RESEARCH ARTICLE

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Breast Anthropometry: Values and Application in Breast Surgery for Vietnamese Women

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Abstract

Objectives: Breast surgery requires a high aesthetic outcome and should be individualized according to anthropometric breast and body characteristics. This study aimed to measure the anthropometric parameters and volume of Vietnamese female breasts and their application in breast surgery. **Subjects and Methods:** A cross-sectional descriptive study enrolled 240 women treated at Vietnam National Cancer Hospital aged 18 to 78 years old. The measurements were obtained with the patient sitting upright in the anatomic position based on key landmarks and breast volume was also assessed. Differences in breast anthropometric measurements and breast volume were compared between groups of age, BMI, and the number of children. The correlation between breast volume calculated by anthropometric method and surgical specimen volume was evaluated to determine the accuracy of this method. **Results:** The mean values of the right and left breast volumes are less statistically different. Mean breast volume of the right breast and left breast were 396.1±182.3ml and 399.4±182.2ml, respectively. The proportion of breast ptosis increased with age (p=0.027), Body mass index (p<0.0001), and the number of children (p=0.004). The most important factor affecting the size and shape of the breast was body mass index (BMI). Mastectomy specimen volume and breast volume calculated by the anthropometric method are highly correlated with r=0.966. **Conclusions:** The results of this study should be applied in clinical practice in breast surgery for Vietnamese women.

Keywords: Breast surgery- plastic surgery- breast cancer

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Introduction

The female mammary gland has many anatomic variations in the human body. This variation is the result of many factors, of which race is the most important factor. Breasts are secondary sexual characteristics of the female gender, which depend on hormonal activity, therefore, the size and shape of the breast vary in different reproductive periods (adolescence, pregnancy, breastfeeding, menopause…) (Jernström and Olsson, 1997). Anthropometric measurements of the female breast are an important factor in fashion and medical health care, especially in breast surgery.

Breast surgery is a common surgery for cosmetic purposes or disease treatment. Reconstructive surgery after total mastectomy requires a relatively accurate measurement of the removed breast morphometry to select an appropriate reconstructive method, to obtain bilateral symmetry after surgery. In mastopexy, augmentation mammoplasty, and reduction mammaplasty, the parameters of the aesthetically perfect breast are the standard to optimize aesthetic outcomes and postoperative satisfaction.

Previous studies about breast anthropometry over the world are mainly based on analysis of breast profile of "ideals" population, which included young women with natural breast, to define critical ideals of perfect anthropomorphic measurements to optimize patient satisfaction in cosmetic and reconstructive breast surgeries (Westreich, 1997; Avşar et al., 2010; Liu and Thomson, 2011; Mallucci and Branford, 2014). There is limited research focused on other populations and the relationship between hormonal and constitutional factors and breast anthropometry (Brown et al., 1999; Kim et al., 2014). Additionally, the main problem in the objective assessment of breast morphology is the absence of a standard for anthropometric measurements (Kayar et al., 2011; Xi et al., 2014; Kim et al., 2015; Choppin et al., 2016; Rostas et al., 2018).

Vietnam is a developing country with a current population of over 98 million inhabitants. The demand for mammoplasty and reconstructive breast surgery after total mastectomy due to breast cancer had been increasing. The lack of data, especially breast anthropometry of the Vietnamese population, has been an issue in clinical practice and obtaining the perfect results of breast surgery. The goal of the present study was to measure breast anthropometry in Vietnamese women in variations of

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population and determine the affecting variable factors of breast parameters.

Materials and Methods

Patients and methods

A cross-sectional descriptive study enrolled 240 women treated at Vietnam National Cancer Hospital aged 18 to 78 years old by random sampling in a period from January 2019 to January 2021. These patients had breast cancer and were scheduled for a total mastectomy. All subjects with a history of breast surgery, breast radiation and neoadjuvant chemotherapy for breast cancer, pregnant and breastfeeding patients, breast deformity due to the tumor, or any health problems were excluded. All participants signed a consent form.

