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BREAST ANTHROPOMETRIC INDICES AND SATISFACTION AMONG PATIENTS UNDERGOING COSMETIC BREAST IMPLANT SURGERY AT TAN HUNG GENERAL HOSPITAL

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ABSTRACT

Background: Cosmetic breast implant surgery is increasingly common. Accurate preoperative breast anthropometry supports individualized implant selection, while patient satisfaction is an important indicator of healthcare service quality. However, studies combining these two aspects in private healthcare settings in Vietnam remain limited. **Objectives:** To assess preoperative breast anthropometric characteristics patient satisfaction with healthcare services; and their associated factors among patients undergoing cosmetic breast implant surgery at Tan Hung General Hospital. **Materials and methods:** An analytical cross-sectional descriptive study was conducted among 246 female patients aged 18-60 years who were indicated for cosmetic breast implant surgery from June 2024 to March 2025. Data included general characteristics, preoperative breast anthropometric measurements, and satisfaction assessed using the inpatient satisfaction questionnaire issued by the Vietnamese Ministry of Health. **Results:** The mean age was 34.0 ± 6.7 years. A statistically significant physiological asymmetry was observed between the two breasts; the mean left breast volume (238.32 ± 189.05 mL) was higher than the mean right breast volume (213.05 ± 171.77 mL), with $p < 0.001$. The overall satisfaction rate with healthcare services was 82.1%. The highest satisfaction was recorded for the attitude, communication, and professional competence of healthcare workers (98.0%), while the lowest was for facilities and patient-serving amenities (89.4%). No statistically significant association was found between age, education, occupation, income, and overall satisfaction ($p > 0.05$). **Conclusion:** Preoperative breast anthropometric indices showed physiological asymmetry between the two sides, which should be considered in preoperative counselling and surgical planning. Overall patient satisfaction was high; however, facilities and cost-related information should be further improved to enhance service experience.

Keywords: Breast anthropometry, cosmetic surgery, breast implants, patient satisfaction, healthcare service quality.

I. INTRODUCTION

Cosmetic breast implant surgery is among the most commonly performed aesthetic procedures worldwide, aiming to improve breast shape, increase breast volume, and enhance women's self-confidence [1]. Along with advances in surgical techniques and implant materials, preoperative assessment has become increasingly important to ensure symmetry, safety, and consistency with patients' expectations. In aesthetic plastic surgery practice, breast anthropometric assessment provides a fundamental basis for identifying asymmetry, selecting appropriate implant size and shape, and counselling patients regarding realistic expectations [2], [3]. Measurements such as sternal notch-to-nipple distance, clavicle-to-nipple distance, medial and lateral breast radii, breast projection, and breast

volume are useful for individualized surgical planning. In addition to anatomical and aesthetic outcomes, patient satisfaction is an important indicator of healthcare service quality. Satisfaction after surgery is related not only to professional outcomes but also to accessibility, information transparency, administrative procedures, facilities, communication, professional competence of healthcare workers, and service costs [4], [5].

In Vietnam, studies on breast anthropometry have mainly focused on women attending specialized centers or on clinical contexts related to breast surgery [6]. Evidence combining preoperative breast anthropometry and patient satisfaction in private general hospitals providing aesthetic services remains limited. This study was conducted with the objectives to assess preoperative breast anthropometric characteristics patient satisfaction with healthcare services; and their associated factors among patients undergoing cosmetic breast implant surgery at Tan Hung General Hospital.

II. MATERIALS AND METHODS

2.1. Participants

Women patients aged 18-60 years who were indicated for cosmetic breast implant surgery at the Department of Plastic and Aesthetic Surgery, Tan Hung General Hospital, during the study period were eligible for inclusion.

- **Inclusion criteria:** Women patients aged 18-60 years who were indicated for cosmetic breast implant surgery at the Department of Plastic and Aesthetic Surgery, Tan Hung General Hospital, and agreed to participate in the study.

