International Journal of Engineering Inventions
e-ISSN: 2278-7461, p-ISSN: 2319-6491
Volume 14, Issue 6 [June. 2025] PP: 256-260

Analysis of the body shape of women in their 30s in Vietnam

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ABSTRACT: *To design clothes that fit the wearer's body, designers need to conduct in-depth research on the characteristics of the human body shape. This study was conducted to analyze the body shape of women in their 30s in Vietnam. Based on a cross-sectional study, 321 body dimensions were measured using the Martin anthropometric measuring set. SPSS 22 software was used to analyze the anthropometric statistical characteristics. The results showed that the Body Mass Index (BMI) of women in their 30s in Vietnam was average, smaller than that of Vietnamese women and ASEAN women. Body characteristics according to standing posture in the normal body shape. Hourglass body shape characteristics, the hip circumference is larger than the bust circumference. This result was applied to design suitable clothing models for women in their 30s in Vietnam.*

Keywords: *Analysis of the shape women body, the shape women body in Vietnam.*

Date of Submission: 14-06-2025 Date of acceptance: 29-06-2025

I. INTRODUCTION

Research on human body shape helps manufacturers to produce clothes that fit and are suitable for wearers' bodies. It is necessary to design clothes based on research on human body shape. Research results need to be updated after a certain period of time to suit changes in body shape over time [1][2].

Human body shape characteristics have been studied by many different authors. Research subjects are varied depending on the research purpose such as women aged 18-24 [1], 19-year-old students [3], female students [4], male students [5], women aged 25 to 35 [6] [7], men in China [8], Vietnamese men [9], 15-year-old students [10], kindergarten girls [11], children [12].

Each country, region, and ages have different shape characteristics. Therefore, the study of body shape characteristics has been focused on and updated after about 10 years. Women aged 30 are in a period of many changes in shape due to the rapid development and perfection of organs in the body. Research on body shape characteristics of women aged 30 contributes to providing design solutions to increase the ability to respond to the needs of beautiful, comfortable, and well-fitting clothing for users.

II. RESEARCH METHODOLOGY

2.1. Research subjects

The subjects of measurement are Vietnamese women aged 30.

The minimum sample size is determined according to the formula [13]:

$$n_{0.05} = \frac{t^2 * \sigma^2}{m^2} = \frac{1{,}96^2 * 5^2}{1^2} = 96 \text{ (People)}$$

In which:

n is the number of samples

t is the reliability, determined by p,

p = 0.95 corresponding to t = 1.96; m is the error (m = 1)

σ is the standard deviation (σ = 5cm determined through a preliminary survey with 30 standing heights). To make the research results more reliable, 325 samples were selected, and the samples with low reliability and variance were eliminated, leaving 321 samples.

2.2. Measuring equipment and tools

Use a Martin anthropometric measuring set to take height, length, and width measurements. An electronic scale is used to determine body weight.

2.3. Research method

Data collection method: Use a cross-sectional statistical method. Directly measure 11 anthropometric measurements in standard standing position [13], [14], including weight, 2 length measurements, 1 width measurement, 1 height measurement, and 6 circumference measurements.

Method of studying human body characteristics: Use SPSS 22.0 software [2],[3] and Excel 2010 to conduct, determine basic statistical characteristics:

Mean

The mean is one of the most typical characteristics of a series of numbers, it represents the central tendency of that series of numbers and is determined by formula (1)

$$(1) \qquad \bar{X} = \frac{X_1+X_2+\cdots+X_n}{n} = \frac{1}{n}\sum_{i=1}^{n} X_i$$

In which: $\bar{X}$: Mean

N: Total number of measurements in the series

$x_1, x_2, \ldots, x_n$: Value of each measurement

Standard Deviation

Standard deviation is a quantity commonly used to reflect the dispersion of a variable around the mean and is used to measure the dispersion of a data set that has been tabulated into a frequency table.