The measurements were obtained with the patient sitting upright in the anatomic position. Key landmarks on the breast were identified and marked. The landmarks were: suprasternal notch; midclavicular point (the point 5cm lateral to the acromioclavicular joints). Upper chest width (CC1): chest width measured at the level of the superior breast. Middle chest width (CC2): chest width measured at the level of the nipple. Lower chest width (CC3): chest width measured at the level of the inferior breast. Nipple-nipple length (NNL) Horizontal measurement from the center of one nipple to the other; Lateral mammary radius (LR): Horizontal measurement from the center of one nipple to the level of the most lateral point of the inframammary fold. Medial mammary radius (MR): Horizontal measurement from the center of one nipple to the level of the most medial point of the inframammary fold. Nipple-inframammary fold length (IR): measurement from the center of one nipple to the level of the lowest point of the inframammary fold. Mammary projection (MP): measured at 90 degrees to the chest wall just beneath the breast.

The measured parameters were the following: body weight, height, upper chest width (CC1), middle chest width (CC2), lower chest width (CC3), clavicle-nipple length (CNL), sternal notch-nipple length (SNL), nipple-nipple length (NNL), medial mammary radius (MR), lateral mammary radius (LR), nipple-inframammary fold length (IR), mammary projection (MP) and breast ptosis. BMI was calculated using the height and weight measurements (BMI=weight [kg]/height [m]).

The participants were evaluated for breast ptosis according to Kirwan's classification system (Kirwan, 2002). For grade A, the nipple should be approximately 2cm above the inframammary fold. For grade B, the nipple is at 1cm above the level of the inframammary fold. In grade C, Stage C, nipple position even with the inframammary fold. For grade D, the nipple is approximately 1cm below the inframammary fold. In grade E, the nipple is approximately 1cm to 2cm below the inframammary fold. In grade F, the nipple is approximately 2cm or more below the inframammary fold. We use German Hoechstmass graduated tape measure, division unit 1mm. Time of measurement within 30 days before surgery and regardless of the patient's menstrual cycle.

Breast volume (mammary volume [MV]) was calculated according to the following formula defined by Qiao (Qiao et al., 1997):

$$MV=\pi/3 \times MP^2 \times (MR + LR + IR - MP).$$

Breast volume measurement methods were administered by Archimedes procedure: submersion of the breasts into a water-filled container to calculate the amount of displaced water. For the patient who underwent a total mastectomy and axillary lymph node dissection into an el block, the fat tissue and axillary lymph node were removed from the specimen before volume measurement. The instrument for measuring the volume of breast specimens is a container with 10ml divisions and a 50ml syringe with divisions. The water used to measure the volume of breast specimens has a temperature equivalent to body temperature (about 37 degrees Celsius). Measurement was performed within 15 minutes after the excision of the specimen.

Statistical Analysis

Data were analyzed by SPSS version 22.0 software. The measured values were expressed as mean±standard deviation (SD), 95% confidence interval, min, max. Fisher's exact test was used to compare the breast ptosis, according to age, BMI, and the number of children. The student's t-test was applied to compare the measurement of right and left breasts. The level of statistical significance was determined as $p<0.05$. The absolute agreement between breast volume values for anatomic methods and surgical specimen volume was evaluated by calculating the intraclass correlation coefficient r using the Pearson test.

Results

The study was conducted on 240 breast cancer patients undergoing total mastectomy at Vietnam National Cancer Hospital, in which 2 patients had a bilateral mastectomy. The mean age of the patients was 48.9 (18-78 years); 59 patients were 18-40 years old, 109 patients were 41-55 years old, and 72 patients were 56-78 years old. 232 patients were nulliparous, the average number of children was 2.38, all 232 patients had breastfed their children. 112 patients were in a premenopausal state and 128 patients

