



## QUALITY OF BREAST CANCER EARLY DETECTION SERVICES: AUDIT OF BREAST SERVICE IN AL YARMOUK TEACHING HOSPITAL

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### ABSTRACT

**Background:** Breast cancer (BC) is a global challenge. Women in low and middle-income countries face steeplechases to BC care, from accessing early detection programs to receiving timely diagnosis and treatment. The current study objective is to assess the quality of breast cancer early detection services in a single center. **Patients and methods:** A cross sectional study conducted in the breast-early detection clinic in Al Yarmouk teaching hospital. Data collection and interviewing beneficiaries was done for calendar year 2022. Three measures regarding mammograms interpretation and another two for cancer detection were calculated. **Results:** A total of 2456 mammograms were performed, 381 patients had abnormal-mammograms. Recall rate was 15.5%, while 33.5% were lost at follow-up imaging. A total of 118 patients were recommended for FNA/Biopsy, of them 22.8% were lost to follow-up. 77.2% received FNA/Biopsy within 1-30 days. The rate of having breast cancer if one received a biopsy after abnormal mammogram was 60.4%. The cancer detection rate after abnormal mammogram test was 22.3/1000 mammograms performed. Both cancer detection indicators exceed the benchmarks. **Conclusions:** High-quality BC early detection service is achievable if certain considerations were met.

**KEYWORDS:** Quality of Breast clinic, Early detection, Breast cancer, Screening, Mammography.

### INTRODUCTION

Breast cancer (BC) is a global challenge and the most common type of cancer among women. The disease is associated with a significant health burden and mortality among women. In 2020, 2.3 million women were diagnosed with BC, and 685,000 deaths were reported globally and 7.8 million women had been living with BC for the past 5 years, making it the world's most prevalent form of cancer.<sup>[1]</sup> Many barriers to BC screening have been identified, including access to health services, difficulties within infrastructure, incomplete information, socioeconomic status, and geographical conditions.<sup>[2]</sup> Breast cancer screening is performed in women without having any signs or symptoms so that disease can be detected as early as possible. The components of a breast screening evaluation depend on patient age and other factors, such as medical and family history, and can include breast awareness (i.e., patient familiarity with her breasts), physical examination, risk assessment, screening mammography, and in selected cases, screening MRI.<sup>[3]</sup> A diagnostic breast evaluation differs from breast screening in that it is used to evaluate an

existing problem (e.g., dominant mass, discharge from the nipple).<sup>[4]</sup> Women in low-income and middle-income countries (LMICs) face steeplechases to BC care, from accessing early detection programs to receiving timely diagnosis and appropriate treatment. The situation is reflected in BC 5-year survival outcomes, which are 40–60% in LMICs versus 84% in North America.<sup>[5]</sup> Benefits and harms of BC screening has been argued, yet harms have not been given equal attention compared with benefits<sup>[6]</sup> Harms can range from needless anxiety and morbidity, inappropriate economic cost and the demand for further exposure to ionizing radiation, up to overdiagnosis and false-positive mammography. It is for this reason emphasis on quality control and quality assurance is required.<sup>[7]</sup> The current study objective is to assess the quality of breast cancer early detection services in a single center.

### PATIENTS AND METHODS

This was a cross-sectional study; data were collected from reviewing records and interviewing beneficiaries of a breast-clinic for a whole calendar year 2022. Al-

Yarmouk breast-clinic serves around 10,000 people yearly. The service is comprehensive and free of charge, the clinic is equipped with an attached radiological unit that provides both ultrasonography and mammography tests, in addition to a cytology-histopathology laboratory. The mammography experience was defined as the entire process from the initial order of mammogram, through diagnostic follow-up imaging, biopsy (tru-cut) or fine needle aspiration (FNA), and BC diagnosis. From the collected data, the following three measures of mammogram interpretation and diagnostic follow-up were calculated for the clinic, the benchmarks were adopted from previous literature.<sup>[8]</sup>

- **Recall rate:** The proportion of mammograms interpreted as abnormal (BI-RADs 0, 4 or 5). (The benchmark for recall rate was met if no less than 5% and no greater than 14% of mammograms were interpreted as abnormal).
- **Timely follow-up imaging:** The receipt of diagnostic imaging within 30 days of an abnormal mammograms (benchmark of 90% and above).
- **Not lost at FNA/biopsy:** The proportion of women who needed FNA/biopsy and received an FNA/biopsy within 30 days of the abnormal mammogram test (benchmark of 70% and above).

