



# Breast Cancer: A Review of Mammography and Clinical Breast Examination for Early Detection of Cancer

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**How to cite this paper:** Balali, G.I., Yar, D.D., Dela, V.G.A., Effah-Yeboah, E., Asumang, P., Akoto, J.D. and Abdallah, F. (2020) Breast Cancer: A Review of Mammography and Clinical Breast Examination for Early Detection of Cancer. *Open Access Library Journal*, 7: e6866.

<https://doi.org/10.4236/oalib.1106866>

**Received:** September 27, 2020

**Accepted:** October 20, 2020

**Published:** October 23, 2020

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## Abstract

Worldwide, breast cancer is one of the most common causes of death among women. Undoubtedly, early detection of breast cancer is one of the best ways to manage and treat the disease. According to literature, Mammography and Clinical breast exams are known to be some of the best methods in early detection of breast cancer. Hence information on these two detection methods is very important for planning health policies. This study therefore aimed at reviewing the literature on breast cancer as well as examining the literature on two breast cancer detection methods and their effectiveness. Statistics show that early detection is a primary necessity in the treatment of breast cancer among women. It was also found out that mammography as being the most recommended form of detection, is mostly not available at remote areas in developing countries leading to the increased risk of deaths and hence the greater mortality in these areas. Inexperience and lack of professional know-how have been found to also contribute to the upsurge of cases at developing regions. The review recommends that stakeholders and governmental bodies should help equip such areas with mammography equipment, professional knowledge on its usage. The study also, recommends that further studies be conducted to find out the relationship between various screening methods and age groups to clarify the issue of false positives and false negatives. Also, studies should be conducted on the knowledge and usage of mammographic screening in rural areas of developing countries.

## Subject Areas

Oncology

## Keywords

Breast Cancer, Risk, Cancer Screening, Mammography, CBE, Detection and Treatment

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## 1. Introduction

Women's health is a sine qua non for successful reproduction in the human race whilst breast cancer is a threat to their survival across the globe [1]. It is estimated that about 508,000 women die annually from breast cancer [2]. However, in 2018, breast cancer deaths stood at 627,000 representing nearly 15% of all recorded cancer deaths among women worldwide [3]. This is an indication of an upsurge of breast cancer deaths (approximately 119,000) from 2017. There are reported high risks of breast cancer in developed countries although these risks have now become common throughout the world.

Although recorded cases of breast cancer show that developed countries suffer more from the disease, in 2011 50% of breast cancer death cases were from 58% of developing countries. In the United States, for instance, approximately 230,480 females were diagnosed with breast cancer and resultant death cases in the same year (2011) were around 39,520 [4]. This is a great detriment to the health of women across the globe hence the need for investigations to combat the situation. It is often said that early detection of breast cancer aids tremendously in its treatment [5] [6]. Consequently, the aftermath of the treatment of breast cancer depends on timing detection [7].

The higher variation of breast cancer survival between developed and developing countries even worsens the situation. Studies show that about 80% survival rate is high in North America, Japan, and Sweden; however, the survival rate in low income and developing countries is about 40% [8] [9]. This phenomenon is a result of the lack of good health promotion leading to a lack of awareness, early detection programs, scarcity of adequate diagnosis and inadequate treatment facilities [10]. This has increased the numbers of women reaching late-stage of the disease leading to higher complications. Therefore there is the need for frequent updates on studies that focus on breast cancer awareness and screening methods, specifically mammography and clinical breast examination.

## 2. Review of Literature

This study employed Boolean Operators to search for published relevant literature on mammography, mammogram and clinical breast exam, breast cancer, clinical screening, diagnosis of breast cancer, and other information that have born with the topic. Academic search sites used for the study included PubMed,

Scholar Google, and Web of Science and other sites includes WHO, International Agency for Research on Cancer, CDC and institutional repositories. The search style and terms such as “AND”, “OR” and “NOT” “breast cancer”, “women AND cancer NOT cervical” “mammogram”, “clinical breast exam” “mammogram AND clinical breast exam” “mammogram OR clinical breast exam” were used respectively.

Inclusion criteria are that studies conducted on efficiency and effectiveness of Mammography and clinical breast examination were included. Exclusion criteria involve studies that are conducted on merely other forms of breast cancers examination, screening, population etc.

### 2.1. Literature Search Results

Following the specific methodology designed for this current study, the paper discovered two papers on clinical practice guidelines and two review papers on mammography and clinical breast screening. The paper also identified and included 43 studies based on the inclusion and purpose of the study. Below is a summary of the literature search results in **Table 1**.

