

## Evaluation of Abnormal Mammographic Findings in Initial Screening of 1000 Patients during 2008-2009 in Radiology Department of Imam Reza Hospital

Leili Rahimi<sup>1</sup> (MD); Donya Farrokh<sup>1\*</sup> (MD); Nayere Khadem<sup>2</sup> (MD); Mohammad Khajedaluae<sup>3</sup> (MD); Yalda Fallah Rastegar<sup>1</sup> (MD); Ali Mirsalehi<sup>1</sup> (MD)

<sup>1</sup> Department of Radiology, Imam Reza Hospital, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

<sup>2</sup> Department of Obstetrics and Gynecology, Imam Reza Hospital, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

<sup>3</sup> Department of Social Medicine, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

ARTICLE INFO	ABSTRACT
<p><b>Article type:</b> Original Article</p> <hr/> <p><b>Article history:</b> Received: 28-Jan-2015 Accepted: 18-Feb-2015</p> <hr/> <p><b>Keywords:</b> BI-RADS Breast cancer Mammography Screening</p>	<p><b>Introduction:</b> The aim of this study was to categorize abnormal mammographic findings in 1000 patients according to Breast Imaging-Reporting and Data System (BI-RADS) and to report most common age of abnormal mammographic findings, average age of incidence of malignancy and determination of suitable age to start the screening process in women.</p> <p><b>Materials and Methods:</b> 1000 patients attending Radiology department for mammographic screening during 2007-2008 were asked to participate in this study. One radiologist evaluated the mammograms and categorized patients based on the BI-RADS.</p> <p><b>Results:</b> The average age of patients diagnosed with invasive ductal carcinoma and in situ ductal carcinoma was <math>48 \pm 6.51</math> years. The average age of patients in category 5 (that translates into "probably malignant") was <math>(53 \pm 7.87)</math> years. The average age of patients in other categories except for category 0 and category 1 that translates into "negative" was <math>(52.07 \pm 7.81)</math> years. There was also a significant relationship between patient's age and BI-RADS categories according to findings of this study.</p> <p><b>Conclusion:</b> Based on early incidence of irregular mammographies (52.07 years) and early incidence of malignant findings in such mammographies (<math>48 \pm 6.51</math> years), it is suggested to implement screening programs in a great scale for patients older than 35 years old. Based on high percentage of patients with increased breast density findings in mammograms (11.6%) and diagnosis of two cases with invasive ductal carcinoma in this group, we recommend sonography of patients with such findings to rule out the presence or absence of malignancy with a higher accuracy for which mammograms lack a diagnostic value.</p>

► *Please cite this paper as:*

Rahimi L, Farrokh D, Khadem N, Khajedaluae M, Fallah Rastegar Y, Mirsalehi A. Evaluation of Abnormal Mammographic Findings in Initial Screening of 1000 Patients during 2008-2009 in Radiology Department of Imam Reza Hospital. Patient Saf Qual Improv. 2015; 3(2): 216-219.

### Introduction

Breast cancer is the most common malignant disease in women and is an important factor in their mortality (1). It is responsible for (23%) of all cancer cases and (14%) of cancer deaths worldwide (2, 3). The underlying premise for breast cancer screening is that it allows for the detection of breast cancers before they become palpable. Breast cancer is a progressive disease, and small tumors are more likely to be early stage disease, have a better prognosis, and are more successfully treated (4, 5). Due to the lack of definitive

cognition of the factors that can prevent the disease incidence, the single most important factor in reducing mortality caused by the breast cancer and obtaining better remedial results, early detection of the disease through screening by mammography, has been the only appropriate method of screening in women (6, 7). One of highly applicable methods in mammography standard report, following screening, is the Breast Imaging-Reporting and Data System (BI-RADS) classification system that has been used to standardize

concepts in mammographic reports, easier tracking and reduction of the uncertainties associated with mammography reports (8). The BI-RADS is developed to improve communication between physicians, and provides standardised mammographic reporting, breast imaging terminology, a report organization and a classification system (9, 10). It also provides a complete follow-up and outcome monitoring system that allows a screening or clinical practice to determine performance outcomes such as the Positive Predictive Value (PPV) and the percentage of small and node negative cancers. These quality assurance data are meant to improve the quality of patient care (8).

Several studies have shown that the use of BI-RADS in a clinical setting can be useful in predicting the presence of malignancy and improving the choice and efficiency of further necessary examinations (11, 12).