Table 1. The Distribution of Weight, Height, BMI, CC1, CC2, CC3 According to Age

	Age group			p
	18-40 (n=59)	41-55 (n=109)	56-78 (n=72)	
Height	156.8±5.1	155.7±4.5	153.8±4.7	0.001
Weight	52.3±6.5	54.3±6.2	53.9±7.7	0.187
BMI	21.3±2.5	22.4±2.1	22.8±3.2	0.003
CC1	79.6±5.9	82.6±6.1	83.6±6.2	0.001
CC2	82.5±6.5	85.7±6.7	86.6±6.7	0.001
CC3	74.7±5.8	78.0±6.3	78.7±5.9	<0.001

BMI, Body mass index; CC1, upper chest width; CC2, middle chest width; CC3, lower chest width. The p-value for the difference between the three age groups was analyzed by the Anova test

Table 2. Difference of Breast Anthropometric Measurements in Right and Left Breast

	Right breast Mean±SD (Min-Max)	Left breast Mean±SD (Min-Max)	p
CNL (cm)	19.9±2.5 (15-28)	20.0±2.6 (15-28)	0.876
SNL (cm)	19.7±2.6 (14-28)	19.8±2.5 (15-27)	0.061
LR (cm)	11.7±2.4 (4-24)	11.7±2.3 (6-24)	0.794
MR (cm)	9.6±1.4 (6-14)	9.8±1.5 (6-14)	0.0001
IR (cm)	7.1±1.5 (4-11)	7.1±1.6 (4-12)	0.328
MP (cm)	3.8±0.7 (2-6)	3.9±0.7 (2-6)	0.415
AD (cm)	3.7±0.8 (2-6)	3.7±0.8 (2-6)	0.516
MV (ml)	396.1±182.3 (91.6-1055.6)	399.4±182.2 (91.6-997.9)	0.059

Clavicle-nipple length (CNL), sternal notch-nipple length (SNL), nipple-nipple length (NNL), medial mammary radius (MR), lateral mammary radius (LR), nipple-inframammary fold length (IR), mammary projection (MP), areola diameter (AD) and mammary volume (MV). The student's t-test was applied to compare the measurement of right and left breasts

were menopausal.

Mean height was 155.4±4.8cm (145cm-173cm), mean weight was 53.7±6.7kg, and mean body mass index was 22.2±2.6kg/m². Mean CC1, CC2, CC3 were 82.1±6.2cm; 85.2±6.8cm; 77.4±6.2cm respectively. The mean values of the body and breast measurements according to age are presented in Table 1. The weight, BMI, CC1, CC2, CC3 all statistically increased with age while the figure for height was highest in young women.

The breast ptosis was evaluated according to the classification of Kirwan (Kirwan, 2002): Stage A, nipple position 2cm above the inframammary fold; Stage B, nipple position 1cm above the inframammary fold; Stage C, nipple position even with inframammary fold; Stage D, nipple position 1cm below the inframammary fold; Stage E, nipple position 2cm below the inframammary fold; and Stage F, nipple greater than 2cm below the inframammary fold. Of the 240 patients in the study, the number of breast ptosis grade A, B, C, D, E, F were 41 (17.1%); 49 (20.4%); 431 (17.9%); 63 (26.3%); 23 (9.6%) and 21 (8.8%) respectively. Ptosis is defined as the case where the nipple position is 1 cm below the inframammary fold (Stages D, E, F). Ptosis was observed in 44.58% of cases. The proportion of breast ptosis increased with age ($p=0.027$), Body mass index ($p<0.0001$), and the number of children ($p=0.004$).

Mean nipple-nipple length (NNL) was 19.3±2.1cm. Comparing the right and left breast differences in 240 patients in our study, there was no significant difference in the CNL, SNL, MR, LR, IR, MP, AD, and MV between the values of the right and left breasts ($p>0.05$) but medial mammary radius (MR) of left breast higher than the right side with $p<0.05$. The mean values of the breast anthropometry according to age, BMI, and number of children are presented in Table 3. Comparison of mean values by age group, BMI, and the number of children using univariate and multivariate analysis. All measurements statistically increased with BMI in both univariate and multivariate analysis ($p<0.0001$). All measurements statistically rose with the number