- **Exclusion criteria:** Patients with incomplete clinical records, those who did not cooperate with the survey, or those who refused participation.

2.2. Research methods

This was an analytical cross-sectional descriptive study conducted at Tan Hung General Hospital, Ho Chi Minh City. The overall study period was from April 2024 to June 2025, and data were collected from June 2024 to March 2025.

The sample size was estimated using the formula for estimating a single proportion, with $p = 0.702$ from a previous study, a 95% confidence level, and an absolute precision of $d = 0.055$. The calculated sample size was 266. During the data collection period, 246 eligible patients agreed to participate; all of them were included in the final analysis. The calculated sample size was 266 participants. During the study period, 246 eligible patients agreed to participate and were included in the final analysis. The participation rate was 92.5% (246/266). A total sampling method of all eligible patients during the study period was applied.

- Variables and data collection tools

General characteristics included age, education, occupation, monthly income, number of hospital admissions, and body mass index (BMI).

Preoperative breast anthropometric indices included clavicle-to-nipple distance (CNL), sternal notch-to-nipple distance (SNL), lateral radius (LR), medial radius (MR), nipple-to-inframammary fold distance (IR), breast projection (MP), areola diameter (AD), and breast volume (MV). Breast volume was estimated using the Qiao formula [2]. Measurements were performed using a standardized Martin anthropometric instrument set.

Satisfaction was assessed using the inpatient satisfaction questionnaire issued under Decision No. 3869/QĐ-BYT of the Vietnamese Ministry of Health in 2019 [5]. The

questionnaire comprises five domains: (1) accessibility; (2) transparency of information and administrative procedures; (3) facilities and patient-serving amenities; (4) attitude, communication, and professional competence of healthcare workers; and (5) service outcomes. Responses were rated on a 5-point Likert scale ranging from 1 (“very dissatisfied”) to 5 (“very satisfied”). The internal consistency reliability of the questionnaire was evaluated using Cronbach’s alpha coefficient. A Cronbach’s alpha value of 0.70 or higher was considered indicative of acceptable reliability.

- Data processing and statistical analysis

Data were cleaned and analyzed using IBM SPSS Statistics version 23.0. Quantitative variables were presented as mean $\pm$ standard deviation (SD), while categorical variables were presented as frequencies and percentages. Paired Samples T-Test was used to compare anthropometric indices between the right and left breasts. Associations between demographic factors and overall satisfaction were analyzed using the Chi-square test or Fisher’s exact test, with odds ratios (ORs) and 95% confidence intervals (95% CIs) where applicable. Statistical significance was set at $p < 0.05$.

Overall satisfaction was classified as “satisfied” when the average score of the items reached levels 4-5, and “dissatisfied” when the average score was below 4.

- **Ethical Approval:** The study was approved by the Biomedical Research Ethics Committee of Can Tho University of Medicine and Pharmacy under Decision No. 24.139.HV/PCT-HDDD dated June 28, 2024. Participation was voluntary, and all personal information was kept confidential.

III. RESULTS

3.1. General characteristics of study participants

Table 1. Demographic and basic clinical characteristics of participants (N = 246)

Characteristic	Category	Frequency (n)	Percentage (%)
Age group (Mean: 34.0 ± 6.7 years)	18-45	229	93
	46-60	17	7
Education	High school	82	33.3
	College/University/Postgraduate	164	66.7
Occupation	Office worker	70	28.5
	Homemaker	60	24.4
	Freelance/Business/Other	116	47.1
Monthly income (Mean: 33.4 ± 15.2 million VND)	≤ 40 million VND	200	81.3
	> 40 million VND	46	18.7
BMI (Mean: 20.6 ± 2.1 kg/m ²)	Underweight (<18.5)	46	18.7
	Normal ($18.5-22.9$)	166	67.5
	Overweight/Obese (≥ 23)	34	13.8

Most participants were aged 18 - 45 years (93%), had college-level education or higher (66.7%), and worked as office workers (28.5%). All patients were admitted to the hospital once during the study period.

