

Relation of Breast Density with Age and Ethnicity in Malaysia

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Abstract — *Breast cancer is one of the cancer that affect women the most. In order to reduce the morbidity and mortality rate due to breast cancer, the best way is to screen and diagnose it as early as possible. There are several ways to diagnose breast cancer; one of them is using mammography. In mammography, cancer or lesions are detected by validating the lesion density, size, shape and nature. Since density is one of the parameter of detecting lesions, it may be difficult for the radiologists to detect the lesions in dense breasts. This study is organized to determine the distribution and association of breast density with age and ethnicity. A cross sectional study was conducted in Department of Imaging, Country Height Health Sanctuary. All medical record of patients underwent medical check-up at the center from January 2007 to December 2009 were selected for this study. Standardized checklist was used to retrieve the data from available medical record of patients in the center.*

Results: With the total number of 610 subjects, there were significant associations between breast density and age group. However, there were no significant association between breast density and ethnic groups. As conclusion Age has association with breast density while there are no significant association between breast density and ethnic groups¹.

Keywords — mammogram, breast density, ethnicity.

I. INTRODUCTION

Breast cancer is one of the cancer that affect women the most. In 2007, 32.1% cases of female breast cancer were reported to the National Cancer Registry, making it the commonest cancer in Malaysian women. In order to reduce the morbidity and mortality rate due to breast cancer, the best way is to screen and diagnose it as early as possible. There are several ways to diagnose breast cancer; one of them is using mammography. In mammography, cancer or lesions are detected by validating the lesion density, size, shape and nature. Since density is one of the parameter of detecting lesions, it may be difficult for the radiologists to detect the lesions in dense breasts. Recent studies have shown that dense breast is considered as one of the risk factors of breast cancer (1).

There are many researches done to determine factors that may affect breast density such as age (2), ethnic, body mass index, bone mineral density and lipid profile (3). However, at present, there is no research done to determine the relationship between breast density against age and ethnic groups for Malaysian population. This study provides information on such factors associated with breast density and determine group of people with higher risk of getting breast cancer, therefore further actions can be taken.

II. BACKGROUND

There are various factors that affect breast density. Maskarinec et.al has published data indicated that breast densities are affected by demographic, anthropometric, reproductive and lifestyles factors (4).

Kelemen et al. have suggested that lower mammographic density is associated with increasing age, with some of the greatest decreases occurring with menopause (5). The decline in density with age may seem paradoxical, as breast cancer incidence increases with age, but this apparent paradox may be resolved by reference to a model of breast cancer incidence proposed by Pike and colleagues. The model is based on the concept that breast tissue age, or breast tissue exposure rather than chronological age, is the relevant measure for describing the incidence of breast cancer. Breast tissue age is closely associated with exposure of breast tissue to hormones and growth factors, and to the effects that menarche, pregnancy and menopause have on these exposures and on susceptibility to carcinogens. Breast tissue exposure to hormones is the greatest at the time of menarche, falls with pregnancy, is further reduced in the premenopausal period, and is the least after the menopause (6).

The observation that ethnicity showed a stronger association with breast density than location agrees with findings from a

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twin study suggesting that 60% or more of variability in breast density is related to genetic factors (4). The differences in breast cancer incidence rates between most ethnic groups can be largely explained by difference in risk factors (7). In Malaysia, the prevalence of breast cancer is different among the three main ethnic groups. According to National Cancer Registry (8), the incidence of breast cancer is the highest in Chinese women with age-standardized rate of 38.1/ 100 000 population, followed by Indian with age-standardized rate of 33.7/ 100 000 population and Malay with age-standardized rate of 25.4/ 100 000 population (8). The differences may be related to diet and social factors like socioeconomic status.

III. METHODOLOGY

This was a cross sectional descriptive study, conducted in Country Height Health Sanctuary (CHHS), located in Seri Kembangan, Selangor, Malaysia. The data were taken at the time of research without any intervention or follow-up. A total of 610 women underwent mammogram screening in CHHS from January 2007 to December 2009 with the age of 45 to 69 years old were selected as participants. Exclusion criteria include those women who had history of breast disease or had signs and symptoms related to breast disease, breast surgery, breast augmentation and BIRADS Assessment Categories of 0 and 6.

Random sampling was used to choose samples from the lists of medical records of women underwent mammographic screening that matched our inclusion and exclusion criteria. A standardized checklist which contains all the variables was prepared prior to data collection. Statistical Package for Social Science (SPSS) version 17 was used to analyze the selected data. Descriptive analysis was done to find out the proportion and percentages of each classification of breast density to every independent factor. Chi-square was used to determine association between breast density with age group and ethnic group and BIRADS Assessment Categories for Detecting Abnormalities.

IV. RESULTS

A. Socio-demographic Characteristics

Table 1 shows the distribution of subjects by socio-demographic characteristics. Out of the 610 patients, 274(44.9%) were in the age group of 40-49 years of age, 294(48.2%) in the age group of 50-59 years of age, while the other 42 women (6.9%) were between 60-69 years old. By ethnic distribution, the majority were Chinese with 458(70.1%), followed by Malays with 125(20.5%), and the least were Indian with only 27(4.4%) people.