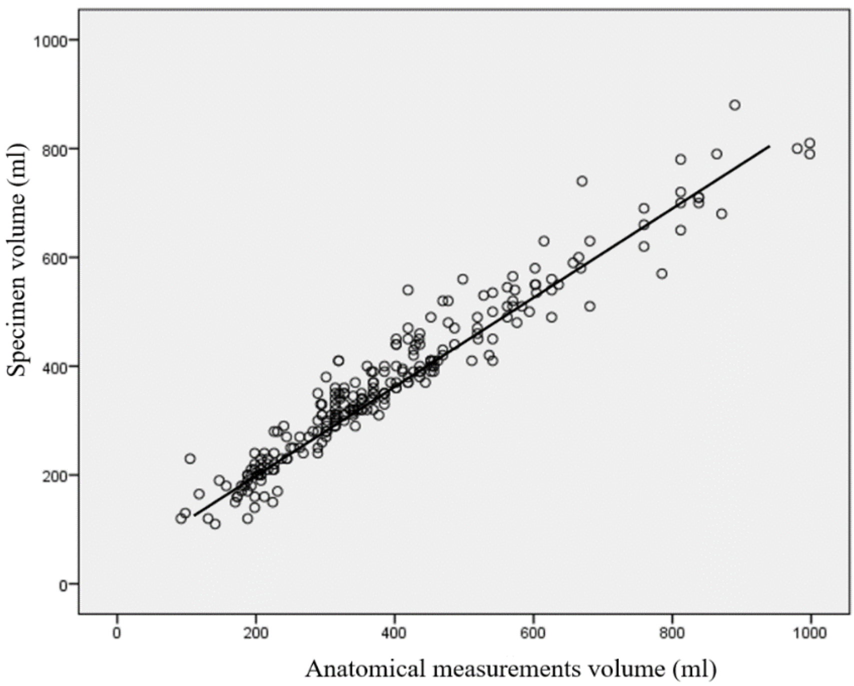

Figure 1. The Regression Curve for Anatomical Measurement Against Specimen Volumes (ml)

Table 3. Difference of Breast Anthropometric Measurements According to Age, BMI, and Number of Children

