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ORIGINAL RESEARCH

Distribution of the Breast Lesions Based on the Mammogram Scoring among Different Age Groups

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ABSTRACT

Background: The mammary glands are prone to various lesions, either benign or malignant, many of benign types that can mature to malignant if untreated. The breast glandular structure can undergo changes from puberty to pregnancy and menopause due to hormonal effects, so the type of lesion occurrence among women varies depending on the age.
Objectives: This study aimed to identify if there is an association between age and BIRADS classification and/ or association between age and type of lesions.
Methodology: One hundred women from the city of Kirkuk participated in this study; they underwent mammography screening for detecting breast lesions. The relationship between age and mammography screening classification has been analyzed.
Results: There is a significant association between age and BIRADS, and the age over 40 year was more frequent in most scores of BIRADS classification. In addition the number of patients with breast lesions in both BIRADS-3 and BIRADS-4 increased significantly with age. On the other hand, there is no significant association between age and types of breast lesion.
Conclusion: There is significant association between age and BIRADS.

Keywords: Breast Lesions, Mammography screening, BIRADS.

INTRODUCTION

The mammary glands are prone to various lesions, either benign or malignant, many of benign type that can mature to malignant if untreated (Paepke et al., 2018). In general breast malignancy is three times more common in developed countries than it is in undeveloped countries, it is the next most prevalent cancer after the cancer of the lung with a growing prevalence (1 in 8 women between ages 45-55) in west, and it is the second commonest cause of death. Meanwhile the lowest rate is found in the Middle East and Asian countries but in the last decades the incidence rate has increased even in these countries (Das et al., 2012). And there is a prediction by GLOBOCAN 2020 that the incidence

will have significantly increases by 2040 in the countries that classified with low and medium human development index (HDI).

The breast glandular structure can undergo changes from puberty to pregnancy and menopause due to hormonal effects, so the type of lesion occurrence among women varies depending on the age. About 80% of breast cancers are diagnosed in females aged 50 and over. In addition, according to epidemiological information, fifty percent of breast cancer cases occur in women between the ages of 50 and 69 years (Kamińska et al., 2015).

Although recent study showed that breast cancer can occur in the young age (Saadaat et al., 2020), but generally, growth disorders and benign tumors are more common, Breast abscess occurs in the adolescent women due to duct ectasia which is resulted from over development of ductal sinus. Meanwhile benign breast lesions are more frequent in the young women at childbearing age, peaking between the ages 30 and 50 of age, while the peak incidence of the breast cancers occur in older age after the menstrual period has stopped (post menopause women) (Duflos et al., 2012).

Radiologist assess the breast lesions to one breast imaging reporting and data system (BI-RADS) category as: 1). BI-RADS 0 indicates that the mammogram images can be hard to read, 2). BI-RADS 1 means there is no anomaly, 3). BI-RADS 2 may show few benign cysts or benign masses, 4). BI-RADS 3 possibly not malignant tumor, 5). BI-RADS4 indicate there is a doubtful of malignant tumor, 6). BI-RADS 5 extremely indicates to malignant tumor, and 7). BI-RADS 6 represents that needs to confirm the malignant tumor by biopsy. In a previous study which based on mammogram screening, we found that the most of the lesions fall within BIRADS-3, followed by BIRADS-4 (Muhammed and MirzaHussain 2021; Mustafa, 2015).

AIMS OF THE STUDY

This study aims to identify if there is an association between age and BIRADS classification.

METHODOLOGY

One hundred women participated in this study; they underwent mammography screening for detecting breast lesions at Kirkuk City. The age of each participant with the result of the mammography screening reported by the radiologist based on the BI-RADS classification was recorded (1,2). The relationship between age and mammography screening classification has been analyzed by using (F) test and post hock test.

The collection of study cases started from November 2020 and continued until March 2021.

RESULTS

According to the mammography reports, the distribution of breast lesions based on BIRADS classification in our study was between BIRADS score 1 to 5, and at the same time neither BIRADS-0 nor BIRADS-6 case appeared. On the other hand the most frequent age in most BIRADS scores was between 40-49 years, and it had a significant relationship between the assessment category (BIRADS) and the women's age at p-value = 0.018 (Table 1). The significance appeared in diagnostic category as suspicious malignant in BIRADS (which includes potentially malignant lesions “BIRADS-4”) and this significant difference appeared at level 0.05 with all BIRADS categories except with the diagnostic category as high suggestive malignant “BIRADS-5” (Table 2).

Meanwhile, the results showed there was high significant association between age and both BIRADS-3 and BIRADS- 4 at P-value = 0.00 (Table 3). The table (4) shows that the increase in age is accompanied by a significant increase in the number of cases of breast lesions that fall within BIRADS-3, the same thing appears with the lesions that fall

within the BIRADS-4 level, but with age 50 and over the increment becomes insignificant.

As previous study indicated that the main types of breast lesion that reported by radiologist were fibrocystic changes (36%) and fibro adenoma (27%) (1), therefore, the data of relationship between age and types of breast lesion were tabled in table (5) which reveals that there is no significant relationship has been reported among women's age with regard to nature of the breast lesion.

DISCUSSION

The study showed that the majority of lesions appeared in women at age 40 and over. The reason for this result is probably due to that the tendency for breast lesions and malignancy increases at age 40 years and over (Nwadike et al., 2017), on the other hand the ages over 40 years are the most suitable ages for mammography screening, because the density of the breast tissue decreases with age, which makes this examination more detectable for lesions and more accurate in diagnosis (American College of Radiology, 2013).