### 2.2. Global Distributions of Breast Cancer

GLOBOCAN estimates that the incidence rates of breast cancer in women are 43.1 per 100,000 [18]. As of 2018, two million new cases have been reported by the global cancer observatory. A trend observed was that the highest reported cases of breast cancer were concentrated in developed countries with most of the countries in Europe. In contrast, the lowest recorded cases were found in developing countries in Africa and parts of Asia. The highest recorded incidence rate was found in Belgium (113.2) while the lowest incidence was recorded in Bhutan (5.0). Apart from Belgium, the countries with the highest rates include Luxembourg (109.3), the Netherlands (105.9), France (99.1), New Caledonia (98.0) and Lebanon (97.6). Based on WHO regions, the WHO Europe region (69.5) has the highest incident rate followed by the WHO Americas region (66.5) while the lowest incidence rates are recorded in WHO south-east Asia region (27.5). Based on continents, the Oceania continent recorded the highest incidence of 86.7% while the lowest was recorded in Asia (34.4%) [19]. The graphs below indicate the distributions of the recorded incidence rates (**Figure 1**, **Figure 2** and **Figure 3**).

### 2.3. Global Mortality Rates

According to WHO, in 2018, it was estimated that globally about 627,000 women died from breast cancer. An observable trend was that most of the deaths were recorded in developing countries as compared to developed, although this trend is subject to change due to increasing rates in almost every region every year. The global cancer observatory recorded that the country with the highest mortality rate per 100,000 as in 2018 was Fiji (36.9), followed by Barbados (33.1),

**Table 1.** Literature search results.

Authors/ Cancer Organization	Objective	Type of screening	Type of studies	Age group	Findings	Database
[11]	Recommendation statement on screening for breast cancer in the general population.	Mammography	Review	40 - 49	The decision to start biennial screening mammography should be left to the individual before age 50	PubMed
[12]	Review of the evidence of 2003, ASC.	Mammography	Review	All ages	Mammography is good yet faced with some false-positives at early ages	Scholar Google website
[13]	To detect breast cancer rate, nodal status, tumour size, and associated risk factors using clinical breast examination (CBE) and mammography as screening tools in women aged 40 - 49 years.	Clinical Best Examination and Mammography	Research article	40 - 49 years	CBE normalized at 90% and Mammography BI-RADS I (58.4%) and BI-RADS II (34.6%) and only 7% for BI-RADS II and none for BI-RADS IV group	PMS
[14]	Differentiating imaging modalities used for screening women at high-risk for breast cancer over the age of 50.	Mammography and magnetic resonance imaging (MRI)	Research article	50	Mammography is the only imaging modality proven to reduce mortality from breast cancer, MRI can often identify smaller malignancies at a greater resolution at an earlier stage.	Scholar Google
[13]	To detect breast cancer rate, nodal status, tumour size, and associated risk factors using (CBE) and mammography as screening tools in women aged 40 - 49 years.	Mammography and CBE	Research article	40 - 49 years	CBE normalized at 90% and Mammography BI-RADS I (58.4%) and BI-RADS II (34.6%) and only 7% for BI-RADS II and none for BI-RADS IV	Scholar Google
[15]	Analysis of new screening methods.	Mammography	Review	40 - 74	Breast cancer mortality is reduced by 40% with false negatives (15% - 20% and positives (10%) of screened women, 80% of which are resolved with additional imaging, and 10%, with a breast biopsy	Scholar Google
[16]	Latest guidelines for mammography and technologic advances.	Mammography	Guidelines data	Ages 40 to 44, 45 to 54, and 55 and older	40 - 44 should have the choice of mammography stating, 45 - 54 should do mammography every year and 55 and above should do mammograms every 2 years and finally, all women should continue, as long as they are expected to live 10 years or more	
[17]	Update of the 2002 U.S. Preventive Services Task Force (USPSTF) recommendation statement on screening for breast cancer in the general population.	Film mammography, clinical breast examination, breast self-examination, digital mammography, and magnetic resonance imaging	Clinical practice guidelines	General population		

Somalia (29.1), Syrian Arab Republic (26.9) while the lowest mortality rate was recorded in Mongolia (4.0) and the Republic of Gambia (4.0) respectively. Based on the WHO regions, the WHO East Mediterranean region recorded the highest mortality rate of 18.1 per 100,000 followed by the WHO Africa region (16.4) while the WHO western pacific region recorded the lowest mortality rate of 9.2. Based on continents, in 2018 Africa recorded the highest mortality rate of 17.2 per 100,000 while the lowest was recorded by Asia (11.3). The graphs below show the pictorial representation of the figures (Figure 4, Figure 5 and Figure 6).

