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Lessons learned: audit of the record-keeping quality of a tertiary hospital's mammography service

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Abstract

Breast cancer is the most common cancer worldwide. In diagnostic centers offering mammography, periodic audit of medical archived procedures is an important component of a quality assurance program; this ensures optimal follow-up of positive cases and establishment of measures to combat any deficiencies.

The study aimed to audit the record-keeping of the mammography service in a tertiary institution, with a view to improving its efficiency.

A retrospective audit of request forms, questionnaires, mammograms, and reports of 1,098 women who had mammography at the radiology department of a public tertiary hospital between 2011 and 2018.

An internal audit of records evaluated the completeness of clinical information on the request forms, questionnaires, accuracy of diagnosis, and state of stored mammographic films, years later. Microsoft Excel and SPSS version 23 were used for the analysis of descriptive and inferential statistics, respectively.

Two hundred and thirty (21%) and 791 (72%) women had screening and diagnostic mammography, respectively; their ages ranged from 31 to 85 years. Indication of study was not stated on 73 (7%) request forms and 281 (26%) request forms were improperly filled. There were 52 (4.7%) women not clerked with the questionnaire, while 158 (14%) had no clinical breast examination prior to imaging. One hundred and thirty (12%) mammograms were damaged, while 2 were missing and not reviewed.

Our study revealed a significant lapse in quality of our mammography record archival system. Evidence obtained helped institute necessary measures in place for digitization and quality control of mammography services.

Introduction

Breast cancer is the most common cancer worldwide, according to the GLOBOCAN 2020 report that estimates cancer incidence and mortality. It accounted for more than 24.5% of all female cancers, inducing a substantial public health burden.[1] It ranked as the fifth most common cause of cancer deaths, leading to 6.9% of all cancer mortality worldwide.[1,2] In Nigeria, it is the leading cause of cancer-related deaths,[3,4] with late presentation identified as the major driver of this high mortality rate.[5]

Mammography is the gold standard in radiological investigation for breast cancer screening, and studies have shown that screening with mammography reduces breast cancer mortality.[6,7]

The medical audit is an important component of a mammography quality assurance program. In addition, it measures the ability of a mammography unit to detect non-palpable, early-stage breast cancer and also exposes any deficiencies in technical performance and image interpretation.[8–10]

To ensure the optimal follow-up and treatment of positive cases detected by mammography, it is necessary that every diagnostic center has its medical records and image archival procedures systematically reviewed periodically. All mammography practices in the United States are required by the Mammography Quality Standard Act to perform annual medical audits of selected imaging and clinical outcomes.[11] This is the practice in most developed countries but not yet formally instituted as a required practice in Nigeria. Mammography plays a vital role in the continuum of quality breast cancer care and, therefore, requires a comprehensive audit. Hence, our audit will serve as an eye-opener to the strengths and weaknesses encountered in a system with no formal quality control and may serve as a

springboard to encourage similar centers to institute quality control measures starting with an audit of their records and practices.

The aim of this study was to audit the record keeping of the mammography service in a tertiary institution to identify gaps, with a view to improving its efficiency and improving future outcomes.

Materials and Methods

This was a retrospective audit of our mammography records. We reviewed the contents of referral and clerking documents, the status of the films and reports of 1098 women who had done mammography studies at the Radiology Department of the University of Nigeria Teaching Hospital, Enugu between January 2011 and December 2018. An analogue GE Alpha RT Mammography Unit had been used to acquire the images of the breast.

The internal audit was jointly done by two radiologists with over 5 years of experience in breast radiology using a data proforma with pre-determined indices to be assessed. Records of each patient's health and lifestyle questionnaire, investigation request forms, were evaluated for completeness of requisite clinical information on them. We also assessed the state of the stored mammographic films and original written reports, years after the investigation was done.

Data collected was recorded and cleaned up using the Microsoft Excel 2016 spreadsheet. IBM SPSS Statistics version 25 was employed for descriptive analysis of the continuous data (patient's age, age at menarche and menopause) and categorical data (indication for mammography, menstrual status, presence or absence of required request form details, whether or not patients received clinical breast exam or did further imaging and the state of

stored films) using measures of central tendency, proportions, and percentages. Summary and graphical representation of data were used where appropriate.

Results

There were 21% (231/1098) and 72% (792/1098) of women who had screening and diagnostic mammography, respectively. The ages of the women ranged from 31 to 85 years, with an average age of 51.4±8.2 years. The majority of these women (61.4%; 675/1098) were postmenopausal, while 37.3% (410/1098) were premenopausal.

Two hundred and one request forms were not properly filled, with various details required from the clinicians left blank. Patients' hospital numbers, in 636 (58%) forms, were the most frequently left out, while 73 (7%) request forms had no stated indication (*Figure 1*).

Our audit showed that 1.046 (95%) women were clerked with the questionnaires prior to imaging, while 5% (52/1098) of them had no filled questionnaires in the mammogram jackets. A positive family history of breast or other cancers was noted for 90 (9%) of these women; 941 (90%) women had no history of any cancer. The menstrual status at the time of imaging was also recorded with varying outcomes, though 13 of the forms had no detail of this parameter, as shown in Table 1.

Other prerequisite details were either omitted or not well documented in the filled questionnaires. There were 321 (31%) forms with patients' hospital numbers not filled, 97 (9%) forms with wrongly filled or empty patient phone numbers, 67 (6%) forms that had no documentation on family history, and 158 (15%) forms with no records of a clinical breast

examination meant to be done prior to imaging. Of the 670 women requiring further imaging, there was no evidence that 54% (362/670) of them did have further imaging. One hundred and thirty mammograms were damaged due to humidity and stuck together, while 2 were missing and could not be reviewed.