3.2. Preoperative breast anthropometric indices

Table 2. Comparison of preoperative anthropometric indices between the right and left breasts

Index	Right breast (Mean $\pm$ SD)	Left breast (Mean $\pm$ SD)	p*
Clavicle-to-nipple distance (CNL), cm	19.49 $\pm$ 1.98	19.77 $\pm$ 1.88	<0.001
Sternal notch-to-nipple distance (SNL), cm	20.44 $\pm$ 1.95	20.69 $\pm$ 1.85	<0.001
Lateral breast radius (LR), cm	9.47 $\pm$ 1.26	9.64 $\pm$ 1.27	<0.001
Medial breast radius (MR), cm	7.94 $\pm$ 1.29	8.14 $\pm$ 1.31	<0.001
Nipple-to-inframammary fold distance (IR), cm	5.31 $\pm$ 1.09	5.39 $\pm$ 1.13	<0.001
Breast projection (MP), cm	2.98 $\pm$ 1.09	3.13 $\pm$ 1.13	<0.001
Areola diameter (AD), cm	4.34 $\pm$ 0.85	4.34 $\pm$ 0.85	0.891
Breast volume (MV), mL	213.05 $\pm$ 171.77	238.32 $\pm$ 189.05	<0.001

* Paired Samples T-Test.

Table 2 shows clear physiological asymmetry between the two breasts. Most left breast measurements were statistically significantly higher than the corresponding right breast measurements ($p < 0.001$), except for areola diameter. The mean left breast volume was approximately 25 mL higher than the mean right breast volume. In addition, 63.8% of patients had a preoperative breast volume below 200 mL.

3.3. Patient satisfaction with healthcare services

Table 3. Overall satisfaction by five healthcare service domains

Domain	Satisfied n (%)	Dissatisfied n (%)
Attitude, communication, and professional competence of healthcare workers	241 (98.0)	5 (2.0)
Accessibility	238 (96.7)	8 (3.3)
Transparency of information and procedures	233 (94.7)	13 (5.3)
Service outcomes	231 (93.9)	15 (6.1)
Facilities and patient-serving amenities	220 (89.4)	26 (10.6)
Overall satisfaction with hospital healthcare services	202 (82.1)	44 (17.9)

Patients expressed high satisfaction with the attitude, communication, and professional competence of healthcare workers. The highest level of dissatisfaction was observed in the domain of facilities and patient-serving amenities (10.6%). Based on the average scores across the five domains, the overall satisfaction rate was 82.1%.

3.4. Factors associated with overall satisfaction

Table 4. Association between overall satisfaction and selected demographic characteristics

Characteristic	Dissatisfied n (%)	Satisfied n (%)	OR (95% CI)	p
Age				
18-45 years	42 (18.3)	187 (81.7)	1.68 (0.37-7.64)	0.551
46-60 years	2 (11.8)	15 (88.2)	Reference	
Education				
High school	14 (17.1)	68 (82.9)	-	0.707
Intermediate/College	1 (9.1)	10 (90.9)		
University/Postgraduate	29 (19.0)	124 (81.0)		
Monthly income				
≤ 40 million VND	32 (16.0)	168 (84.0)	0.54 (0.25-1.15)	0.085
> 40 million VND	12 (26.1)	34 (73.9)	Reference	

No demographic factor showed a statistically significant association with overall satisfaction. Patients with a monthly income above 40 million VND tended to have a higher proportion of dissatisfaction than those with lower income (26.1% versus 16.0%), but the difference did not reach statistical significance ($p = 0.085$). Occupation was excluded from the table because of the space limitations. Analysis showed no significant association between occupation and patient satisfaction ($p = 0.957$).