We retrospectively assessed the introduction of BI-RADS. The purpose of this study was to evaluate abnormal mammographic findings among 1000 people attending for screening and classifying them according to BI-RADS system as a common language between the radiologists, and among the secondary objectives of this study is the classification of mammographic findings based on BI-RADS reviewing the most common age of abnormal mammography, the age frequency distribution of patients, the mean age of patients with malignancy diagnosis, studying the type of the mammographic findings and their highest prevalence, and determining the appropriate age to begin screening.

**Materials and Methods**

In this study which showed a cross-sectional assessment, mammographic findings were examined in 1000 women that were referred to radiology department of medical center of Imam Reza Hospital, Mashhad Iran, during 2008-2009, for screening in order to detect breast cancer in its early stages. To report mammograms that were performed by a single radiologist, the BI-RADS system has used mammographic findings such as breast mass, calcification, tissue irregularity of breast and associated findings such as skin thickening, dent and deformation of nipple, Axillar lymphadenopathy and existence of lesions in the mammograms, have examined and after reviewing the mammographic findings, the final conclusion has assigned to one of the BI-RADS six groups. Method of data collection has been as the observation and check list. Data from the observations has been analyzed by the SPSS software and through the chi-square (for qualitative variables), Mann-Whitney and Kruskal-Wallis tests.

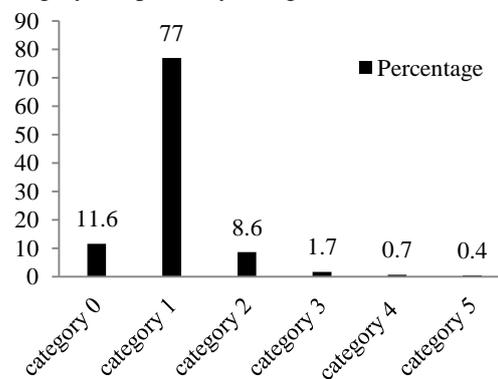
**Results**

In this study, 1000 people were involved that (6.8) percent of them were under the age of 40 years old, 38 percent of people aged 40 to 50, 42.2 percent aged 50

to 60, and 13 percent of them, were 60 to 70 years old.

Most patients (42.2%) aged 60 to 70 years and the lowest number of patients (6.8%) aged less than 40 years old. According to BI-RADS classification, among 1000 performed mammograms in order to do screening, the highest rate is assigned to category 1 (no specific finding on mammography), rate of (77%) and the lowest rate is correspond to category 5 (probably malignant), rate of (0.4%). In general, the frequency percentage of the subjects in category 0, 1, 2, 3, 4, 5 are respectively (11.6, 77, 8.6, 1.7, 0.7) and (0.4) percent.

- Category 0 = imperfect review
- Category 1 = negative
- Category 2 = benign
- Category 3 = probably benign
- Category 4 = suspicious findings
- Category 5 = probably malignant



**Figure1: Frequency distribution of the subjects based on BI-RADS criterion.**

Table 1 shows that the mean age of the individuals in category 5 (probably malignant group) is (53.00 ±7.87) that is the highest, among the age groups and the category 0 is the lowest mean age (43 years old).

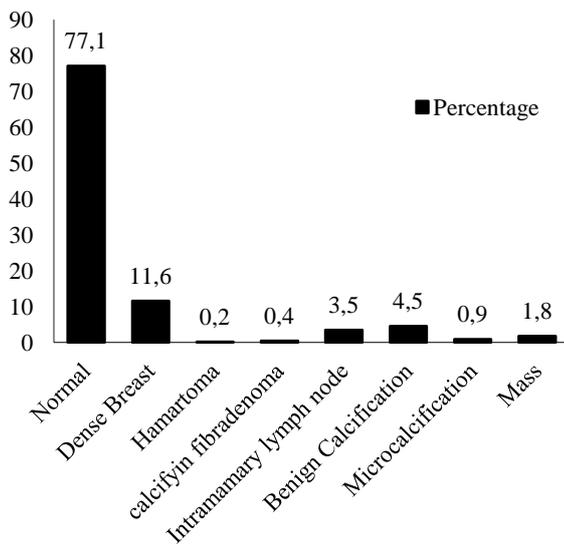
The result of Kruskal-Wallis test shows that there is a significant relationship between the age groups (P<0.001). Mean age of individuals in category 0 (imperfect review) is (43.67±4.63). Mean age of individuals in category 1 (negative) is (52.94 ±6.7).

Mean age of individuals in category 2 (benign) is (52.81±7.7). Mean age of individuals in category 3 (probably benign) is (49.94±8.67). Mean age of individuals in category 4 (suspicious findings) is (47.57±4.61) (P< 0.001).