$$s = \sqrt{\frac{(X_1-\bar{X})^2+(X_2-\bar{X})^2+\ldots+(X_n-\bar{X})^2}{n}} = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(X_i-\bar{X})^2} \qquad (n > 30) \qquad (2)$$

In which: $\bar{X}$: Mean

s: Standard deviation

x_i,: Value of the i-th measurement

Coefficient of variation

The coefficient of variation also shows the dispersion of xi values compared to the mean but in relative form.

$$cv = \frac{s}{\bar{x}} \cdot 100 \ (\%) \qquad (3)$$

In which: $\bar{X}$: Mean

s: Standard deviation

III. RESULTS AND DISCUSSION

3.1. Determine basic statistical characteristics.

Table 1. Determine basic statistical characteristics.

STT	Measurement	Symbol	Minimum	Maximum	Mean	Std. Deviation	Coefficient of variation	Median	mod
			Min	Max	$\bar{X}$	δ	Cv (%)	Me	Mo
1.	Height	Cđ	148,00	168,30	158,93	0,56	0,35	160,00	160,00
2.	Weight	kg	40,60	58,00	51,41	0,43	0,92	51,30	51,00
3.	Front waist length	Det	33,00	38,00	37,23	0,21	0,60	37,25	37,00
4.	Back waist length	Des	33,50	39,70	37,43	0,19	0,50	38,25	38,50
5.	Chest to armpit	Vngn	72,00	88,60	78,90	0,42	0,53	79,00	80,00
6.	Bust circumference	Vn	76,00	95,00	82,41	0,39	0,47	82,00	82,00
7.	Under Bust circumference	Vcn	66,00	84,00	72,17	0,41	0,57	71,00	71,00
8.	Waist circumference	Ve	59,50	76,50	67,43	0,39	0,58	66,50	59,50
9.	Abdominal circumference	Vb	62,50	81,50	71,85	0,40	0,56	72,50	71,00
10.	Hip circumference	Vm	84,40	99,50	89,79	0,39	0,43	89,00	85,00
11.	Shoulder width	Rv	34,50	38,50	36,27	0,10	0,28	36,40	37,00

3.2. Body Mass Index (BMI)

Height is an important dimension, showing the stature of the human body. The average height of women in their 30s in Vietnam is 158.93 cm. So, women in their 30s in Vietnam have the same height as Vietnamese women and are average compared to the height of ASEAN women [15] The average weight of women in their 30s in Vietnam is 51.41 kg. So, women in their 30s in Vietnam have a smaller weight than Vietnamese women and are average compared to the height of ASEAN women [15]

Table 2. Height, weight, and BMI of ASEAN women

STT	Nation	Height	Weight	BMI
1.	Laos	1.53 m	56.0 kg	24.0
2.	Philippines	1.54 m	57.1 kg	24.2
3.	Cambodia	1.54 m	55.5 kg	23.3
4.	Indonesia	1.54 m	55.5 kg	23.3
5.	Vietnam	1.58 m	55.7 kg	22.4
6.	Malaysia	1.57 m	66.0 kg	26.9
7.	Thailand	1.59 m	65.0 kg	25.7
8.	Singapore	1.61 m	62.2 kg	24.0
9.	Myanmar	1.55 m	56.3 kg	23.5

Body mass index is an index commonly used to assess body fatness and thinness

$$\text{BMI} = \frac{W}{H^2}$$

In which:

W: Weight (kg)

H^2: Height (m)

BMI index according to IDI & WPRO [16] is determined in table 3. BMI index of women in their 30s in Vietnam is 20.35 kg. So, women in their 30s in Vietnam have normal BMI index. It is smaller than Vietnamese women and ASEAN women [15]

Table 3. BMI

BMI	**Body shape**
< 18,5	Thin
18,5 – 22,9	Normal people
≥ 23	Overweight people
23 – 249	Pre-obese people
25 – 29,9	Level 1 obesity
≥ 30	Level 2 obesity

