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The Normal Types of Ultrasound Breast Morphology (Glandular Tissue And Fat Lobules) among Women of Different Age Groups in Golden Horses Health Sanctuary

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K **:** Breast morphology; Ultrasound; Age; Ethnic

I

e breast which is primarily in uenced by the endocrine system serves as a secondary sex organ in humans and also possesses the ability to produce milk in mammals. With these vital functions of the breast, it is important for the radiologist to understand the normal anatomy and physiology of it, in order to be able to identify abnormalities which may occur [1]. Even though ultrasound technique has been thought to be the best technique for the detection of breast abnormalities, it has been recorded by researches that, in the last few years a number of radiologists have experienced problems in distinguishing between normal and pathological changes in the breast based on age by ultrasound procedure [2].

e major anatomical structures in the breast include skin, fat, facial layers, Cooper ligaments, bro glandular tissue, lymphatic, and neurovascular structures, which are all placed over the chest wall. e volume of bro glandular tissue in women di ers with age, with many women having more fat within the breasts a er menopause [3]. Previous study states that breast development occurs in di erent phases of a woman's life [4]. e development of the mammary gland as a complex organ starts in the early phase of gestation with a steady change in shape, function and size from puberty to menopause [5-6]. Recent researches have added new knowledge about the anatomy of the breast which indicates fat in the breast to be hypoechoic and dark gray in color, while broglandular tissue is hyperechoic and white in gray-scale intensity [7]. A number of factors such as age, hormones, reproductive history, diet and genetics in uence the density of a

for breast checking in. Respondents were identi ed and selected using simple random sampling method. Subjects were randomly selected from the list of respondents that went to the Imaging Department in the Golden Horses Health Sanctu8loh02theu8l[S. is list was used as sample frame. A standardized questionnaire that was designed in two languages (major Malaysian languages); Malay and English. e forward-backward translation method was used in translating the questionnaire into each language to ensure conceptu8l equivalence.

As Klang Valley`s residents comprised of three major ethnic groups (Malay, Chinese and Indian) we chose Golden Horses Health Sanctu8loh(GHHS) located in Seri Kembangan district located within Klang Valley, Selangor, Malaysia and almost all of the outpatients reside in Klang Valley.

Sample size was calculated based on previous nding since no study has been conducted on normal ultrasound breast morphology. For this reason, the mean percent mammographic density in premenopausal according to a study carried out by Butler et al., was 47.4 and the mean percent mammographic density in postmenopausal was 41.7. In total, six hundred and een females were selected. Ethical clearance for the study was reviewed and approved by Jawatankuasa Etika, Universiti Putra Malaysia and Medical Research Ethics Committee (MREC) of 5 (ly whd8a Tw -1..sity in postceTdb Tw 8(Sanages)0.5 (Subjects)8e str)0.been conducted whd hicelpostthis r0 -1 into each language ti fTrmratia Tw -sity in postO ea

e measured data were collected by uni-dimensional (length) for support ligaments and ducts while two-dimensional (length × width) for glandular tissue and fat lobules, sizing from three di erent areas for each tissue three readings were taken and average obtained to minimize errors.

R

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. e giving response rate in this study was 87.9%.

Breast morphology of right and le breast of pre-menopausal and post-menopausal groups in di erent age and ethnic group.

e tables below (Tables 1-4) shows that there was a race distribution of the study population, using U/S for breast tissues for four di erent quadrants of the right and le breast of respondents in pre-menopausal and post-menopausal groups (Figures 1 and 2).

G

e mean of glandular tissue (length × width) in pre- menopausal group for upper outer and upper inner quadrants have the highest values compared with lower outer and lower inner quadrants which have the least values in each ethnic group for example, we can see tha mean of glandular tissue in right upper outer in pre-menopausal and post-menopausal for Indian respondents were 22.51 mm ± 8.79 mm and 22.80 mm ± 10.08 mm respectively while in Chinese respondents were 17.73 mm ± 7.53 mm and 14.18 mm ± 6.35 mm. In post-menopausal age group the average value of glandular tissue in upper outer of right and le breast still have the highest values in each ethnic group compared to the other quadrants which became less than values in pre-menopause and are a bit di erent from each other.

