoustic shadowing at the edges.

5. Results

All 318 cancer instances mentioned in this paper received clinical examinations, ultrasounds, and biopsies for confirmation.

The prevalence of various forms of breast cancer reported at the hospital between March 4, 2016, through May 25, 2019, were depicted in Table 1 and Figure 2. According to the distribution of the reported breast cancer cases found in the data, most patients were invasive ductal carcinomas (74.84%) and carcinomas in situ (14.47%).

Table 1 Distribution of the types of reported Breast Cancer cases N=318

Types	frequency	%
Carcinoma Insitu	46	14.47
Invasive Ductal Carcinoma	238	74.84
Angiosarcoma	1	0.32
Phyllode	5	1.57
Papilloma	22	6.92
Inflammatory carcinoma	6	1.89

Figure 1 shows the distribution of the different types of breast cancer cases recorded between March 4, 2016, through May 25, 2019.
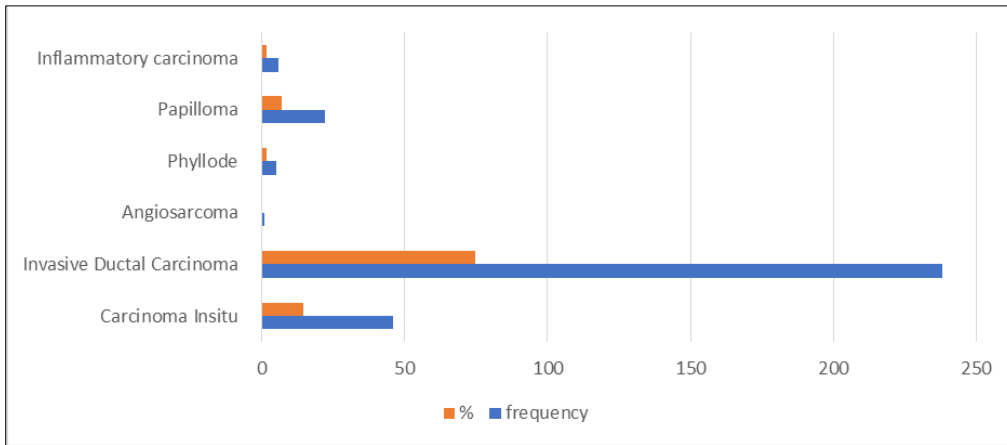
Figure 1 Types of breast cancer and frequencies

Figure 2: The most susceptible age group for invasive ductal carcinoma is shown in Figure 2 by the age prevalence. Ages 41 to 50 make up the majority of cases of invasive ductal carcinoma, accounting for about 38% of all cases.

In a similar vein, 21% of the hospital patients tested within three years were aged 51 to 60. About 20% of instances of invasive ductal carcinoma were thought to occur in people between the ages of 31 and 40.
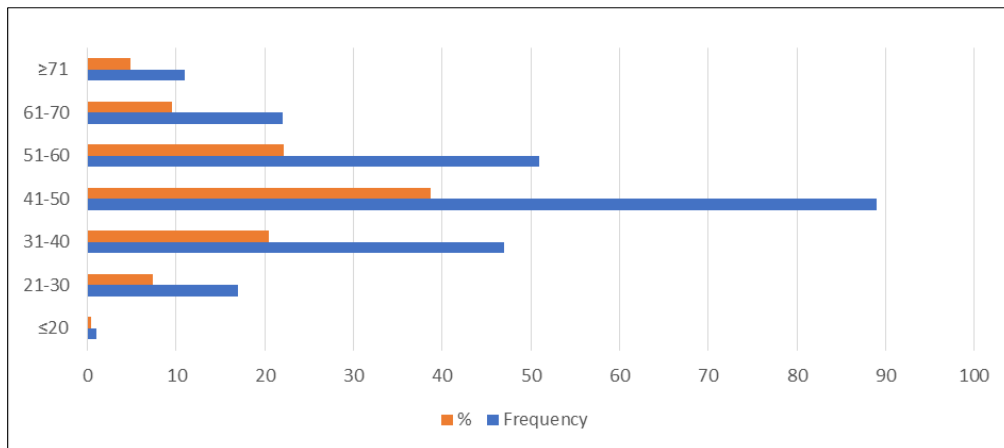

Figure 2 Frequency and age distribution of Invasive ductal carcinoma

Figure 2 shows the age distribution of invasive ductal carcinoma cases reported from March 4, 2016, through May 25, 2019.