	Age group					BMI				Number of children				
	18-40 n=59	41-55 n=109	56-78 n=72	p1	p1*	<18.5 n=9	18.5-22.99 n=151	23-24.99 n=51	≥25 n=29	0 n=8	1-2 n=156	≥3 n=76	p2	p2*
R-CNL	19.0±2.0	20.0±2.3	20.7±2.8	0.001	0.215	17.9±1.9	19.4±2.1	20.4±2.2	22.8±2.7	17.4±1.6	19.7±2.3	20.7±2.5	<0.0001	0.011
R-SNL	18.6±2.1	19.7±2.4	20.5±2.8	<0.0001	0.107	17.1±1.7	19.1±2.2	20.0±2.3	22.8±2.6	17.2±1.6	19.4±2.5	20.6±2.6	<0.0001	0.006
R-LR	11.3±2.7	11.4±1.8	12.4±2.8	0.007	0.607	9.4±0.5	11.2±2.0	12.3±2.5	14.1±2.7	9.6±1.1	11.5±2.4	12.2±2.5	0.005	0.05
R-MR	9.3±1.3	9.5±1.2	9.9±1.6	0.036	0.952	9.0±0.9	9.2±1.2	9.9±1.4	11.2±1.5	8.7±1.1	9.5±1.3	9.9±1.5	0.009	0.03
R-IR	6.8±1.4	7.2±1.5	7.2±1.6	0.3	0.455	6.3±0.8	6.8±1.4	7.4±1.5	8.4±1.6	5.6±0.9	7.1±1.5	7.3±1.5	0.014	0.096
R-MP	3.7±0.7	3.9±0.7	3.9±0.7	0.106	0.847	3.1±0.6	3.7±0.6	4.0±0.6	4.5±0.7	3.2±0.5	3.8±0.6	3.9±0.7	0.017	0.257
R-AD	3.5±0.8	3.7±0.8	3.7±0.9	0.284	0.299	3.3±0.6	3.5±0.8	3.8±0.8	4.3±0.9	2.9±0.2	3.6±0.8	3.8±0.9	0.01	0.031
L-CNL	19.1±1.9	19.9±2.6	20.8±2.7	0.001	0.293	18.2±1.9	19.3±2.3	20.6±2.2	22.9±2.4	17.5±1.6	19.7±2.5	20.8±2.5	<0.0001	0.003
L-SNL	18.8±1.9	19.8±2.5	20.6±2.7	<0.0001	0.272	17.4±1.7	19.2±2.2	20.3±2.3	22.9±2.4	17.3±1.5	19.5±2.5	20.7±2.4	<0.0001	0.001
L-LR	11.3±2.7	11.5±1.6	12.4±2.7	0.011	0.659	9.4±0.9	11.2±1.9	12.3±2.4	13.8±2.7	9.4±0.7	11.6±2.3	12.2±2.4	0.003	0.046
L-MR	9.5±1.4	9.7±1.5	10.0±1.6	0.164	0.7	9.0±0.3	9.4±1.3	10.1±1.6	11.3±1.4	8.8±0.9	9.7±1.4	10.1±1.6	0.026	0.053
L-IR	6.8±1.3	7.2±1.6	7.0±1.7	0.188	0.4	6.1±1.0	6.8±1.5	7.3±1.6	8.2±1.6	5.7±0.9	7.0±1.6	7.2±1.6	0.032	0.123
L-MP	3.7±0.7	3.9±0.7	3.9±0.7	0.092	0.847	3.1±0.6	3.7±0.6	4.0±0.6	4.5±0.7	3.2±0.5	3.8±0.6	3.9±0.7	0.014	0.202
L-AD	3.5±0.8	3.8±0.8	3.7±0.9	0.236	0.208	3.3±0.5	3.5±0.7	3.9±0.8	4.3±0.8	2.9±0.2	3.7±0.8	3.8±0.9	0.01	0.034
NNL	19.1±1.8	19.4±2.0	19.3±2.4	0.638	0.122	17.9±1.2	18.7±1.8	19.9±1.8	21.8±2.1	17.3±1.7	19.4±1.9	19.3±2.3	0.024	0.377
R-MV	355.4±174.9	395.3±169.5	430.6±201.7	0.063	0.785	227.4±87.7	342.3±132.9	449.1±161.6	634.9±226.6	229.1±92.5	388.9±169.5	428.5±204	0.009	0.077
L-MV	357.2±174.8	402.4±173.2	429.6±196.7	0.074	0.697	223.6±86.9	347.8±137.4	450.9±162.5	632.0±218.3	228.7±89.6	392.3±169.7	432.1±202.9	0.007	0.061

R-CNL, right clavicle-nipple length; R-SNL, right sternal notch-nipple length; R-LR, right lateral mammary radius; R-MR, right medial mammary radius; R-IR, right nipple-inframammary fold length; R-MP, right mammary projection; R-AD, right areola diameter. L-CNL, left clavicle-nipple length; L-SNL, left sternal notch-nipple length; L-LR, left lateral mammary radius; L-MR, left medial mammary radius; L-IR, left nipple-inframammary fold length; L-MP, left mammary projection; L-AD, left areola diameter; NNL, nipple-nipple length; R-MV, right mammary volume; L-MV, left mammary volume; BMI, Body mass index;Values p2, p2* compare the mean values of breast anthropometric measurements between the groups of patients who had one child, 1-2 children, and more than 2 children.; p1*, p2* multivariate regression analysis of children using univariate analysis. However, using multivariate analysis, there was a significant difference with R-CNL, R-SNL, R-LR, R-MR, R-AD, L-CNL, L-CNL, L-LR, L-AD and no significant difference with R-IR, R-MP, L-MR, L-IR, L-MP, NNL, R-MV, and L-MV. All measurements were no statistically significant difference with age according to multivariate analysis (Table 3)

Of the 240 patients enrolled in the study, two patients were diagnosed with bilateral breast cancer and underwent a bilateral total mastectomy. Therefore, the total number of breast specimens is 242. The mean mastectomy specimens volume was 372.6±151.2 (110ml-880ml). The mean breast volume was calculated to be 394.98±180.32 (92ml-998ml) using the anthropometric method. The mean difference between calculated volumes and specimen volumes was 22.7±51.8 (ml). Mastectomy specimens volume (y) and breast volume calculated by anthropometric method (x) are related by regression equation $y=0.808x+53.3$ (ml), correlation coefficient $r=0.966$ (Figure 1).