Another two measures for cancer detection were calculated as follows:

- **Cancer if biopsied:** The proportion of patients who received malignant FNA/ biopsy following an abnormal mammogram test within 30 days of the abnormal mammogram test, (benchmark of 15–40%).
- **Cancer detection rate:** The number of BCs detected following an abnormal mammogram test for every 1000 mammograms performed (benchmark of 3–10 per 1000).

The data collection instrument was created in an excel sheet. Auto-calculated cells and data validation checks were built into the instrument to help guide the data collection and entry process.

## RESULTS

Table (1) depicts the mammogram-experience during 2022. A total of 2456 mammograms were performed in 2022. The total number of abnormal mammography tests (i.e. mammograms with birad 0, 4, or 5) was 381 mammograms, thus the recall rate was 381 (abnormal mammograms)/ Total mammograms 2456 = 15.5%.

Once a patient receives an abnormal mammogram, she would be scheduled for a diagnostic radiological test; i.e. ultrasonography. The follow up period for the next radiological test ranged from 1-30 days. Of the 381 abnormal-mammograms, 253(66.5%) received a diagnostic ultrasonography, while the remaining 128(33.5%) were lost to follow up.

Thus, the timely-follow up imaging rate was calculated by dividing the number of those who received a follow-up diagnostic test by total abnormal mammograms =  $253/381 = 66.5\%$

Out of the 81 patients with abnormal mammograms birad zero, 75 (92.5%) received normal/benign follow-up tests (i.e. their sonographs or MRI ranged from Birads 1 to 3, so they were not a candidate for cytology/histopathology tests). The remaining six patients (7.5%) had Birad 4/5 on the follow-up radiological test, so they were considered among the candidates for cytology/histopathology testing.

As for patients who had Birad 4 or 5 on mammograms. A total of 172 patients received follow-up diagnostic test, 60/172 patients (34.8%) had normal follow-up diagnostic tests and didn't require further FNA/Biopsy testing. On the other hand, 112/172 (65.2%) were candidates for cytological or histopathological testing in the hospital.

Thus, the total candidates for cytology/histopathology tests were 118 patients out of 178 patients with abnormal mammograms (172 birad 4/5 and 6 birad 0). Of the 118 candidates for FNA/Biopsy, 27/118 (22.8%) patients were lost to follow-up. Table (2) illustrates the causes of loss to FNA/Biopsy. As for the remaining 91/118 (77.2%), they received FNA/Biopsy within 1-30 days. Thus, the rate of patients not lost to FNA/Biopsy divided by those with abnormal mammograms who got a diagnostic test was  $91/178 = 51.1\%$

Of the 91 patients who had abnormal mammograms initially followed by abnormal radiological tests and submitted to FNA/Biopsy tests, 36/91 (39.5%) had benign cytology/histopathology tests. While 55/91 (60.5%) were diagnosed as malignant cases.

The total cancer cases recorded in the breast clinic for the calendar year 2022 was 73 cases. 55/73 (75.3%) cases were diagnosed within the breast-clinic through the daily routine work, while 18/73 (24.7%) cases were referred from private sectors with an already performed cytology or histopathology tests that prove malignancy. Table (3). Shows the cancer statistics

Cancer detection rate for the year 2022 per 1000 women calculated by dividing total recorded cancer cases in 2022 per total beneficiaries =  $73/8744 = 8.3/1000$  women.

Cancer detection rate for the breast clinic was calculated by dividing total detected cases in the clinic per the total number of beneficiaries =  $55/8744 = 6.2/1000$  women

The rate of having a confirmed BC if one received a biopsy after abnormal mammogram was  $55/91 = 60.4\%$ . Whereas, the confirmed-cancer detection rate after abnormal mammogram test for every 1000 mammograms performed was calculated by dividing the biopsy confirmed cases by total mammograms done in

2022 =  $55/2456 = 22.3$  per 1000 mammograms performed. Both cancer detection indicators exceed the benchmarks.

Figure (1). Illustrates a comparison between quality benchmarks and current achieved percentages in Al Yarmouk Breast clinic for the calendar year 2022

The current study showed an underachieved percentage regarding the loss to a diagnostic ultrasound and loss to a cytology/histopathology test. With an increase in cancer detection indicators compared to benchmarks.