IV. DISCUSSION

4.1. Preoperative breast anthropometric characteristics

This study found that 63.8% of patients had a preoperative breast volume below 200 mL, which may reflect the relatively small breast volume among Asian women seeking breast augmentation services. A statistically significant physiological asymmetry was observed, with the left breast having a higher mean volume than the right breast (238.32 mL versus 213.05 mL), along with higher values for most anatomical distances such as CNL, SNL, LR, and MR. This finding is consistent with previous studies. Avşar *et al.* [3] reported natural asymmetry in breast anthropometry among Turkish female students, while a Vietnamese study by Nguyen Cong Huy and Le Hong Quang also documented differences in breast anthropometric measurements [6]. In clinical practice, even a modest asymmetry of approximately 25 mL may be relevant for individualized implant selection and preoperative counselling. Careful assessment of baseline asymmetry may help prevent postoperative dissatisfaction caused by persistent or amplified asymmetry [8].

4.2. Patient satisfaction with healthcare services

The overall satisfaction rate in this study was 82.1%. The highest satisfaction was observed in the domain of attitude, communication, and professional competence of healthcare workers (98.0%), suggesting that patient-provider interaction was evaluated positively. This is an important component in aesthetic surgery, where trust, communication, and expectation management strongly influence perceived service quality. Nevertheless, 10.6% of patients were dissatisfied with facilities and patient-serving amenities, and a notable proportion were not fully satisfied with cost-related aspects. In

private healthcare settings, patients often have high expectations regarding comfort, convenience, and financial transparency. Therefore, continuous improvement in facilities, amenities, and preoperative cost communication should be considered priorities for service quality improvement [9].

4.3. Factors associated with overall satisfaction

This study did not identify statistically significant associations between age, education, occupation, income, and overall satisfaction. Although patients with higher income showed a tendency toward greater dissatisfaction, the association was not statistically significant. This result should be interpreted cautiously because the actual sample size was smaller than the initially calculated sample size, which may have limited statistical power for detecting associations. The absence of significant demographic associations suggests that satisfaction may be influenced more strongly by service experience, counselling, communication, surgical expectation management, and perceived outcomes than by basic demographic characteristics. However, this inference should be confirmed in future studies using larger samples and multivariable analytical models.

4.4. Study limitations

This study has several limitations. First, it was conducted at a single center; therefore, the findings may not be generalizable to all patients undergoing cosmetic breast implant surgery in Vietnam. Second, the cross-sectional design does not allow causal inference. Third, the actual sample size of 246 was smaller than the initially estimated sample size, which may have reduced the ability to detect factors associated with dissatisfaction. Finally, the Ministry of Health satisfaction questionnaire is useful for standardized hospital quality assessment but may not fully capture aesthetic surgery-specific patient-reported outcomes such as those assessed by instruments like the BREAST-Q [9].

Future studies should be conducted across multiple centers, including both public and private healthcare facilities, to improve the representativeness and generalizability of the findings. Prospective longitudinal studies are also recommended to evaluate changes in patient satisfaction over time and to better explore potential causal relationships between patient characteristics, surgical outcomes, and satisfaction. In addition, larger sample sizes would increase statistical power for identifying factors associated with dissatisfaction. Future research should incorporate validated breast surgery-specific patient-reported outcome measures, such as the BREAST-Q, alongside the Ministry of Health satisfaction questionnaire to provide a more comprehensive assessment of patient satisfaction, quality of life, psychosocial well-being, and aesthetic outcomes following breast augmentation surgery.

V. CONCLUSION

Among 246 women patients undergoing cosmetic breast implant surgery at Tan Hung General Hospital, preoperative breast anthropometric indices showed physiological asymmetry between the two sides, with the mean left breast volume and several anatomical distances being significantly higher than those of the right breast. The overall satisfaction rate with healthcare services was 82.1%; satisfaction was highest for the attitude, communication, and professional competence of healthcare workers, and lowest for facilities and patient-serving amenities. Overall satisfaction was not significantly associated with age, educational level, occupation, or income. These findings highlight the importance of standardized preoperative breast anthropometric assessment, individualized preoperative

counselling, and improvements in hospital facilities and preoperative cost transparency to enhance patient experience and the quality of aesthetic surgical care.

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