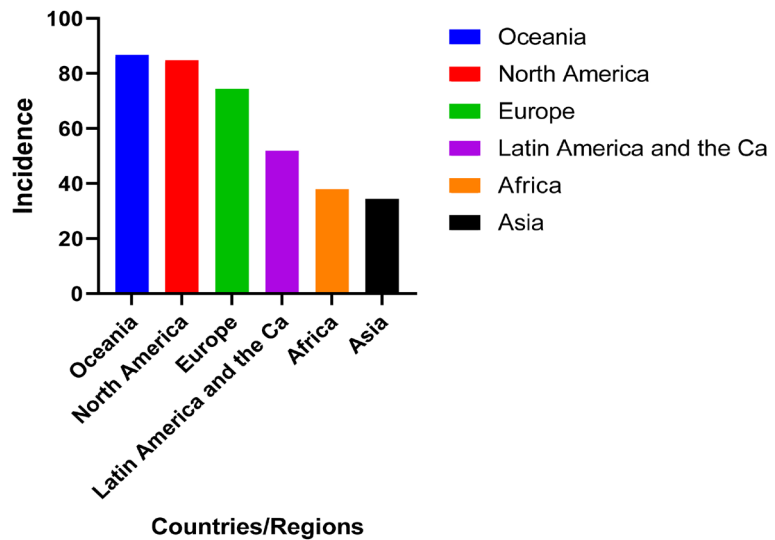


Figure 1. Distribution of breast cancer incidences among continents according to Global Cancer Observatory 2018.

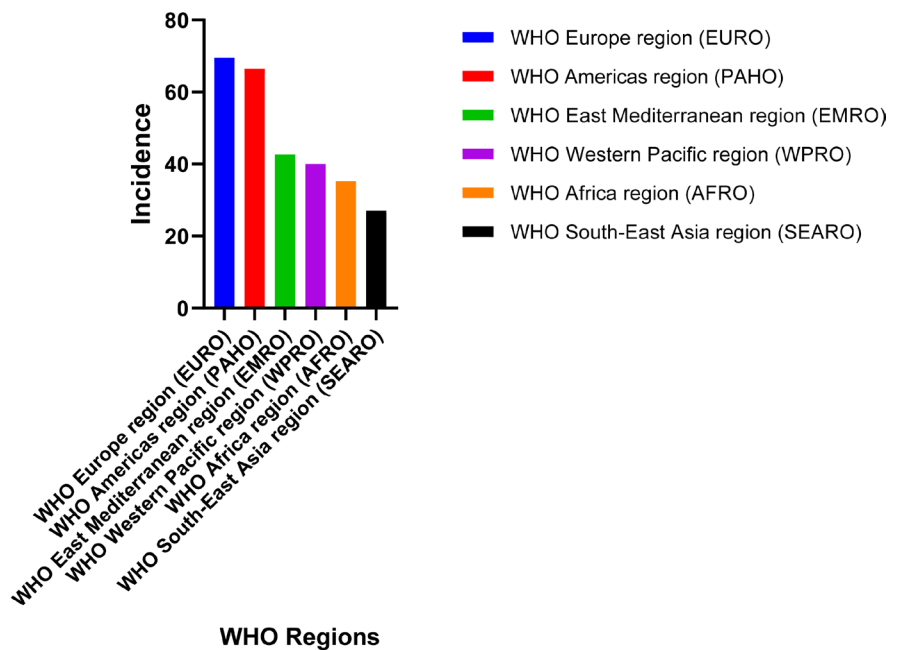
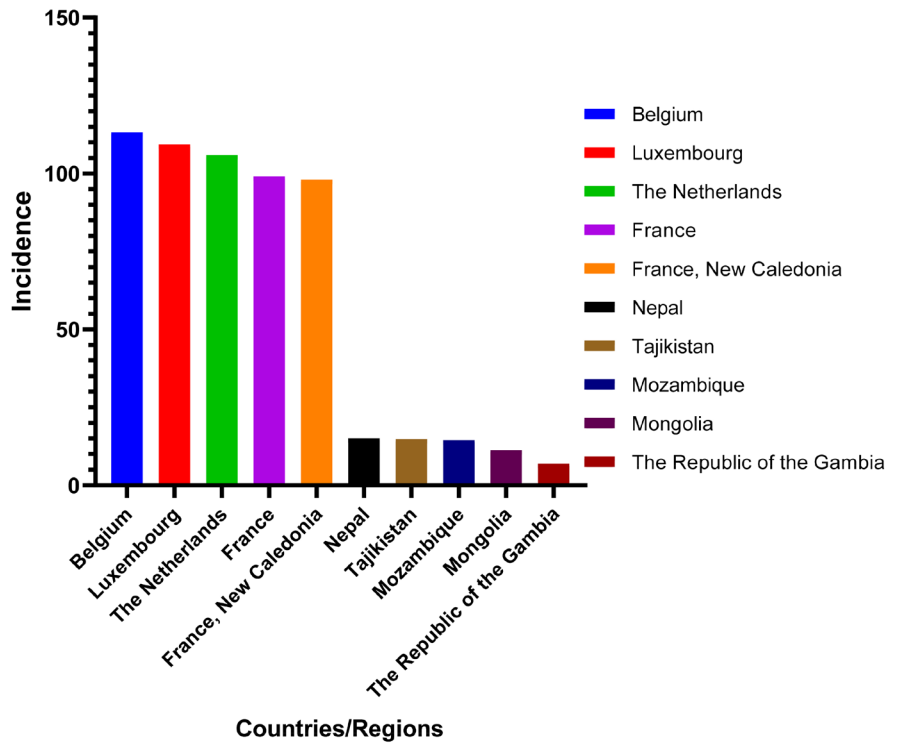
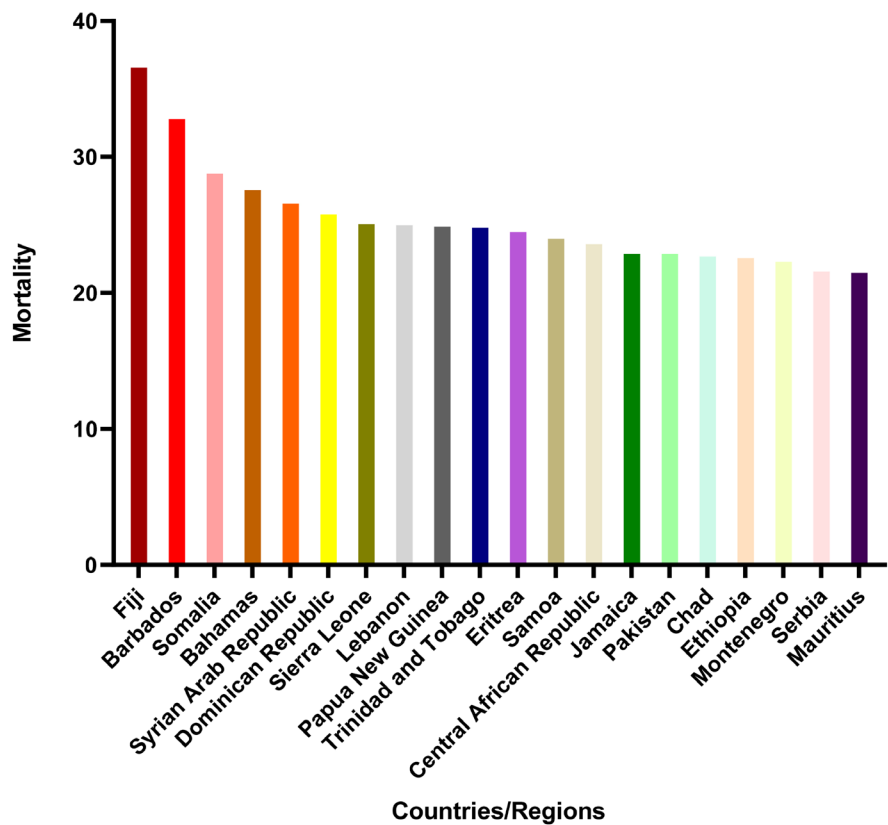