## TABLES AND FIGURES

**Table 1: Mammography experience in Al Yarmouk Breast Clinic during the calendar year 2022.**

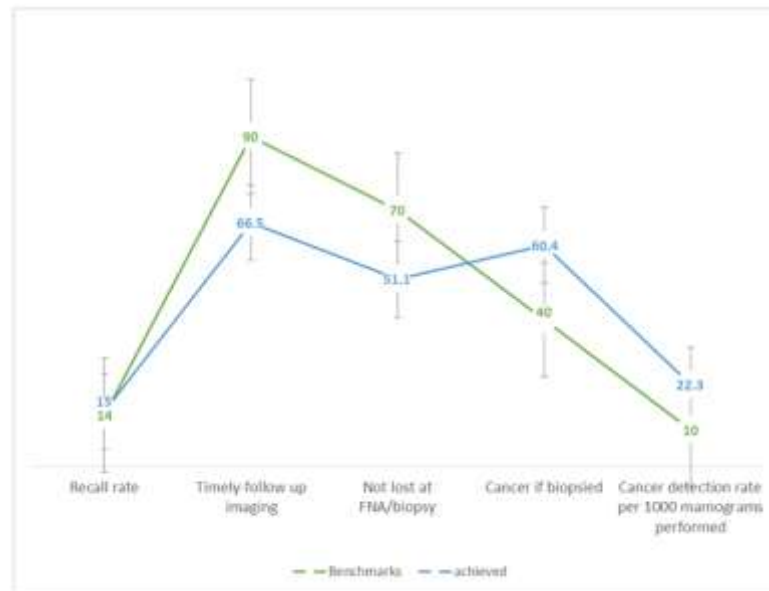
Variable	Number
<b>Mammography By Birads</b>	
Birad 0	149
Birad 1	1191
Birad 2	553
Birad 3	331
Birad 4	200
Birad 5	32
<b>Total mammograms</b>	<b>2456</b>
<b>Diagnostic imaging Follow up to Mammography</b>	
<b>There were 149 Birad 0 mammograms</b>	
How many of 149 Birad 0 mammograms were loss to follow up	68
How many of 81 Birad 0 mammograms received a follow up US test within 30 days	1
How many of 80 Birad 0 mammograms received a follow up US test within 15 days	5
How many of 75 Birad 0 mammograms received a follow up US test within 7 days	19
How many of 56 Birad 0 mammograms received a follow up US test within 3 days	56
How many of the 81 Birad 0 mammograms needed FNA/Biopsy	6
<b>There were 232 Birad 4 or 5 mammograms</b>	
of 232 Birad 4/5 mammograms were loss to follow up	60
of 172 Birad 4/5 mammograms received a follow up US test within 30 days	1
of 171 Birad 4/5 mammograms received a follow up US test within 15 days	4
of 167 Birad 4/5 mammograms received a follow up US test within 7 days	17
of 150 Birad 4/5 mammograms received a follow up US test within 3 days	150
of 172 Birad 4/5 mammograms received a Birad1,2,3 on follow up US test	60
How many of the 172 Birad4/5 mammograms needed FNA/Biopsy	112
<b>FNA/Biopsy after abnormal mammography</b>	
Total number of abnormal mammograms who needed FNA/Biopsy	118
of 118 abnormal mammograms were loss to follow up	27
of 91 abnormal mammograms received FNA/biopsy within 30 days	1
of 90 abnormal mammograms received FNA/biopsy within 15 days	8
of 82 abnormal mammograms received FNA/biopsy within 7 days	19
of 63 abnormal mammograms received FNA/biopsy within 3 days	63
<b>Cancer among abnormal mammography</b>	
Patients received an FNA/Biopsy within 30 days of abnormal mammography	91
How many of the FNA/biopsy were diagnosed Benign	36
How many of the FNA/biopsy were diagnosed Malignant	55

**Table 2: The distribution of patients lost to cytology or histopathology follow-up by causes.**

Causes	Number	percentage
No consent for FNA/Tru Cut	4	14.8
Private sector <sup>(patient choice)</sup>	9	33.4
Private sector <sup>(lack of Lab materials)</sup>	8	29.6
Excisional biopsy	6	22.2
<b>Total</b>	27	100.0

**Table 3: Cancer statistics for Al Yarmouk Breast clinic in the year 2022.**

Variable	
<b>Cancer statistics</b>	
Cancer detection rate for 2022 per 1000 women	8.3
Cancer detection rate for Breast clinic per 1000 women	6.2
<b>Number of total cancer cases recorded</b>	<b>73</b>
Number of cancer cases referred from private sectors	18
Number of cancer cases detected in Breast clinic	55
Total breast-clinic-beneficiaries	8744
Total mammograms	2456
Confirmed Breast Cancer if biopsied	60.4%
Confirmed Breast Cancer in abnormal mammograms per 1000	22.3

