Determining the Body Measurements of the Filipino Plus-Size Woman: An Anthropometric Approach (Part I)

Patricia S. Elumba[†]

Dept. of Clothing, Textile and Interior Design, University of the Philippines

Abstract

This research analyzed the anthropometric data for Filipino plus-size women. The study aims to identify key dimensions used for the sizing system that can improve on fit and style concerns/issues for the plus-sizes. This study also develop a reference of body measurements for Filipino plus-size women from the data collected. The data was collected from subjects residing or working in the University of the Philippines and within Metro Manila. The full figure body shapes have been derived from the raw anthropometric data. The pear and the barrel shapes were derived figure types based on the anthropometric data collected. These body types show that weight distribution is on the lower torso for the pear and the upper torso for the barrel.

Key words : body measurement, body type, plus-size.

I . Introduction

Medical experts have noted a growing trend towards obesity among populations in the Asia-Pacific region. Aside from the Philippines, countries like Singapore, Hong Kong, Indonesia, and Thailand also had an increased prevalence of obesity in both adults and children in the past five years. As of March 2004, the National Statistical Coordination Board (NSCB) noted that from a projected population of 82.7 million, 4.4% of women and 2.1% of men are considered obese based on the 2001 Food and Nutrition Research Institute (FNRI) reports. In 2003, the NSCB also reported that 23% of a total population of 39.5 million women and 17% of 40 million men were considered obese. Most obese women complain about their bulging tummies,

flab in the abdomen, and sagging arms. In 2003, both Newsweek's "Obesity: The World's Expanding Middle" and the Economist's "The Shape of Things to Come" have put obesity in the limelight. In light of this, the aspect of clothing for obese women needs to be addressed. This should help resolve some of the socio-psychological issues that confront those who are obese. Clothes come in special sizes for wide women, short women, young and old women. Big sizes for the overweight are synonymous with a "deviation" rather than a "variation" in the height and weight charts. Plus-size garments have become popular and significant in the market due to the presence of obese and overweight women. However, there seems to be a lack of appropriate sizes and styles.[1] Making this type of apparel should help enhance the confidence and well being of the large-size women. Body-size

---

[†] E-mail : che@up.edu.ph

[1] T. San Juan, "The Fat Market is a Big Market." *Philippine Daily Inquirer*, 24 October 2003, G1.

and proportion should be studied to make apparel that will be based on actual body measurements.[2] Size- designation must be based on body and not final garment measurements. The range of apparel sizes for plus-size women is varied and not based on Filipino body measurement standards. In the absence of such measurements, there is a need to implement a measurement survey to determine the obese populations' anthropometry.

II. Objectives of the Study

This research effort was done primarily to determine the anthropometric data for Filipino plus-size women. More specifically the study aims to:

1) Identify key dimensions used for the sizing system that can improve on fit and style concerns/issues for the plus-sizes.

2) Develop a reference of body measurements for Filipino plus-size women from the data collected.

III. Theoretical Background

One of the greatest challenges facing apparel manufacturers today is finding a cost-effective method for providing quality-fit in plus-size apparel. Lack of good fit is often the reason given by consumers for deciding not to purchase clothing and it is estimated that as much a 35% of clothing purchased from catalogs are returned because of problem of fit.[3]

Body measurements of important anatomical structures are taken to be able to determine measurements essential to the assembly of the garment. A pattern that conforms closely to body dimensions and contours will provide the best fit and comfort. Pattern size is determined by comparing specified individual body measurement with matched standardized body measurement. Figures varying in proportion or contour (with bulges or hollows) but close in dimension will require pattern alteration for good fit.[4] Specific body shapes and proportions, body curves establish certain body measurements that make the garment fit well.[5]

Obese persons require clothing that is neither too loose nor tight and allows freedom of movements.[6] Pleasing distribution of the body flesh over the frame is desirable. Figure faults are obvious in the obese. A very common fault is the deposit of adipose tissue in certain areas of the thigh, hip and the midriff. Concealing these figure faults is certainly a challenge to both the manufacturer and designer.[7]

Fit preference is related to age and body shape — older women and larger women generally prefer more loosely fitted apparel. Heavy women who are rectangular shaped usually prefer loosely fitted jackets as compared to those with average weight and waist. The preference for loosely fitted clothing revealed the diverse relationship with specific clothing benefits (i.e. body emphasis, fashion innovativeness, satisfaction, and fashion image with ready-to-wear and sex apparel). Interestingly, a semi-fitted prefe-