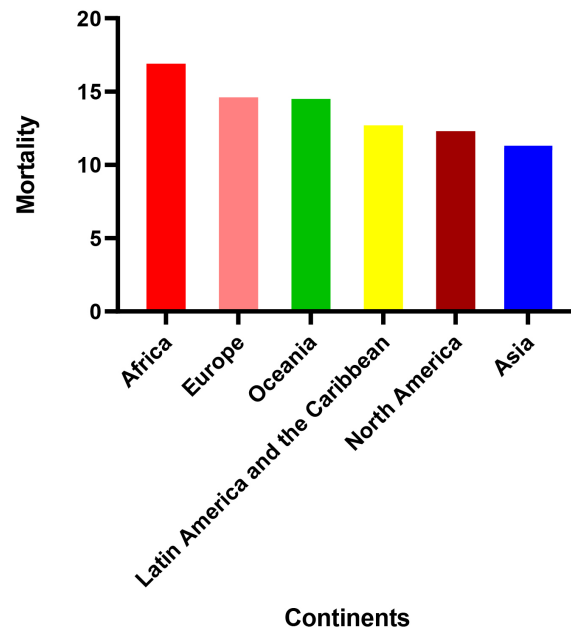
Figure 2. Distribution of breast cancer incidences among WHO regions according to Global Cancer Observatory 2018.