B. Mammogram

Table 2 shows the distribution of subjects by mammography results. For breast density distribution, there was 36 (5.9%) samples with BIRADS I while 342 (56.1%) samples in BIRADS II. BIRADS III has frequency of 187(30.7%) while

the rest, which were 45 (7.4%) were in BIRADS IV.

For distribution based on mammographic pathology category, 464(76.1%) were in category 1 while 136(22.3%) were in category 2. Only 9(1.5%) were in category 3 while the remaining one (0.2%) was in category 4. None of the sample was in category 5. The findings reflected that majority of the subjects have normal breasts.

TABLE 1: DISTRIBUTION OF SUBJECTS BY SOCIO-DEMOGRAPHIC CHARACTERISTICS
(A) AGE GROUPS AND (B) ETHNIC GROUPS

(a)

| Age group | Frequency (n) | Percentage (%) |
|-----------|---------------|----------------|
| 40-49 | 274 | 44.9 |
| 50-59 | 294 | 48.2 |
| 60-69 | 42 | 6.9 |

(b)

| Ethnic | Frequency (n) | Percentage (%) |
|---------|---------------|----------------|
| Malay | 125 | 20.5 |
| Chinese | 458 | 70.1 |
| Indian | 27 | 4.4 |

TABLE 2: DISTRIBUTIONS OF SUBJECTS BY BIRADS ASSESSMENT CATEGORIES OF BREAST DENSITY
(A) AND BIRADS ASSESSMENT CATEGORIES FOR DETECTING ABNORMALITIES (B)

(a)

| BIRADS Assessment Categories of Breast Density | Frequency (n) | Percentage (%) |
|--|---------------|----------------|
| BIRADS I | 36 | 5.9 |
| BIRADS II | 342 | 56.1 |
| BIRADS III | 187 | 30.7 |
| BIRADS IV | 45 | 7.4 |

(b)

| BIRADS Assessment Categories For Detecting Abnormalities | Frequency (n) | Percentage (%) |
|--|---------------|----------------|
| Category 1 | 464 | 76.1 |
| Category 2 | 136 | 22.3 |
| Category 3 | 9 | 1.5 |
| Category 4 | 1 | 0.2 |
| Category 5 | 0 | 0 |

V. DISCUSSION

A. Age Group

Our study shows that there is association between breast density and age group ($p < 0.05$). The breast density differs among different age groups. Younger age group is having denser breast while older age group mostly has less dense breast. This can be explained by changes occur in breast due to aging. The proportion of breast fat increases and the epithelium involutes due to aging.

The same results were found in other studies conducted by Roubidou et al. (9), Buchanan et al. (10) and Grove et al. (11). With decreased breast density, the breast cancer risk also decreases. However, by increasing age, the breast cancer risk also increases.

Apparently, decline in density with age may seem paradoxical as women who have more than 50% of total breast area is mammographically dense have high breast density and are at 3- to 5-fold greater risk for breast cancer than women in whom breast density is less than 25% (12). Fortunately, those contrast findings can be resolved by reference to a model of breast cancer incidence proposed by Pike and colleagues. The model is based on the concept that breast tissue age, or breast tissue exposure rather than chronological age, is the relevant measure for describing the incidence of breast cancer (13).

Our p-value is much higher than p-value from other studies. This can be caused by the different tests used. In our study, we used non-parametric methods which have lower power that may have tendency not detect a difference when it is there. In other words, the difference of breast density among different age groups is less likely to be detected.

B. Ethnicity

In current investigation, we did not find any association between ethnicity and mammographic breast density among ethnic groups in Malaysia. In a study by Maskarinec et al., ethnicity showed a strong association with breast density where 60% or more of variability in breast density is related to genetic factors (4).

Other series have noted a lower breast density among African American women when compared with Latino and Caucasian women. This study controlled for different factors, including age, BMI, selected menstrual or reproductive factors, family history, and hormone replacement therapy use (14). However, this study includes only small sample size. So, racial difference is associated with breast density and it explains the ethnic difference in risk of developing breast cancer.

Nevertheless, according to a more recent study with a larger sample group, which involved 15,292 of white, African American, and Asian women, they did not find evidence that mammographic breast density differences exist across racial groups (15).

The differences in socioeconomic conditions, health awareness, and accessibility of breast cancer screening among the ethnic groups may affect the distribution of ethnicity in this

study (16).

Ethnicity is not specified for any BIRADS categories. In other words, there is no significant association between ethnicity and breast density. There is no significant difference of breast density among ethnic groups in Malaysia. So, ethnicity and breast density do not explain the variability of breast cancer risk among ethnic groups in Malaysia. Diet intake, lifestyle, socioeconomic status and genetic variations among major ethnic groups in Malaysia may have impact with this outcome as they may differ with other ethnic groups like the Caucasians and Latinas. Asians have distinctly different physical proportions, including breast size, cup size, and BMI (15). Therefore, breast density may not be as predictive of breast cancer risk across racial groups in Malaysia. However, density may still be predictive of risk within racial groups or within groups with similar BMI or breast size (15). We did not control these factors and therefore need to be further studied.

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