Figure 3 demonstrates the lack of any reports of in-situ carcinoma in people aged 20 and under. However, the bulk of the 46 instances of Carcinoma in Insitu recorded was between the ages of 31 and 50 (30.43%) and 41 and 50 (28.26%). Age groups 21 to 30 had a comparatively high report of breast cancer (13%).
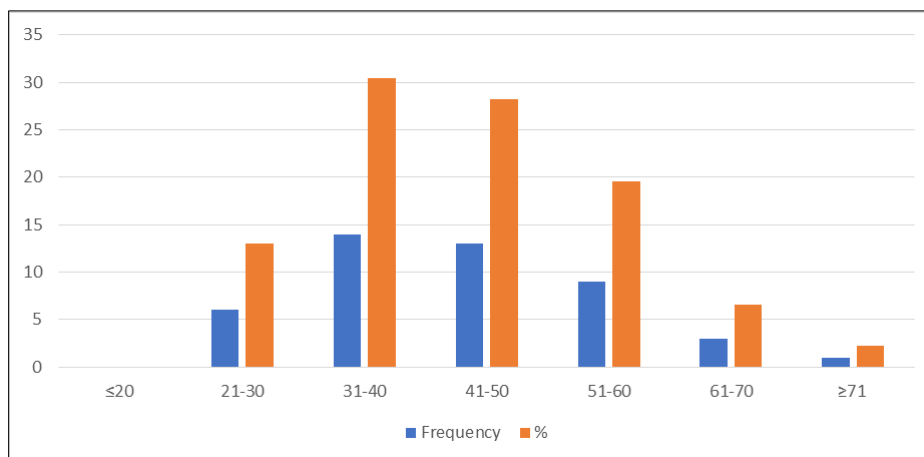
Figure 3 Age distribution of invasive carcinoma Between March 4, 2016- May 25, 2019

5.1. Other reported breast Cancer

Other frequent breast cancer types included angiosarcoma, phylloid, papilloma, and inflammatory carcinoma, according to Table 2. In those aged 20 to 60, papilloma is present. However, it is more common in people aged 31 to 40.

Table 2 Distribution of other types of cases of Breast Cancer reported between the March 4 4 May 25, 2019

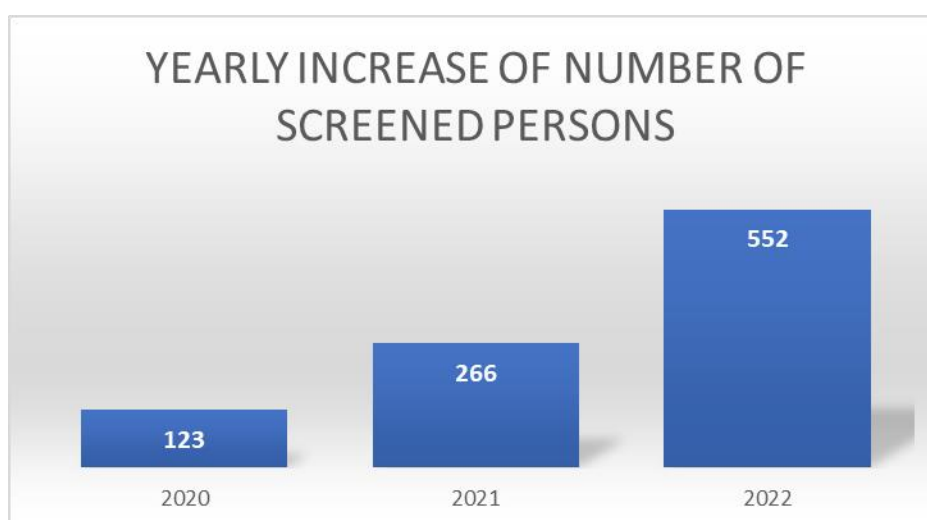| Age	angiosarcoma	phyllode	papilloma	Inflammatory carcinoma
≤ 20	0	4	2	0
21-30	0	1	5	0
31-40	0	0	9	0
41-50	0	0	2	2
51-60	1	0	4	0
61-70	0	0	0	0
≥ 71	0	0	0	4

Figure 4 Yearly increase in the number of screened persons

6. Discussion

With a proportion of 74.84%, invasive ductal carcinoma of the breast is the most common type of breast cancer in this study. These results concur with the findings of other investigations [24, 25, 26]. At the in-situ CA stage, one would have anticipated that they would have received a diagnosis much earlier. One of the following could offer a possible explanation. Ductal carcinoma in situ can present clinically poorly, ranging from lack of symptoms to non-alarming watery/bloody expectoration from the nipples.