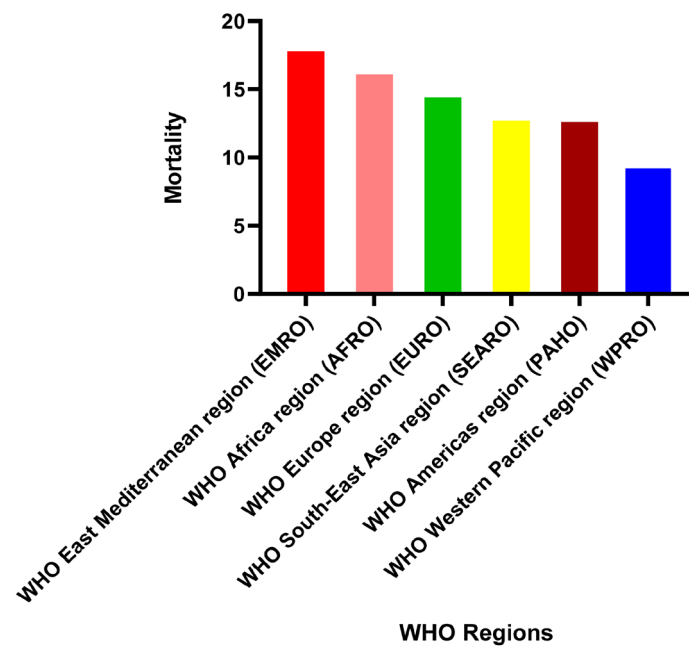
**Figure 3.** Distribution of breast cancer incidences among countries according to Global Cancer Observatory 2018.



**Figure 4.** Distribution of mortality cases among countries according to Global Cancer Observatory 2018.



**Figure 5.** Distribution of mortality cases among continents according to Global Cancer Observatory 2018.



**Figure 6.** Distribution of mortality cases among WHO region according to Global Cancer Observatory 2018.

#### 2.4. Risk Factors of Breast Cancer

The physiological abnormal changes such as hyperplasia and hypertrophy that cells in the body undergo play a role in the development of cancer [20]. These two cellular phenomena compound the issue of breast cancer by disrupting the normal growth of cells. Although medically, the science of how breast cancer occurs and the causative agents have not yet been discovered, several factors

predispose a person especially a woman to the disease [21]. These factors are presented below:

#### 2.4.1. Age

As women get older their bodies go through several hormonal imbalances, especially during menopause. Certain life processes such as pregnancy augment the shape and size of the body. Apart from that women tend to have fat deposits more as they age [22]. Though breast cancer occurs in different ages at different times, according to literature about 1 out of 8 women develop breast cancer younger than 45 years of age while about 2 out of 3 women develop breast cancer at age 55 or older. Moreover, about 80% of women aged 45 years and above are diagnosed with breast cancer each year. Also, 43% of women aged 65 years and above are diagnosed with breast cancer each year [23]. Therefore is a very substantive variable in early detection of breast cancer in women.

#### 2.4.2. Genetics

Women possess the genes for breast cancer known as the *BRCA1* (*Breast Cancer gene one*) and *BRCA2* (*Breast Cancer gene two*) genes [24]. These genes ensure the healthy growth of cells surrounding the ovaries, breast and other cells and also repair cell damage [25]. However, mutations in these genes could lead to increased risks of breast cancer. Apart from that, these mutations could be hereditary [26]. Although researchers have established the link between breast cancer and the genes, globally only about 10% of all breast cancers are associated with the genes. Hence it does not necessarily mean that possessing the mutated gene leads to breast cancer [27]. Secondly, researchers have also discovered that single nucleotide polymorphisms (SNPs) can also be associated with increased risks in breast cancer in women possessing *BRCA1* gene mutation in addition to women who do not inherit the gene [28].

#### 2.4.3. History of Breast Cancer

Breast cancer runs through families and women whose close relatives such as sister, mother have been diagnosed with the disease are more likely to be at risk [29]. Although, globally less than 5% of reported cases were recorded to be caused by family history [30]. As stated above mutated breast cancer genes can be inherited and hence increases risk if your close family relatives have ever been diagnosed with cancer, have been diagnosed with other cancers, women in the family have had cancers in both breasts, a male has been diagnosed with breast cancer and if relatives have been diagnosed with breast cancer before age 50 [24].

#### 2.4.4. Obesity

According to global statistics for cancer recorded in 2018, 33% of breast cancer were attributed to obesity [8]. Obesity is attributed to a lot of diseases and conditions and breast cancer is one of them. Due to unhealthy dietary choices and physical inactivity, the body changes in size and weight which can slow down metabolism and other bodily functions. Besides, fat cells known as adipocytes



increase in number and size due to large volumes of energy getting into the body [31]. The increase in body fat increases the levels of secretion of the hormone oestrogen abnormally which increases the risk factor for breast cancer. Although the exact mechanisms by which obesity increases the risk of cancers is not yet known, the interaction of the adipose tissue with the oestrogen hormone could initiate tumour growth and progression [32].

## 2.5. Diagnoses/Detection of Breast Cancer

Several interventions have been used over the decades to improve on early detection of breast cancer to enhance survival [8] [11] [33]. The major preventive steps for breast cancer are still a distant goal hence secondary treatment through early detection seems to be the most feasible approach in contemporary society [34]. Mammography, breast self-examination and clinical breast examination have been amalgamated into different screening programs throughout the entire globe to enhance early detection where clinical breast examination (CBE) has been proven to be an important tool [35].