Discussion

Lately, breast surgery has long been recognized as an "art" rather than a "science" field, not only because of the wide variation of female breast characteristics but also the high requirements on the aesthetic outcome of the surgery. Therefore, breast surgeons have to gain knowledge of the parameters of the breast anthropometry and breast volume and the variations of these parameters under the influence of physiological factors. This variation is the result of many factors, of which race is the most important factor. Additionally, the size and shape of the breast also vary depending on pregnancy and breastfeeding state which is different for women around the world due to Vietnamese tradition. This led us to conduct this research to build parameters of the breast anthropometry of Vietnamese women for breast surgery in Vietnam. Of 240 patients treated in Vietnam National Cancer Hospital, we determined measurements of the breast anthropometry according to age, BMI, and the number of children (Table 2). The mean mastectomy specimen volume of 240 women was 372.6±151.2 mL. The mean breast volume calculated by the anthropometric method is 394.98±180.32 mL. Our study also confirmed the high accuracy of the breast volume calculation method based on anthropometric measurements with $r=0.966$.

Previous studies on anthropometric breast characteristics often only focused on a narrow group of women with a sample size not large enough. In the first two of the studies in the world, author Qiao Q studied 125 Chinese women aged 18 to 26 years (Qiao et al., 1997), and author Westreich M studied 50 Israeli women aged 17 to 38 years (Westreich, 1997). With small size samples, they focused on defining the parameters of the aesthetically perfect breast to apply to mastopexy, augmentation mammoplasty, and reduction mammaplasty to optimize aesthetic outcomes and postoperative satisfaction. A study of 385 Turkish female students to measure anthropometric breast values in Turkish females. However, this study only included women between the ages of 18 and 26 years with a body mass index between 20 and 26 (Avşar et al., 2010). A study conducted with data based on 104 Australian women aged 19-67 aimed to evaluate the "normal" breast volume as well as the factor impacts. Interestingly, the authors found that breast volume was affected by body mass index but age. However, the study did not have an adequate anthropometric mammograms assessment, there was only breast volume involved by 3D scanning. In addition, the influences of pregnancy and lactation on breast volume weren't evaluated (Coltman et al., 2017). These effects were recorded in Kim et al., (2014)'s study based on 250 Korean women. Moreover, this study only included non-menopausal women aged 20 to 50 years while women over 50 years of age have a significant increase in demand for breast plastic, reconstructive and cosmetic surgery that has become a global trend. Our study also showed that there were some differences in mammograms between the group of women aged 56 to 78 and women in other age groups.

In this study, ptosis breast degree significantly increased with age, body mass index, and the number of children. A definition of ptosis breast is a condition in which nipple and parenchyma descend more than 1cm from the crease underneath or inframammary fold. According to this definition, the sagging breast rate among 240 women participating in our study was 44.58%. This result is higher than the study in Korea which was 32.4% (Kim et al., 2014). This difference can be explained by the sampling in the following study, the research subjects are women under the age of 50. It may also be due to the habit of having many children and breastfeeding of Vietnamese women. Our study also confirmed that the degree of mammary parenchyma ptosis increases by age, body mass index, and the number of pregnancy (Kim et al., 2014). The previous point that lactation increases the mammary parenchyma ptosis has not been validated. Some recent research results in Korea and the US showed that breastfeeding factors do not increase the degree of mammary parenchyma ptosis (Kim et al., 2014; Rinker et al., 2008).

