₁ # Volume XVII Issue 1 Version I

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₆ ## Abstract

₇ Background: A number of factors such as age, hormones, reproductive history, diet and
₈ genetics influence the morphology of a woman's breast. A study conducted found age,
₉ hormones, reproductive history, genetics and diet (body habitus) to be the major contributors
₁₀ to breast density. The purpose of this study was to assess knowledge and find association of
₁₁ breast morphology with sociodemographic factors, family information and gynecology history
₁₂ by ultrasound.Methods: A self-administration questionnaire that included information of
₁₃ patients and an analytic crosssectional study design was used to determine the morphology of
₁₄ normal breast among all respondents that attending the imaging department of Golden Horses
₁₅ Health Sanctuary, Sri-Kembangan located in Klang Valley, Selangor, Malaysia. All women
₁₆ were subjected to bilateral whole breast ultrasound using ultrasound.

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₁₈ *Index terms*— breast morphology, ultrasound, age, ethnic, socio-demographic factors, marital status.

1 I. Introduction

₂₀ he breast which is primarily influenced by the endocrine system serves as a secondary sex organ in humans and
₂₁ also possesses the ability to produce milk in mammals. With these vital functions of the breast, it is important
₂₂ for the radiologist to understand the normal anatomy and physiology of the breast in order to be able to identify
₂₃ abnormalities which may occur in any breast [1]. The major anatomical structures in the breast include skin,
₂₄ fat, facial layers, Cooper ligaments, fibro glandular tissue, lymphatic, and neurovascular structures, which are all
₂₅ placed over the chest wall. The volume of fibro glandular tissue in women differs with age, with many women
₂₆ having more fat within the breasts after menopause [2]. Breast ultrasound plays a major role in the identification,
₂₇ diagnosis, and staging of breast cancer [3,4]. At present, it is generally assumed that glandular tissue, which is a
₂₈ common site for breast cancer, is the most vulnerable among the tissues (adipose, skin, and areolar tissues) making
₂₉ up the breast [5]. The amount of glandular tissue is linked to breast cancer risk, so an objective quantitative
₃₀ analysis of glandular tissue can aid in risk estimation [6]. Based on the study, the morphology of breast using
₃₁ ultrasound assessment suggesting that in young non lactating breast, the tissue is primarily composed of fibro
₃₂ glandular tissue with little or no subcutaneous fat. With increasing age and parity, fat is deposited in both the
₃₃ subcutaneous and retro mammary layers [7]. The difference in incidence rates between the Malays and Chinese
₃₄ can be explained in terms of the risk factors e.g. Increasing age, geographic location, family history, reproductive
₃₅ factors, oral contraceptives, Hormone replacement therapy and more, known to be associated with breast cancer.
₃₆ There is also a possibility of under-reporting in Malay women because they are more likely to seek alternative
₃₇ therapy and hence not present to the medical practitioner [8].The main reason for conducting this study is to
₃₈ reduce breast cancer percentage in Malaysia by early detection of abnormalities which may lead to cancer, and
₃₉ that can be done by referencing the diagnosis of normality and its measurements in different age and ethnic
₄₀ groups.

2 II. Patients and Method a) Study design and population

₄₂ Analytic cross-sectional research design was conducted from October 2013 to December 2014 on females admitted
₄₃ to the imaging department of Golden Horses Health Sanctuary (GHHS) for breast checking in Seri Kembangan

district located within Klang Valley, Selangor, Malaysia. Respondents were identified and selected using modest random sampling method. Subjects were randomly selected from the list of respondents that went to the Imaging Department in the GHHS using SPSS. This list was used as sample frame. A total of 615 females were selected.

3   b) Data collection

Data was collected using self -administered questionnaires which was developed and validated especially for this study. All women subjected to bilateral whole breast ultrasound examination using Philips ultrasound iu22. Both breasts were scanned utilaizing clockwize, overlaping radial approch. The breast divided into four quadrants. Each quadrant was scanned in a radial fashion to accommodate the arrangement of ducts in the breast with a linear array probe L17-5 (5-17MHz), depth 3.5-4.0 cm and gain 86%-87%. Data are acquired at the region of interest (ROI).

4   c) Inclusion Criteria

The inclusion criteria for normal breast respondents were females aged 20 to 70 years.