**Table1 : Age distribution of the subjects based on BI-RADS criterion**

Test result	99% confidence Interval	age		groups
		Mean ± standard deviation	number	
< 0.001	42.55-44.80	43.67± 4.63	116	Category0
	52.32-53.57	52.94 ± 6.70	770	Category 1
	50.63-55.00	52.81 ± 7.70	86	Category 2
	43.22-56.40	49.94 ± 8.67	17	Category3
	41.11-54.04	47.57 ± 4.61	7	Category 4
	30.00-76.00	53.00 ± 7.87	4	Category 5
		51.77 ± 7.25	1000	total

Most results corresponded to normal mammograms as (77.1%). (11.6%) of subjects showed dense breast view in the radiograph. (0.2%) of subjects showed Hamartoma view in the radiograph. (0.4%) of subjects showed Fibroadenoma view in the radiograph. (3.5 %) of subjects had Intramammary lymph nodes. (4.5 %) of subjects showed benign Calcification view in the radiograph. (0.9%) of subjects showed Micro Calcification view in the radiograph. (1.8%) of subjects had Mass.



**Figure2: Frequency distribution of mammographic findings in the subjects.**

Mann-Whitney test shows that the mean age of individuals in all categories except category 1, is significantly lower than the mean age of individuals in category 1(no specific finding on mammography). (48 year compared to 53year)

In this study, (51.5) percent of individuals less than 40 years old had dense breast or abnormal mammography.

And the mean age of individuals whom that have been diagnosed as Ductal carcinoma in situ and Ductal carcinoma invasive, based on biopsy, is  $48 \pm 6.51$  years old.

Table 2 shows that from 116 dense breast cases in mammography results, which 108 cases of them underwent ultrasonography, 91 cases (86.4%) were without any specific finding on ultrasonography, 15 cases (12.9%) demonstrated cyst and 2 cases (1.7%) were diagnosed as malignant.

This study shows that 2 dense breast cases in mammography result demonstrated hypoechoic mass on ultrasonography and the result of biopsy detected invasive Ductal carcinoma for all of them. Among 7 malignant calcification cases, (28.6%) invasive Ductal carcinoma and (71.4%) Ductal carcinoma in situ was diagnosed by biopsy. Also, among 7 mass cases, (57.1%) invasive Ductal carcinoma was detected through biopsy.

**Table2: Distribution of Ultrasound results based on the results of mammography**

Ultrasound result	Dense breast in mammography	
	number	percentage
No specific finding	91	86.4
Cyst	15	12.9
Benign growth	0	0
Malignant	2	1.7
Total	108	100.0

**Discussion**

In our country, Iran, several studies have been accomplished in field of breast cancer screening that I review and compare them with my paper:

In a study that was done in Shahid Beheshti Hospital of Babol, Mammography of 100 referred women to hospital was studied of which, 20 patients had abnormal mammograms and 80 people had normal mammograms. Sample size in this study is small (n=100), whereas in our study, the sample size was 1000, which makes the results considerable and more accurate. Also in our study, instead of classification based on normal and abnormal mammography which is less accurate, findings have been explained based on BI-RADS system that is a classification standard system, in which (77%) of graphs were in category 1 (no specific finding) and (23%) were in other categories (13).

In a study that has been done at the Medical Science University of Tabriz, about the mammography of 40 years old women and older, like the present study, 1000 samples have been investigated. In this research, mean age of individuals with cancer diagnosis has been reported 50-59 years old. In this study, mammography screening is recommended from the age of 40; while in our study, mean age of individuals with malignancy diagnosis is 48 years old (14).

Compared with another research that has been done in the Medical Science University of Urumiya that has investigated results of mammography in 1004 cases, the common age of refer for mammography screening was 29-30 years old; while in our study, the most referred people for undergoing mammography screening were 50-60 (42.2%) years old and people less than 40 years old devoted the least number of referred ones. In the above study, the most number of breast malignancy occurred in fifth and forth decade, respectively which is similar to our research and matches with international statistics (15).

**Conclusion**

Breast cancer screening by mammography is one of the best early cancer diagnosis methods, also putting results in BI-RADS classification system is one of the most proper methods of mammography report which results in creation of a unique language between radiologist and in making an organized approach in field of radiologic report.