Compared to the lateral mammary gland size, we did not notice a statistically significant difference (Table 2). The mean volume on the left side (399.4±182.2 ml) was larger than the mean on the right side (396.1±182.3 ml), however, the difference was not significant ($p=0.059$). The most impactful factor on mammary glands was known as ethnicity. According to the latest survey in 2021, bra size varies from A in Asia and Africa to the end of DD in the Nordic countries and the United States. With the function of excreting milk during breastfeeding, mammary glands change drastically in structure and volume during pregnancy and lactation under the influence of gonadal hormones. The effects of female sex hormones on breast volume beyond pregnancy and lactation were also noted in a 1997 study in the US, the authors found a positive correlation between breast volume and the use of oral contraceptives (Jernström and Olsson, 1997). In addition, body fat percentage has also been found to be related to breast volume as the greater body mass index, the bigger breast volume (Coltman et al., 2017). The hypothesis that breast volume increases with age has been still controversial. From the results of this study, we did not note any difference in breast volume in different age groups. This result is similar to the study by Coltman CE et al based on 104 Australian women aged 19 to 67 (Coltman et al., 2017). By contrast, the opposite was true for another Korean study based on 250 women aged 20 to 50 when it concluded that breast volume increases with age (Kim et al., 2014).

In this study, we measure the breast magnitude based on anatomical landmarks before we can apply the formula of Qiao to determine the total breast volume (Qiao et al., 1997). The breast volume calculated by this method was more proper compared with measuring the post-operative specimen (r=0.966). This method was widely acknowledged due to having high precision, easy performance, and low costs (Kayar et al., 2011; Choppin et al., 2016). There was a greater accuracy in estimating breast volume by some high technical measurement methods e.g. magnetic resonance imaging, computed tomography, 3D scanning compared to the method we used (Kayar et al., 2011; Bulstrode et al., 2001; Kovacs et al., 2007). However, these methods have high costs (Choppin et al., 2016; Caruso et al., 2006) and are unlikely to be widely applied in developing countries such as Vietnam.

In Vietnam, the rate of patients diagnosed with early-stage breast cancer is lower than in developed countries due to difficulties in cancer screening in the community. Combined with the characteristics of small breast volume, the number of patients undergoing conservative surgery is much lower than in western countries, unsteadily most patients underwent a total mastectomy. This led to high demand for reconstructive breast surgery after total mastectomy. Reconstructive surgery requires a relatively accurate measurement of the removed breast morphometry to select an appropriate reconstructive method, to obtain bilateral symmetry after surgery. The results of this study were reliable because of the large sample size with different groups of Vietnamese women in the variation of age, parity, and body characteristics. We applied these results to our clinical work and succeeded in making mammaplasty more precise in augmentation of mammaplasty, reduction of mammaplasty, and breast reconstruction after total mastectomy in patients treated at Vietnam National Cancer Hospital.

There are some limitations of our study. Firstly, the subjects included breast cancer patients. Therefore, breast tumors may cause breast deformity and bias in anthropometric measurements. To limit this bias, most of the patients selected in the study were in an early stage when the tumors were local in the gland tissue and did not cause a change to the natural shape of the breast. All subjects with breast deformity due to the tumor were excluded. Secondly, all patients in this study had breastfed their children which led to the inability to evaluate the impact of breastfeeding state on shape and breast volume. Finally, this cross-sectional study is unable to determine the change in breast anthropometry over the reproductive period while mammary grand underwent physiological processes in pregnancy, lactation, menopause, aging, and change in weight.

In conclusion, this study constructed a parameter of female breast anthropometry and breast volume of different groups of Vietnamese women in the variation of age, parity, and body characteristics. These results were applied in breast surgery for Vietnamese women to obtain a high aesthetic outcome and postoperative satisfaction.

Author Contribution Statement

Study concepts: Le HQ, Nguyen CH. Study design: Le HQ, Nguyen CH. Data acquisition: Nguyen CH, Hoang AD. Data analysis and interpretation: Nguyen CH. Manuscript preparation and editing: Le HQ, Nguyen CH.

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Availability of data

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Conflict of Interest

All authors declare no conflict of interest.

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