A clinical breast examination is usually performed physically by a professional in the health care delivery system [36]. It is normally carried out during regular medical check-up of women which could lead to the detection of various breast abnormalities including breast cancer. It is a subjective process and hence American Cancer Society does not recommend this method for breast screening. However, the United States Preventive Services Task Force also stated that there is no significant factual evidence scientifically to either approve or disapprove clinical breast examination (Siu, 2016). Notwithstanding, other breast screening methods like Mammography are designed to improve upon the traditional breast screening methods [37]. Moreover, the use of X-ray in the examination of various parts of the body has become popular in the current society. Mammography is also a form of X-ray used in the examination of the breast with a tube voltage ranging between 25 kVp and 32 kVp to display details of the tissue within the breast [38]. This allows for early detection and diagnosis of the disease. It detects any abnormality within the breast including the growth of cancerous cells. Mammography has been used since the 1990s and its chief purpose is to detect the disease earlier than the traditional methods of breast screening [39]. Studies have shown that regular mammography has reduced mortality of the disease over the years hence proven effective in this respect [40] [41].

Mammography has proven to be highly useful in many parts of the world especially the developed countries where there is sophisticated machinery in the health care delivery system [42]. Mammography is resource instanced and therefore highly complex; however, there is no up to date information categorically proving the effectiveness of this method in developing countries over clinical breast examination [43] [44]. This current review is systematically designed to review existing literature and highlight up to date information on the efficacy of various forms of inventions for breast cancer but specifically on mammogra-

phy and clinical breast examination. It hopes to reveal the shortcomings of these methods and suggestions for the entire process as a form of health promotion to decrease the incidence of breast cancer in women.

## 2.6. Mammography versus Clinical Breast Exam

Breast cancer in women is a dangerous health condition that poses a threat to women's lives [11]. As is widely known, prevention is better than cure hence breast cancer in women is mostly tackled with screening as a preventive step to eradicate the disease. The process does not necessarily need evidence of breast cancer before it is carried out and therefore assessing potential people especially women for breast cancer is to detect early signs of some specific types of breast cancer likely not to even have symptoms. In detecting breast cancer methods such as mammography, clinical breast exam and self-exam are employed.

Mammography is used as a screening tool for diagnosing breast cancer. Mammography is a tool designed especially for early detections of breast cancer [45]. This is done by the detection of calcifications and characteristic masses. The process involves the use of low radiation in the form of X-ray [38]. During mammography, special measures are put in place to prevent motion blur and effects of high radiations including reducing tissue thickness that the X-rays penetrate, and therefore decreasing the number of radiations that usually scatter (scatter radiations usually decreases image quality); the radiation dose is also reduced respectively [33].

There is no vibrant study that emphatically states the importance of clinical breast exams done by a physician or health care professional. There is scanty information provided in relevant published journals that states that various tests can aid in finding breast cancer early [46]. Generally, the detection of breast cancer occurs as a result of some symptoms such as lumps by women during their day to day activities including dressing, bathing etc. [47]. It is recommended that women should know the normal nature of their breast so that they can detect changes and report to the health care professional instantaneously [48].

A study conducted by [13] revealed that out of 113 women investigated for the presentation of a tumor, about 46% were undergoing CBE, 20% on mammography. For detection of breast cancer in this study, about 93% was self-detected while 6% was also detected by mammography and finally, 1% was detected by CBE.

In comparison, although mammography is a modern method of detecting breast cancer and it is more recommended, it is very imported to utilize both methods to achieve the same results in detecting breast cancer.

## 2.7. Treatment/Management of Breast Cancer

Formerly, radical surgery was used as the sole treatment of breast cancer. Today, treatment methods have evolved due to the development of advanced technolo-

gies and therapies [49]. Presently, methods such as chemotherapy, surgery, hormonal therapy and biological therapy are employed in the treatment of breast cancer.

Before treatment is performed, tests are conducted to determine if the tumour found is benign or malignant. The latter usually indicates that the tumour is cancerous and needs to be treated immediately. The level of tumour growth as well as the size, extent, location in the breast will determine the treatment method to be used. Hence the doctor and patient usually adopt a treatment plan suitable for the individual. The treatment is usually done a few weeks after diagnoses [50].

Breast cancer treatments are grouped into local and systemic treatments. The local treatments include radiation treatment and surgery treatment. These local treatment targets the specific area the cancerous cells are and either destroy, remove or control the cells [51]. Systemic treatments, on the other hand, target the whole body system and eradicate, destroy all cancerous cells in the body. Some examples of systemic treatments are hormone therapy and chemotherapy [52].