According to:

- Low mean age of abnormal mammographic findings and dense breast ( $52.07 \pm 7.81$ )
- Low mean age of malignant findings ( $48 \pm 51.6$ )
- Being 5.51% of mammography with abnormal result or dense breast under age of 40

→ more widespread development of organized plans of screening is recommended and since the age of breast cancer in Iran is 10 years earlier it may be better to start the screening from an earlier age (>35) but to reach the exact age for starting the screening, studying in widespread groups with more samples is needed.

According to:

- Significant percentage of dense breasts among referred individuals (11.6%)
- And diagnosis of 2 Ductal carcinoma invasive cases among them

→ undergoing ultrasonography in women having dense breasts is recommended to diagnosis malignant lesions which are not seen in

mammography.

- In order to reach results such as determination of the exact age of starting screening, amount of influence of screening on decreasing mortality due to breast cancer, amount of prevalence of breast cancer among Iranian women and different age groups, amount of influence of adverse effects due to screening (over diagnosis of breast cancer, psychological and economical effects), investigation of relation between the age of catching breast cancer and family history and risk of breast cancer factors.

→ accomplishing more extensive studies specifically control case studies in bigger groups of women is recommended which needs perfect and organized plans.

### Acknowledgment

With special thanks to Dr. Donya Farrokh (my thesis director) and sincere appreciation of all who have helped me to carry out this paper.

### References

- 1- Brunnicardi FC, Schwartz SI. Schwartz's principles of surgery. 9th ed. New York: MC Graw Hill; 2010. p424-469.
- 2- Wang Y, Zhang Y, Pan C, Ma F, Zhang S. Prediction of Poor Prognosis in Breast Cancer Patients Based on MicroRNA-21 Expression: A Meta-Analysis. *PLoS One*. 2015;10(2):e0118647.
- 3- Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. *CA Cancer J Clin*. 2011 Mar-Apr;61(2):69-90.
- 4- Smith RA, Saslow D, Sawyer KA, Burke W, Costanza ME, Evans WP, 3rd, et al. American Cancer Society guidelines for breast cancer screening: update 2003. *CA Cancer J Clin*. 2003 May-Jun;53(3):141-69.
- 5- Tabar L, Duffy SW, Vitak B, Chen HH, Prevost TC. The natural history of breast carcinoma: what have we learned from screening? *Cancer*. 1999;86(3):449-62.
- 6- Sutton D. Textbook of Radiology and Imaging. 7th ed. vol 2. London: Churchill Livingstone; 2008. P1451-1488.
- 7- Feig SA. Adverse effects of screening mammography. *Radiol Clin North Am*. 2004;42(5):807-19.
- 8- Ojeda-Fournier H, Nguyen JQ. How to improve your breast cancer program: Standardized reporting using the new American College of Radiology Breast Imaging-Reporting and Data System. *Indian J Radiol Imaging*. 2009;19(4):266-77.
- 9- Timmers JM, van Doorne-Nagtegaal HJ, Zonderland HM, van Tinteren H, Visser O, Verbeek AL, et al. The Breast Imaging Reporting and Data System (BI-RADS) in the Dutch breast cancer screening programme: its role as an assessment and stratification tool. *Eur Radiol*. 2012;22(8):1717-23.
- 10- American College of Radiology (2003) ACR BI-RADS®-Mammography: Breast Imaging Reporting and Data System, Breast Imaging Atlas, vol 4. ACR, Preston.
- 11- Zonderland HM, Pope TL, Jr., Nieborg AJ. The positive predictive value of the breast imaging reporting and data system (BI-RADS) as a method of quality assessment in breast imaging in a hospital population. *Eur Radiol*. 2004;14(10):1743-50.
- 12- Ball CG, Butchart M, MacFarlane JK (2002) Effect on biopsy technique of the breast imaging reporting and data system (BI-RADS) for nonpalpable mammographic abnormalities. *Can J Surg* 45:259-263.
- 13- Mahboubi A.\* As, Alizadeh Navaei R. An Analytical Survey on Breast Lesions In Mammography. *Journal of Babol University of Medical Sciences (Jbums)* 2004 Spring 2004 6(2(22)). Epub 55.
- 14- Shakouri Partouei P.\* Nf. Evaluation of the Mammographic Findings in Patients over 40 Years of Age with Mammary Disorders. *Armaghan Danesh* 2004;9(35). Epub 82.
- 15- Sina, Ali. Jalili, Abdolghader. Abdi, Babak. Rasoul, Ghare Aghaji Asl. "investigation of mammography results and accordance of breast tumors with pathological results in Imam Khomeini Hospital, Urumiya". *Medical journal, Urumiya University of Medical Sciences*, Vol. 13, No 3 (2002), p213-219.