3.3. Body characteristics according to posture

Determine the women body shape of hunchback, arched based on the difference in waist length behind (Des) and in front (Det). The difference in Des and Det of the body of women in their 30s in Vietnam is 0.2. Thus, they have a normal body shape (Table 4)

Table 4. Body characteristics according to posture

Des – Det (cm)	< 0,2	-0,2 to 0,2	> 0,2
Body shape	forward posture	Normal people	hunchback

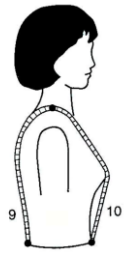

Figure 1. Method of determination Des (9), Det (10)

3.4. Body shape characteristics

According to the method of analyzing and classifying human forms of FFIT (2002), North Carolina State University - USA, based on the ratio of hip circumference, bust circumference and waist circumference. The ratio of hip circumference, bust circumference and waist circumference of women aged 30 in Vietnam is 82cm, 66.5cm and 89cm. The bust measurement is insignificantly smaller than the hip circumference. The waist measurement is small, clearly distinguishing the waist from the chest and buttocks on the body. On the other hand, the size of the Underbust circumference is 11cm smaller than the bust circumference, the Waist circumference is 6cm larger than the Waist circumference (Table 5). Therefore, women aged 30 in Vietnam have the characteristics of an hourglass body shape, with a larger hip circumference than the bust (Figure 2)

Table 5. Mean of dimensions

STT	Measurement	Symbol	Mean (cm)
1.	Bust circumference	Vn	82,00
2.	Under Bust circumference	Vcn	71,00
3.	Waist circumference	Ve	66,50
4.	Abdominal circumference	Vb	72,50
5.	Hip circumference	Vm	89,00
6.	Shoulder width	Rv	36,40

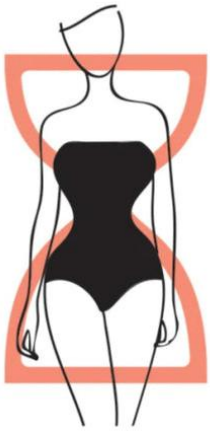

Figure 2. Body shape

IV. CONCLUSION

The cross-sectional study measured 321 female bodies. Measured with the Martin anthropometric measuring set. SPSS 22 software was used to analyze anthropometric statistical characteristics.

Body shape characteristics of Vietnamese women aged 30 were specifically analyzed. The anthropometric statistical characteristics are reliable, within the allowable limits. The average values ($\bar{X}$) are close to the median value (Me) and the dominant number (Mo).

The average height of women in their 30s in Vietnam is equivalent to that of Vietnamese women and is average compared to the height of women in ASEAN

The average weight of women in their 30s in Vietnam is smaller than that of Vietnamese women and is average compared to that of ASEAN women.

The BMI of women in their 30s in Vietnam is normal. It is smaller than that of Vietnamese women and ASEAN women.

Body characteristics according to posture show that the body of women in their 30s in Vietnam is 0.2cm. They have a normal body shape.

The ratio of the bust measurement is insignificantly smaller than the hip measurement. The waist measurement is small, clearly distinguishing the waist from the chest and hip on the body. women in their 30s in Vietnam have an hourglass body shape, with the hips larger than the bust.

REFERENCES

[1]. Nguyễn Thị Mộng Hiền, 2016. *Nghiên cứu đặc điểm vóc dáng ảnh hưởng đến thiết kế hệ số điều chỉnh rập áo cơ sở phụ nữ Việt Nam trên phần mềm 3D-Vstitcher*. Tạp chí phát triển KH & CN, tập 19, số 7.

[2]. Nguyễn Thị Mộng Hiền, Võ Tường Quân, Bùi Mai Hương, Trịnh Thị Kim Huệ, Nguyễn Minh Dương, 2018. *Xây dựng hệ thống cỡ số kích thước cơ thể người nam Miền Nam Việt Nam từ 18 đến 25 tuổi*. Tập 1, số 2.