**Figure 1: Comparison between quality benchmarks and achieved percentages in Al Yarmouk Breast clinic for the calendar year 2022.**

## DISCUSSION

Ensuring a high-quality service is vital for an accurate BC diagnosis. One of the hurdles to the triad system in BC (clinical evaluation, radiology and biopsy confirmation) is the long time for recall test.<sup>[9]</sup> Recall-time ranged from getting the test on the same day of the abnormal mammogram up to 7-15 days and only 1-2 patients got their recall tests within 30 days, similarly a study by Mao X et al in Sweden where recall letters were sent to women within 7 days<sup>[10]</sup>, while recall rates in USA might reach-out to a month<sup>[11]</sup> It had been reported that cancer detection rate significantly increases with each unit increase in the recall rate for recall rates 12%-14%.<sup>[12]</sup> Our current recall rate was 15.5% which is slightly higher than the recommended benchmark of 14%, also was higher than that reported by Yankaskas B et al (12.7%)<sup>[13]</sup>, Rauscher GH et al (10.7%)<sup>[14]</sup>, and by Al Mulhim FA et al (7.9%)<sup>[14]</sup> This might shed the light on the need to enhance mammogram reporting. Since 149/381(39.1%) of abnormal mammography were labelled Birad 0, of which 68/149(45.6%) were lost to follow-up. Thus, to improve mammographic screening, efforts should target lowering the recall rate while maintaining the cancer detection rate. In a study by

Coolen A et al, the recall rate was lowered to only 3% after double reading and coordinating sessions to ensure a high-quality mammogram report.<sup>[16]</sup> The study showed an underachieved percentage regarding the loss to a follow-up diagnostic ultrasound following an abnormal mammography (66.5% vs 90%). One explanation can be inherent to the fact that screening for BC is optional and never obligatory. Though the continuous efforts of the ministry of health to involve other ministries in screening their employees, yet around 77.5% of women self-referral to breast clinic.<sup>[17]</sup> Additional point is scheduling appointments might not be feasible for women, although all screening service is provided free of charge, yet many barriers can stand against including accessibility of service, permissions to leave the house, lack of knowledge, and false beliefs etc. From the same perspective, an underperformed percentage was observed regarding the loss to a cytology/histopathology test. A reason for this loss is related to restricting FNA/Tru-cut biopsies under the ultrasound-guide to only trained radiologists. As a result, FNA/tru-cuts are limited to only one day per week. Out of the 27 patients lost to FNA/Biopsy, 14.8% of patients gave no consent. This highlight the barrier of poor knowledge, and incorrect



beliefs regarding cancer spread after such procedures, the invasiveness of FNA/Tru-cuts are considered as an obstacle to the BC screening triad.<sup>[9]</sup> An interesting point, is that 22.2% of patients had FNA/tru-cut skipped into an excisional biopsy under general anaesthesia. In part, this might be related to the common shortage in cytology/histopathology material supply, distrust in lab work, and surgeons concern about the loss of patients due to delays. In the same context, 9/27(33.4%) preferred private sector. While 8 (29.6%) had no other choice but to go for the private sector due to lack lab material. Probably a collaboration with the private sector brings the benefit of additional materials, and timely management of the cases.<sup>[18]</sup> The current cancer detection rate by mammogram for each 1000 participants was (8.3%) which is comparable to the published rate by Mannu G et al in England (8.82 per 1000 women)<sup>[19]</sup> and Shakor J et al in Iraq-Sulaimania (8.2 per 1000).<sup>[17]</sup> Similarly, the cancer detection rate for breast clinic per 1000 women was 6.2 which is in accordance with results stated by Coolen A et al (6.8 per 1000)<sup>[16]</sup>, Geertse TD et al (6.5 per 1000).<sup>[20]</sup> Interestingly the study showed that 60.4% of biopsied lesions after abnormal mammograms are malignant, and the cancer detection rate per 1000 mammograms performed was 22.3 per 1000, both rates exceed the benchmark. This can be related to the increasing burden of breast cancer in the country, and the fact that breast cancer clinic can be an attracting focal center for high-risk patients.

#### CONCLUSIONS AND RECOMMENDATIONS

High-quality BC early detection service is achievable if certain considerations were met, including organizational management and enhancing the accessibility, and providing a comprehensive service in one building.

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