Surgery is one of the first forms of managing breast cancer, especially in the early stages. The stage of development of the tumour determines whether a mastectomy or modified radical mastectomy will be performed on the patient [53]. It can also be done before or after receiving some initial systemic therapy. The process involves removal of cancerous parts of the breast tissues as well as ensuring the non-cancerous part is preserved and does not affect the shape and natural look. The surgical procedure is known as lumpectomy and sometimes partial mastectomy [54]. After the surgical procedure, radiation therapy is done for six weeks to treat the remaining breast tissue. Mastectomy, another surgical procedure also involves the removal of all breast tissue followed by breast reconstruction [55].

Radiation treatment or therapy, another local treatment utilizes radiations from x-rays and other radiations to kill cancer cells and shrink tumours. However radiation therapy does not destroy cancer cells in one session but it usually takes days, weeks and sometimes months of constant radiation therapy to destroy the DNA of cancer cells for the cancer cells to die [56]. There are two types of radiation therapy known as external beam and internal. The external beam utilizes a machine that focuses on the localized cancer cells in a particular part of the body. The internal beam, on the other hand, uses capsules, seeds, ribbons that contain radiation source. These capsules, seeds, ribbons are introduced into the body and placed near the cancerous tissue to allow the therapy to take place [57].

As stated earlier, systemic treatments target the entire body and focus on all tumours that may or may not be cancerous [52]. Chemotherapy, one of the most popular cancer treatments utilizes drugs containing highly potent chemicals that destroy the rapidly-growing cancer cells in the body. There are a wide variety of chemotherapy drugs. The treatment method can be used alone or combined with other treatment methods to effectively destroy cancer cells [58].

Hormone therapy as its name implies is a method of treating cancer that involves treating cancer that uses/needs hormones to multiply and grow. Some breast cancers develop as a result of the use of hormones. Hence the hormone therapy prevents and stops the growth of cancer using hormones as a medium of growth. Hormone therapy is usually used in conjunction with other treatment methods such as surgery [59].

Biological therapy or immunotherapy or target therapy utilizes the body's natural system such as the immune system, hormonal system to kill and treat cancer. It targets antibodies produced in the body and uses it to destroy/block the cancer cells. This therapy also uses drugs composed of small molecules that block cancels from growing [60].

In all, all these treatment methods illustrated above are all used in combination with one another. Although some treatment methods can be used alone, according to oncologists it is better to combine the treatment methods to ensure all cancer cells have been destroyed in the breast.

### **3. Analysis of Studies on Breast Cancer Screening Articles, Organizational and Reviews**

For breast cancer diagnosis, there are two different types of studies on a mammogram; these include the screening mammograms which are done on patients who present no symptoms. It comes with four X-ray pictures or images. U.S. Preventive Services Task Force endorses that, averagely, women between the ages of 50 and 74 should undergo mammography every two years [35]. This was reported in 2009 such that the recommendations triggered a lot of debate on breast cancer screening and paid attention to early screening considering mammography and clinical breast examination as appropriate tools. Other organizations such as the American Cancer Society (ACS) and the American College of Radiology (ACR) also endorsed that women should start mammography screening [7] [61] at the age of 40 [62]. Moreover in Canada and Europe, some organizations such as the Canadian Task Force on Preventive Health Care and Cancer Observatory respectively suggested that women between the ages of 50 and 69 should undergo mammography for every 2 - 3 years [63]. During screening mammography, both Craniocaudal, CC and mediolateral oblique, MLO images are taken of the breast [64]. In women between the age ranges of 39 - 69, it is reported that mammography screening decreases breast cancer mortality by about 15% [64].

ACS also endorsed CBR once every year for women at age 40 and above; they also endorsed screening with mammogram starting at age 40 and till the end of the woman's life once she is healthy [7] [61]. Reports have also indicated that almost all US medical organizations have recommended mammogram screening of women at age 40 and above. Also, it has been revealed that mammography screening reduces breast cancer in women within the ages of 50 - 60 by 20 - 35 percent and a bit lower in women of age 40 - 49 with 14 years of checkups. The

World Health Organization (WHO) endorsed the screening of mammography for every 1 - 2 years for women within the ages of 50 - 60 as cited in [65]. This, therefore, suggests that the efficacy of mammography in breast cancer screening in women between the ages of 50 - 69 is globally accepted. Notwithstanding, there have been sceptical debates concerning the risks and benefits of the use of mammography specifically for women in their forties. This is due to reports on false-positive results which should be balanced with advantages of screening with mammography in early ages like 40 years.

An age trial in the UK did which was first of its kind to include women at age 40 in mammography screening [66]. The trial did not propose any documented novel policies for women at age 47 for breast cancer screening by the year 2012 which was likely to result in large false-positive results. This suggests that early age screening of breast cancer with mammography is likely to result in many false-positives. Concluding on including this age group in breast cancer screening using mammography is a different issue, however, the concern of increased false-positives within the age group and leading to re-attendance has been disproved by [13]. Therefore their finding should be considered screening policy-making.