The significant association between ages and BI-RADS scores means age related breast lesions. As well as, age related within BIRADS-3 and BIRADS-4. The diagnosis as probably benign in the BIRADS is significantly age related. Meanwhile the diagnosis as suspicious malignant in BIRAD is highly significant in age over 30-39 years old of women at level 0.05 but this significance disappeared between age 50-59 and over 60 years old. It is useful to note the women at age 40-49 years are more vulnerable to breast malignancy (American Cancer Society 2012; Nwadike et al., 2017). The breast malignancy is an age specific occurrence and the profile of incidence increases exponentially until age post menopause then the increment become slowly. The incidence of breast cancer at early age mostly is inherited. Beside that studies indicate that the growth of late onset of breast malignancy is more slowly and less aggressive than early onset (Benz, 2008).

CONCLUSION

There is a significant association between age and BIRADS meanwhile no significant relationship appeared between age and types of breast lesion.

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TABLES

Table (1): association between age and BIRADS

Age BIRADS	Source of variance	Sum of Squares	df	Mean Square	F	Sig.
Assessment category	Between Groups	915.897619	4	228.97440	3.124	**0.018***
	Within Groups	6963.102381	95	73.295815		
	Total	**7879**	**99**			

df= degree of freedom, sig = significance, * means there is significant difference.

There is significant difference between age and assessment category.

Table (2): Post Hoc Test for Significant Differences Regarding Age of Women and BIRADS (1).

		Negative differences between average	LSD	Benign Finding differences between average	LSD	Probably Benign differences between average	LSD	Suspicious Malignant differences between average	LSD
BIRADS	**Average of age/ years**	41.643		38		42.25		47.971	
Possible Finding (BIRADS-0)	0								

Negative (BIRADS-1)	41.643								
Benign Finding (BIRADS-2)	38	3.64286	9.637						
Probably Benign (BIRADS-3)	42.25	-0.6071	5.216	-4.25	8.8773				
Suspicious Malignant (BIRADS-4)	47.971	-6.3286*	5.37545	-9.971*	8.97186835	-5.721*	3.8501		
High Suggestive Malignant (BIRADS-5)	45.667	-4.0238	10.8145	-7.667	12.982939	2.3048	10.143237	2.3048	10.226
Known Biopsy Proven (BIRADS-6)	0								

LSD; least significant difference, * means there is significant differences.
(1); The LSDs for BIRADS- 0 and level BIRADS-6 are not calculated because there is no case that falls within these two scores

The diagnostic category as suspicious malignant in BIRADS has significant differences at level 0.05 with all BIRADS categories except with the diagnostic category as high suggestive malignant.

Table (3): Association between Age of women with Two Scores of BIRADS

BIRAD	**Age**	**Association between Age of women with Two Scores of BIRADS**				
	Source of variance	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Probably Benign (BIRADS-3)	Between Groups	2773.0273	4	693.2568	73.1188	0,000
	Within Groups	369.76812	39	9.4812		
	Total	**3142.796**	**43**			
Suspicious Malignant (BIRADS -4)	Between Groups	2528.779004	3	842.9263348	131.051	0,000
	Within Groups	199.3924242	31	6.432013685	7	
	Total	**2728.171429**	**34**			

df: degree of freedom, p-Value: probability value, Sig: Significance, N.S: Not significant, S: Significant, H.S: High significant, , No. = Number.

There are significant differences between age and both BIRADS.

Table (4): Post Hoc Test for Association between Age of Women and BIRADS - 3 and BIRADS - 4.

1. **Association Between Patients' Age with Their Diagnosis as Probably Benign in BIRDS (BIRADS-3)**

		20-29 differences between average	LSD	30-39 differences between average	LSD	40-49 differences between average	LSD	50-59 differences between average	LSD
Age intervals / year	Average	27.75		35.55		43.81		52.94	
20-29	27.75								
30-39	35.54545	-7.7955*	3.6365						
40-49	43.80952	-15.886*	3.3853	-8.091*	2.2999				
50-59	52.9375	-24.85*	4.1778	-17.05*	3.6365	-8.96*	9.547		
60	63	-35.25*	5.3938	-27.45*	4.7877	-19.4*	4.6	-10.4*	5.210879

2. **Association Between Patients' Age with Their Diagnosis as Suspicious in BIRADS (BIRADS-4)**

		30-39 differences between average	LSD	40-49 differences between average	LSD	50-59 differences between average	LSD
Age	Average	32.8		44.733		53.091	
30-39	32.8						
40-49	44.733	-11.933*	2.671065				
50-59	53.091	-20.29*	2.789836	-8.35758*	2.053*		
60	63.25	-30.45*	1.701295	-18.52*	2.911*	-10.159	19.41643796

* Means there is significant difference at level 0.05.

Table (5): Association between types of breast lesions and Women's Age.

Age Nature of breast	Source of variance	Sum of Squares	df	Mean Square	F	Sig.
Fibroadenoma	Between Groups	595.186	10	59.519	.727	.697
	Within Groups	7283.814	89	81.841		
	Total	**7879.000**	**99**			
Mild fibrocystic change	Between Groups	234.859	27	8.698	.996	.485
	Within Groups	628.531	72	8.730		
	Total	**863.390**	**99**			

No association appears in between age and type of breast lesion