Discussion

The mammographic medical audit is known as an essential component of the quality assurance of a mammographic practice. It serves as a means to assess the accuracy of breast cancer detection by radiologists, recall rates of patients for further evaluation, cost analysis of the practice, and provides information that will enable improvements in the practice and drive policy changes.[10] Hence, the completeness of the mammographic medical records and reports is vital to enable a comprehensive audit, with consequent improvement to the practice.

Our study revealed a significant lapse in the quality of our mammography record archival system, with many lessons learned from these gaps. There was a need for re-education of referring physicians on the importance of properly filled request forms for quality mammographic assessment and patient follow-up. More importantly, some questionnaires lacked important patient biodata such as menstrual age, breast cancer risk factor assessment and findings of Clinical Breast Examinations (CBE) done. Residents were responsible for filing these questionnaires and for the pre-procedural CBE; hence, there was a need for an oversight function by the supervising consultant. We also required proper documentation of findings on further imaging requested for these women. We realized the film storage facility was hot and humid, leading to rapid film degradation. This impressed the need for a digital mammographic processing and archival system, while we plan to convert analog images to

digital images, to prevent the loss of images essential for patient follow-up. There was also a need for proper documentation of films taken in and out of the storage room.

Several departmental remedies have been put in place since the initial outcomes of our audit. A departmental protocol was set up to ensure appropriate request form filling, clerking, and CBE, overseen by the consultants. It has driven the department to provide a Radiology Information System (RIS) that uses a web-based archival system to save images and reports for future retrieval. The hospital has commenced an electronic medical records system established in phases for various units, with our department involved in the first phase.

Quality assurance in mammographic practice in Nigeria is yet to be enacted and not enforced in most of our institutions. In developed countries, there are acts or legal bodies with oversight of mammographic practice quality assurance.[12] Basic or comprehensive medical audits, which include biopsy outcomes, are done annually and yield raw data for computation of accuracy and performance indices.[10,12] Most of the mammographic audits published in our region assessed the demographic data and mammographic features obtained from women assessing mammography.[6,7,13] There was none that assessed the quality of its records, the extent of raw data, or demographic or clinical information obtained during their practice, over the review period.

Our institution is one of the pioneer centers in breast cancer diagnosis and care,[13] hence reviewing our records to uncover the gaps, is considered by experts as an essential exercise to help set up corrective measures.[9] If we are to develop our mammographic practice in Nigeria to that of international best practices for better patient outcomes, then this medical audit is required by every center, as a means of evaluation and driving formulation of guidelines and policy changes in Nigeria by our experts in these centres.

Our study was limited by its retrospective nature with attendant missing information, especially patient data in the registers. We audited the total number of films we could find for that period of review. However, the missing data can also be a strength, as we aimed to evaluate the extent of these gaps.

Conclusions

This audit has helped the department begin to put measures in place for better quality control

To the best of our knowledge, Nigeria is yet to develop national mammography auditing guidelines to ensure quality control in mammographic services. We recommend a national mammography quality control system be put in place, to guide centers to improve their mammographic practice. Similar medical audits of mammographic record quality and a national survey assessing quality assurance in institutions are recommended studies that can propel the formation of these guidelines.

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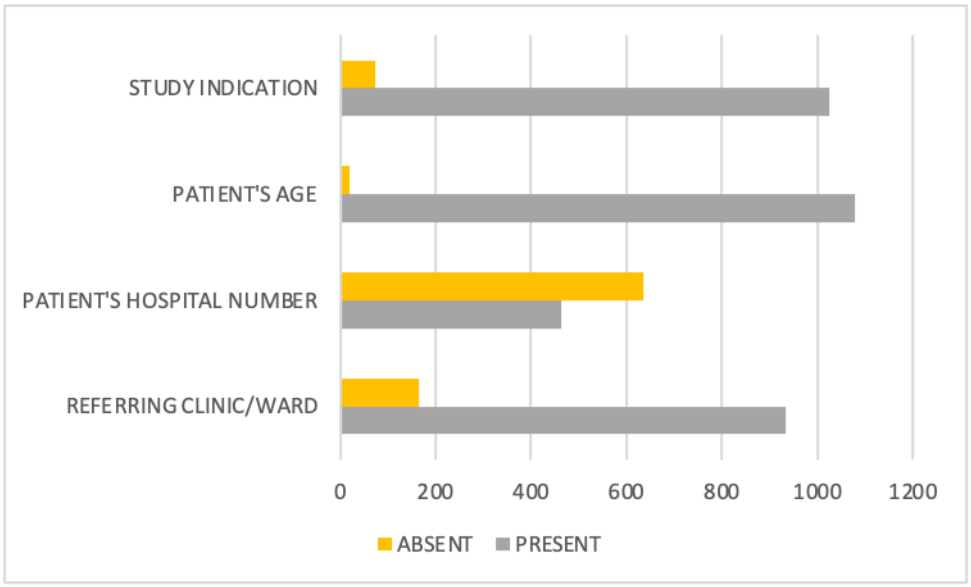

Figure 1. Bar chart showing the distribution of required information on patients' request forms, filled (gray bars) or omitted (yellow bars) by clinicians when requesting for the mammography investigation.

Table 1. Table showing the menstrual status of women as noted on the clerking questionnaires.

Menstrual status	**Frequency**	**Percentage (%)**
Age at menopause	522	47.5
Post-menopausal without age indicated	153	13.9
Pre-menopausal	410	37.3
Menstrual status not indicated	13	1.3
Total	1098	100