F

Indian females have a larger mean for fat lobules (length x width) in four areas compared to Malay and Chinese and Chinese have a smaller mean. e mean of fat lobules (length × width) in pre-menopausal group for lower outer and lower inner quadrants in right and le breast have the highest values compared to the upper outer and upper inner quadrants which have the least values in each ethnic group. For example, the mean of fat lobules in right lower outer and lower inner for Indian and Malay respondents for pre-menopausal and post-menopausal were 26.57 mm ± 12.05 mm, 27.10 mm ± 11.51 mm and 22.52 mm ± 12.21 mm, 15.26 mm ± 8.46 mm respectively while in Chinese respondents were 15.84 mm ± 9.51mm and 17.91 mm ± 10.65 mm. In post-menopausal age group the average value of fat lobules in lower outer and lower inner of right and le breast still have the highest values in each ethnic group compared to the other quadrants which became slightly higher than values in pre-menopause and a little di erence exist among them. In addition, range and standard deviation in pre-menopausal and post-menopausal groups in di erent quadrants and ethnic group were large.

D

Aging of human breast tissue is o en followed by particular structural and functional changes and these changes have been linked by several research ndings 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]. e development of the

Breast Quadrants	1 p77											

using standard sonography. It is important for a specialist to have prior knowledge of the normal breast and its variants in order to be able to detect abnormalities [5]. Breast ultrasound plays a major role in the identi cation, diagnosis, and staging of breast cancer and the di erent so -tissue structures in the breast have di erent echogenicities [10].

In order not to not cause any harm to patients' and mistake normal anatomy for pathologic abnormality, it is necessary to have a prior knowledge of the breast anatomy; the anatomy of a normal breast can be gotten using imaging modalities. is knowledge is also essential in planning of appropriate breast interventions and avoiding

unwanted complications caused by wrong procedures [6,11]. eas most of the other studies conducted focused on asymmetry betweer major anatomical structures in the breast include skin, Less or no ne and right breast by mammogram as a sign of breast disease [20,21]. subcutaneous fat may be seen in young women because the quantity of subcutaneous fat varies considerably with age and parity and large inter individual variation occur. As it is structurally homogeneous, subcutaneous fat appears hypoechoic [12].

In this study, wide spectrum of breast morphology was found. ese ndings are similar to the study conducted, [13] observed that breast glandularity decreases with increasing age (20.1% reduction of breast glandularity from 47 to 72 years). is decrement is due to an increase in the proportion of adipose tissue in the breast. is trend is similar to that reported [14-16] for German, British, and Jamaican studies, respectively. Interestingly, we found that the greatest rate of change occurs a er the age of 50 years whereas, [15,17] reported that the greatest rate of change occurs between the ages of 45 and 55 years. It presented as hyperechoic oval or spindle-shaped in each quadrant of right and le breast of pre-menopause and post-menopause among ethnic groups. More study conducted [18], investigating the in uence of age and/or menopausal status on the association between breast density and risk have showed inconsistent results and found a relatively stronger association in premenopausal women than in postmenopausal women, although the di erence was not statistically signi cant.

Di erent studies with con icting ndings on the relationship between breast density and race have been reported. A study [19] indicated that all quadrants mammographic density is signi cantly higher in Asians than in African Americans. e prevalence of female breast cancer in Malaysia is highest among Chinese, followed by the Indian and Malay ethnicities. e ndings of another study conducted in Malaysia revealed that Chinese women had the highest odds of having dense breasts. However it is interesting to note that breast cancer incidence is highest amongst the Chinese ethnic group in Malaysia as compared to Indians who had the lowest percentage of breast cancer incidence [20]. e ndings of this study also revealed that ultrasound can be a good rst row image modality in breast imaging.

L l

As this study was designed to be cross-sectional. 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.

R l

is study only classi ed normal breast morphology and its associated factor among di erent age and ethnic groups. It would be helpful to compare breast morphology and its associated factors among age and ethnic groups to determine which ethnic group has more breast morphology size. It is also important to note that this kind of study can also be conducted as regards other parts of the human body based on di erent modes of operation using an ultrasound machine.

C l

is work which is the rst comprehensive ultrasound study to be conducted in Malaysia focuses on the classi cation of ultrasound breast morphology among premenopausal and postmenopausal women of di erent ethnic groups in Malaysia. It concentrated on the B-Mode ultrasound, which is the most popular device being used for the evaluation of breast disease and images, displayed in grey scale. ere is no other study result that agrees with the result of this study

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