Other significant obstacles in the fight against cancer are the low economic status of our nations and the lack of knowledge and awareness regarding cancer prevention and treatment [57,60]. Invasive ductal carcinoma incidence peaks between the ages of 41 and 50, then 51 to 60, with rates of 38, 26%, and 21, 3%, respectively, for a total of 59, 56%. These results do not significantly differ from other writers [3, 4].

In our research, carcinoma in situ has the second-highest frequency of all cancer types. It is the most prevalent noninvasive breast cancer [24]. Unfortunately, there is a lack of awareness and expertise among the general public, oncology-trained medical staff, and mammography detection [57]. It accounts for 14.46% of the sample. Its peak age range is between 31 and 49, which is earlier than for invasive carcinoma.

About 6.92% of the cases observed in this retrospective investigation are papillomas. The uniqueness of papilloma tumors is that 20% of patients have atypical cells, and 20% of tumors are malignant [50, 51, 52]. These abnormal cells may become cancerous tumors when exposed to an oncogenic agent such as the human papillomavirus [53, 54, 55, 56]. According to the literature, papilloma tumors typically affect people between the ages of 35 and 55 [49, 50, 51, 52]. Nine of the 22 cases in our study happened between the ages of 31 and 40, five occurred between the ages of 21 and 30, and four occurred between the ages of 51 and 60, providing respective ages of 40, 9%, 22.7%, and 18, 2%.

In our analysis, inflammatory carcinoma ranks fourth in frequency with 1.9%. It is a malignancy that is fulminant in evolution and exceedingly aggressive. The breast exhibits all signs of inflammation but lacks a solid tumor. The skin's blood vessels and the breast's lymphatic tissues are impacted. The literature, which places it between 1 to 5% [28, 29], is consistent with our results. Findings, however, don't match up with what the literature often says about malignancy developing at a younger age [28, 29]. Two of the six cases detailed in our study occurred in patients between the ages of 41 and 50, and four occurred in individuals around 71.

Phyllode tumors are aggressive, large-volume growths that typically originate from connective tissue. Most affected women are in their fourth decade [43, 44, 45]. In our analysis, this particular breast cancer subtype is the fifth most common. Contrary to what is typically described in the literature, four of the five cases reported in this study were diagnosed when the patient was under 20 years old. One was diagnosed when the patient was between 21 and 30 years old.

According to our categorization, the final form of cancer identified in this investigation is angiosarcoma. It grows from the blood and lymphatic tissues' epithelium. Women in their 30s and 40s are affected. When it has spread to other bodily areas, it is typically only discovered until it is too late [39, 40,41,42]. The lone case in this study occurred between 51 and 60 years.

Each year's BC screening program has seen a rise in women participating. This increase in the number of persons coming for screening is mainly attributed to tertiary education, social media, urbanization, and an acceptable social status [57]. Due to a lack of human and financial resources, our feeble health system cannot handle this issue. The WHO recommendation and the clinical trials described in this article promote clinical breast examination and ultrasound investigation as the only options available for us [56,58,59]

7. Conclusion

A variety of disorders make up the heterogeneous malignancy known as breast cancer. Each of these is unique in terms of the age at which it occurs, the tissue damage, and the level of aggression. In our study, the most frequent type of cancer was ductal invasive breast cancer (74.84%), followed by ductal carcinoma in situ (14.47%), papilloma (6.92%), inflammatory carcinoma (1.89%), phyllodes tumors (1.57%), and angiosarcoma (0.32%). The increasing number of women to be screened brings a huge public health challenge. In pattern with the Indian and Chinese clinical trials and the WHO recommendation, clinical breast examination, and ultrasound, which are available and affordable, seem to be the cornerstone for reducing morbidity and mortality of BC in our community.

Compliance with ethical standard

Disclosure of conflict of interest

We declare that we have no conflict of interest as far as this study is concerned.

Statement of ethical approval

Ethical clearance and approval were obtained from the Institutional Review Board of the University of Buea, as well as the director of the Buea regional hospital.

Statement of informed consent

All participants provided written informed consent before enrolment into this study.

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