5   d) Exclusion Criteria

A. Male B. Females < 20 years old because permission was needed from parents C. Females > 70 years old because no obvious changes occurred on breast D. Women that used contraceptive pills or device. E. Women that used hormone replacement therapy. F. Women with history of breast diseases such as: i. Benign breast tumors: fibrosis or cysts and fibroadenoma or intraductal papilloma are abnormal growths which caused a change in the breast tissues.

ii. Malignant breast tumors: carcinoma, adenocarcinoma, carcinoma in situ, invasive carcinoma and sarcoma are types of breast cancer that grow in glandular tissue and breast duct. iii. Breast infections such as mastitis occurred frequently during breast feeding. iv. Nipple infections, mammary duct ectasia and intraductal papilloma caused nipple discharge.

6   e) Ethical consideration

Ethical approval to conduct the study was obtained from medical research ethnics committee of the Universiti Putra Malaysia. Then approval was obtained from The Medical Research and Ethics Committee, Ministry of Health -Malaysia. A written consent was taken from each respondent before conducting the survey.

7   f) Statistical analyses

All analyses were performed using SPSS ® software, version 21.0 (SPSS Inc., Chicago, IL, USA). Normality test were done and all of the quantitative data were found to be normally distributed. Descriptive statistical analysis, which included frequency, mean and standard deviation (SD), was used to characterize the data. Parametric test (one-way ANOVA and t-test) and non-parametric test (Kruskal Wallis and Mann-Whitney) employed to determine the association between normal breast morphology and socio-demographic factors, family information and gynecology history. The level of statistical significance was set at ? < 0.05.

8   g) Breast image analysis

For measuring and analyzing the breast tissues, Philips DICOM Viewer software (R 3.0-SP03) was used. The measuring unit for each tissue is (mm), and the dimensions were obtained. Furthermore, all the measured data were collected by uni-dimensional (length) for subcutaneous fat while two-dimensional (length × width) for glandular tissue and fat lobules, sizing from three different areas for each tissue three readings were taken and average obtained to minimize errors.

9   III. Result

Total of 700 respondents were selected as sample for this study. However 85 respondents (12.14%) returned questionnaires were omitted due to either incomplete answers or were inaccurately completed. Hence, 615 females participated in this study were counted. The giving response rate in this study was 87.9%.

10   a) Factors associated with performing US on breast morphology

Table 1 The percentage of participants who performed Ultrasound was 615 (100%). Among those who did ultrasound wide range of breast tissue size founded.

As shown on Table 2 and Table 3 the relationship between breast morphology and socio demographic parameter, family information and gynecology history. In each quadrant of the breast, the distribution varied between normal and non-normal. For analyzing normal data one-way ANOVA and t-test was used to find the association between breast morphology and socio demographic factors, marital status and breast cancer history

after using homogeneity test of variance, and according to that test plus Levene statistics, variances were equal among age groups, religion, education level, occupation, income and marital status and some tissue in different quadrant for right and left breast i.e subcutaneous fat of left breast in UOQ (L=0.48, p-value=0.75), LOQ (L=1.82, p-value=0.13) and UIQ (L=1.27, p-value=0.24) respectively. For nonnormal data, nonparametric test of Kruskal Wallis and Mann-Whitney was used. At the current study, there was variation and association in tissue with age, ethnic and religion in different quadrants with p-value > 0.05, except in some quadrant of other tissue of right and left breast quadrants, while in education level, occupation, income and marital status there were no association with breast morphology.

11 IV. Discussion

Aging of human breast tissue is often followed by particular structural and functional changes and these changes have been linked by several research findings to the development of aging-related cancer. At the cellular level, morphological and functional changes which may include increased cell size and decreased proliferation may result in aging of human mammary epithelial cells [9]. The development of the breast begins from the stage of fetal development with mammary ridge or milk line which is usually a thickening in the chest region after which the nipples and milk duct system begin to develop when the baby is born, then at puberty stage, child-bearing phase, during menstrual cycle and finally at menopause [10].