[3]. Nguyễn Thị Kim Thanh, Trần Thị Hồng Mỹ, Nguyễn Thanh Yến Xuân, 2010. *Nghiên cứu, xây dựng hệ thống cỡ số cho sinh viên 19 tuổi theo phương pháp nhân trắc học và ứng dụng may đồng phục sinh viên*. Tạp chí Khoa học giáo dục kỹ thuật, số 15.

[4]. Phạm Thị Huyền, 2019. *Xây dựng hệ thống cỡ số cơ thể nữ sinh viên trường Đại học Công nghiệp Hà Nội để ứng dụng thiết kế quần áo*. Đề tài cấp trường Đại học Công nghiệp Hà Nội

[5]. Nguyễn Thị Ngọc Quyên, 2015. *Nghiên cứu ứng dụng phương pháp đo gián tiếp 2D và xây dựng hệ thống kích thước cơ thể nam sinh viên phục vụ ngành May*. Luận văn tiến sĩ, Trường đại học Bách Khoa Hà Nội.

[6]. Nguyễn Thị Thanh Thảo, 2015. *Xây dựng hệ thống cỡ số kích thước cơ thể phần thân dưới phụ nữ Thành phố Hồ Chí Minh độ tuổi từ 25 đến 35*. Luận văn thạc sĩ, Trường đại học Bách Khoa Hà Nội.

[7]. Bùi Thúy Nga, 2010. *Nghiên cứu xây dựng bảng phân cấp các bảng cỡ số cho một số sản phẩm may dành cho phụ nữ*. Đề tài khoa học công nghệ Bộ Công Thương.

[8]. Nie Yayuan, Zhang Wenbin, *Phân tích hình dạng cơ thể của đàn ông trưởng thành ở Thượng Hải*, Học viện thời trang Đại học Donghua

[9]. Nguyễn Mậu Tùng1,2, Trần Thị Minh Kiều1, Phạm Thế Bảo, *phân tích hình dáng cơ thể nam trung niên thành phố Hồ Chí Minh – Việt Nam*, Tạp chí Khoa học và Công nghệ, Số 43B, 2020

[10]. Phùng Thị Bích Dung, 2007. *Góp phần nghiên cứu xây dựng cỡ số quần áo học sinh tuổi 15 tại huyện Thống Nhất tỉnh Đồng Nai theo phương pháp nhân trắc học*. Luận văn thạc sĩ, Trường Đại học Bách Khoa Hà Nội

[11]. Huỳnh Thị Kim Liên, 2010. *Nghiên cứu xây dựng hệ thống cỡ số quần áo trẻ em gái mẫu giáo 6 tuổi tại thành phố Hồ Chí Minh*. Luận văn thạc sĩ, Trường Đại học Bách Khoa Hà Nội

[12]. TS. Vũ Thanh Chương (Chủ Biên) - Ths. Phạm Thị Hồng Tươi Ths. Phạm Thị Kim Phúc - Ths. Bùi Thị Loan, *xây dựng hệ thống cỡ số quần áo trẻ em*, nhà xuất bản khoa học và kỹ thuật Hà Nội-2013

[13]. Võ Hưng, *"Một số phương pháp toán học ứng dụng trong sinh học",* NXB Đại học và Trung học chuyên nghiệp, 1983

[14]. ISO 8559, *Garment construction and anthropometric surveys-body dimensions* (1989).

[15]. Tiêu chuẩn Việt Nam TCVN 5781-2009, *Phương pháp đo cơ thể* (2009).

[16]. Worlddata.info/average-bodyheight.php.

[17]. Erdembieg Anuurad et al, *"The New BMI Crieria for Asians by the Regional Office for the Western Pacific Region of WHO are Suitable for Screening of Overweight to Prevent Metabolic Syndrome in Elder Japanese Wr er"*, J Occ p He h, 45, pp335–343, 2003.