The results from a study stated that at the 40 - 49 of women, about 90% had their CBE normal. They also stated that breast imaging reporting and data system (BI-RADS) I and II had 58.4% and 34.6% of women. They further went on to report that only about 7% of women fitted BI-RADS III and none belonged to BI-RADS IV group [13].

There are several reviews on breast cancer screen but this study considered a systematic review and met-analysis which was conducted on risk factors of getting breast cancer. The study showed that factors such as dense breast, first-degree relatives whose family have a history of breast cancer were also having at double risk for breast cancer among women of age 40 - 49 [13]. Knowing risk factors also facilitates the methods of screening tools to be used for breast cancer screening. The study also stated that knowledge of risk factors will also help to permit personalized mammography screening.

A review conducted in India among women within the ages of 39 - 40 and between the years of 2001 and 2008, which was based on an eight trial recommended strong support for mammography among young females within these ages is beneficial for them [67] [68]. India is one of the countries where breast cancer prevalence is very before age 50. Hence the results of the review paper seem to be logical in this viewpoint and making it valid.

The two review papers systematically gave us an understanding of breast cancer screening in the early ages which supported pieces of evidence from various cancer organizations around the world. Many of them are directly in line with these findings. These trends can be seen in the adapted **Table 2** below.

For ages 50 - 70, this study also analyzed the results of a UK based study that revealed that breast cancer screening mammography for a three years interval

**Table 2.** Recommendations for breast cancer screening for average-risk Women.

Tool \ Organization	American cancer society	American college of obstetricians and Gynecologists	National Comprehensive Cancer Network	U.S. Preventive Services Task Force
Mammography start age	Recommended between age 40 - 45 and specifically at age 45 [7] [16]	Starting at age 40 and above, and 40 - 49 after counselling, finally 50 years if patient have not stated before [69]	Starting at 40 years and above [70]	For age 40 - 49 the starting should be an individual decision, however, recommended age 50 years [17]
Clinical breast examination	Do not recommend [7]	For women around age 25 - 39 years should be 1 - 3 years but for women at age 40 above, should be done yearly [69]	Should be every 1 - 3 years for the ages 25 - 39 and yearly for women at age 40 and above [12]	May be offered for women around age 25 - 39 years should be 1 - 3 years but for women at age 40 above, should be done yearly [17]
Mammography screening intervals	Yearly for women at age 40 - 45, and twice a year with an option for yearly screening for age 55 [7]	Yearly or twice a year [69]	Annually	Biennial
Mammography quitting age	Done when life expectancy is less than 10 years [7]	Should be throughout once initiated until age 75 and stop should be based on a shared-decision making [69]	When factors limit life expectancy to 10 years or less [70]	No sufficient evidence for balancing problems and benefits of screening at above age 75 years [17]

within this age group extends lives. They further stated that a review of the study points out that the 20% reduction death of women was observed in the women included in the study. Their final view is that breast cancer screen prevents about 1300 deaths of women per year.

### Implications

Based on the evidence provided in the literature above, it can be seen that breast cancer screening is very important for early detection, this is a sine qua non for survival.

### 4. Conclusions

Breast cancer of women is a great threat to women survival and therefore needs great attention, analysis on screening methods is therefore necessary hence this study analyzed published relevant data on the benefits of mammography over clinical breast examination with a focus on early detection. After going through several review papers, published individual articles, and organizational standards for screening, the study established that mammography is highly recommended over clinical breast examination, however, mammography is limited in that it is least practiced in remote areas. Hospitals and other health facilities have several pieces of evidence on the effectiveness of mammography in the developed world and have contributed significantly to the reduction of mortality among women with breast cancer.

The study, therefore, recommends that governmental bodies and other organizations should help to equip areas with no mammography equipment, professional knowledge on its usage. The study also, recommends that further studies be conducted to find out the relationship between various screening methods and age groups to clarify the issue of false positives and false negatives. The study also recommends that studies being conducted on the knowledge and usage of mammographic screening in rural areas of developing countries.

### Acknowledgements

The authors acknowledge the technical support received from Priscilla Adjei-Kusi, and encouragement in carrying out this work.

### Availability of Supporting Data

All data used for the study have been included in this article.

### Contributions

Gadafi Iddrisu Balali perceived the idea of the manuscript, did literature search with Vera Gobe Afua Dela and wrote the manuscript, the manuscript was however refined by Denis Dekugmen Yar, Vera Gobe Afua Dela, Gadafi Iddrisu Balali, Emmanuel Effah-Yeboah, Philip Asumang, Justice Delali Akoto and Fuseini Abdallah. All authors read and approved the manuscript for final publication.

### Conflicts of Interest

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

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