In the present study the finding is consistent as in other studies which linked age with breast changes [11,12]. Our work confirms that an increase in age is associated with a reduction in glandular tissue. Moreover the increment of fat in the breast and the radiographic appearance of the breast vary among women of the same age because of variations in breast tissue composition [13]. Most of the studies done in Malaysia, focused on the knowledge of breast cancer screening using mammography or breast selfexamination with socio demographic factors such as [14][15][16]. These studies have similar findings of the association of women with ethnicity, religion, occupation, income, marital status, degree level of education. Family history of breast cancer was higher than those with secondary or primary level of education (p<0.001). Only a few studies have reported on the variation of breast density by race, however, one study done in Department of Imaging, Country Height Health Sanctuary, Malaysia With the total number of 610 subjects, there were significant associations between breast density and age group and there were no significant association with ethnic groups [17][18][19][20]. This is important, because different racial/ethnic groups have different breast cancer risk and these differences change with age [21]. Furthermore, some studies found higher breast cancer risk among women with professional occupations such as nursing [22] and teaching [23][24][25][26]. A study by Rubin et al., (1993) found teachers to be twice at risk of breast cancer mortality compared to other women. Although marital status have been commonly identified by various studies [27][28][29][30] as a positive factor in early cancer diagnosis and better survival, local studies [31,32] to date have not established any significant relationship between marriage and uptake of breast cancer screening. However, there was a study among female secondary school teachers from 20 selected secondary schools in Selangor, Malaysia to determine the knowledge and practices on breast cancer screening and socio demographic but there was no significant knowledge [33]. Yet no studies have been carried out on normal breast morphology related to the socio demographic factors using ultrasound.

12 V. Limitation

As this study was designed to be crosssectional. It may not be possible to conclude that the factors were found to be associated with normal breast morphology predated onset. Incidentally all the respondents that were selected from GHHS which is located in urban area; hence, the result cannot be generalized to both urban and rural. [1]
[2] [3]

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[3]*significance value at level p<0.005 © 2017 Global Journals Inc. (US)

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shows the distribution of respondents
according socio-demographic factors (age, race,
religion, education level, occupation, and income),
family information (marital status), and gynecology
history (menarche age, menopause age and family
history of breast cancer). Overall, the majority of mean
age were 45.92 (SD= 12.94), Chinese 326(51.4%),
Buddhism 282(45.9%), having degree 114 (18.5%),
most of them working 209(60%), having income rang
1001-3000RM, married 538(87.5%), the mean of first
menstrual cycle was 12.1(SD0.64), the mean of
menopausal of premenopausal age was 43.00(SD5.54),

Figure 1: Table 1 :

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Effect of Socio-Demographic Factors, Family Information and Gynecology History on Ultrasound Brea
Morphologyin Different Age Groups

Breast morphology		Age			
		F	P-value	$?^2$	
	Subcutaneous fat				
Year	Upper outer Lower outer	23.62	0.000*	65.8	0.000*
2017	Lower inner Upper inner	25.46	0.000*		
		24.4	0.000*		
	Glandular tissue				

Volume Upper outer Lower outer Lower inner Upper inner Fat lobules Upper outer Lower outer Lower inner U
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Figure 2: Table 2 :

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	Education	P-value		0.000*	3.68	0.000*	0.003*	4.05	3.07	10.08	3.59	0.93	4.01	
	level	F	?²	3.85	0.013*	3.09	2.92	0.008*	0.029*	0.018*	0.014*	0.430	0.008*	
		P-value		0.010*		0.028*	0.035*							
		P-value												
		?²		19.14		30.87	14.03							
non-Socio	Religion	?² P-		7.61	17.95	33.91	15.22	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	
normal de- Eth-	mo- nic	value		0.001*	0.000*	0.000*	0.000*	19.43	14.08	11.64	17.56	17.22	19.79	
dis- mo- nic	graphic	F P-			6.69			0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	
tri- graphic	fac-	value F			0.000*			28.04	22.12	16.05	24.90	27.36	31.78	
bu- fac-	tors	P-value												
tion tors														
		?²			7.33			68.41	31.84	26.61	47.37	24.85	40.27	
		P-value			0.000*			0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	
	Age	F P-		8.66 5.51		4.19								
		value		0.000* 0.000*		0.002*								
	Breast morphology	Subcutaneous fat	Upper outer	Lower outer	Lower inner	Upper inner	Glandular tissue	Upper outer	Lower inner	Upper inner	Fat lobules	Upper outer	Lower outer	

[Note: DVolume XVII Issue 1 Version I]

Figure 3: Table 3 :

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