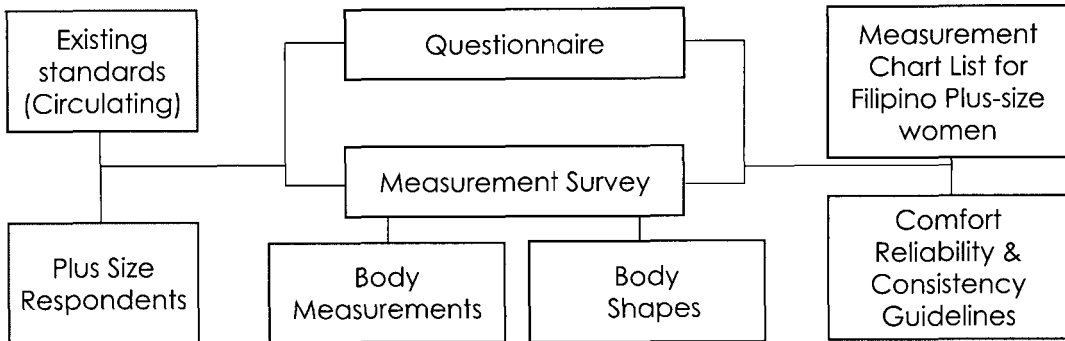[2] F. L. Zangrillo, *Fashion Design for the Plus-Size*, (New York: Fairchild Publications, 1990).

[3] S. Ashdown, and C. Istook, *Use of Body Scan Data to Design Sizing System Based on Target Markets* National Textile Center Project No. 101-B01. Available from http://www.human.cornell.edu/units/txa/research/ntc (2001).

[4] M. J. Kallal, *Clothing Construction*, (New York: Macmillan 1985).

[5] B. Farr, J. Stone, L. Auliff, C. Ouvenson, and R. Glock, "Consumer Choices: Finding Your Best Fit." Iowa State University Extension, (January 1996). Available from http://www.extension.iastate.edu/Publications/PM1648.pdf

[6] P. Brown, *Ready-To-Wear Apparel Analysis*, (New York: Macmillan Publishing Company, 1992).

[7] M. Kefgen, and P. Touchie-Specht. *Individuality in Clothing/Personal Appearance: A Guide for the Consumer*, (New York: Macmillan, 1971).

CONCEPTUAL MAP

```
┌──────────────┐      ┌──────────────────┐      ┌──────────────────┐
│   Existing   │      │  Questionnaire   │      │   Measurement    │
│  standards   │      │                  │      │  Chart List for  │
│ (Circulating)│      └──────────────────┘      │ Filipino Plus-size│
└──────────────┘                                │      women       │
                      ┌──────────────────┐      └──────────────────┘
                      │ Measurement Survey│
┌──────────────┐      └──────────────────┘      ┌──────────────────┐
│  Plus Size   │   ┌──────────────┐  ┌────────┐ │     Comfort      │
│ Respondents  │   │    Body      │  │  Body  │ │  Reliability &   │
│              │   │ Measurements │  │ Shapes │ │   Consistency    │
└──────────────┘   └──────────────┘  └────────┘ │   Guidelines     │
                                                └──────────────────┘
```

rence in garment showed a significant relationship with body shape and the specific clothing benefits. Rectangular and pear shaped were more likely to hide figure flaws with their clothing choices.[8]

Overweight women who have difficulty bending will find dresses that go over the head easier to manipulate than those that have full-length openings. However, front openings of full or three-quarters lengths are better for women who cannot raise their arms above their heads.[9]

Fit issues for the plus-size are a complex interaction of the body measurement, the pattern and the finished garment itself. Since the advent of mass production, the clothing industry has adapted an authoritarian position to improve on ill-fitting.

IV. Methods

1. The Research Paradigm

A survey of body measurements of the female Filipino plus-size would meet the need for actual data on which to base size specifications for these women's apparel. Measuring women belonging to the plus-size group will yield a body measurement reference to be used as a basis for sizing and the development of styles.

The overall activity will also relate body shape and apparel needs particular to the size group.

2. Subjects and Sampling

The study involved measuring a group of selected women belonging to the plus-size range. The data was collected from subjects residing or working in the vicinity of the University of the Philippines (Diliman), neighboring residential areas, offices, schools and fitness centers within Metro Manila. The subjects pre-qualified as female, 18~50 years of age, residents of Metro Manila and with Body Mass Index (BMI) ≥ 30. 30 measurements were taken from the right side unless designated otherwise.
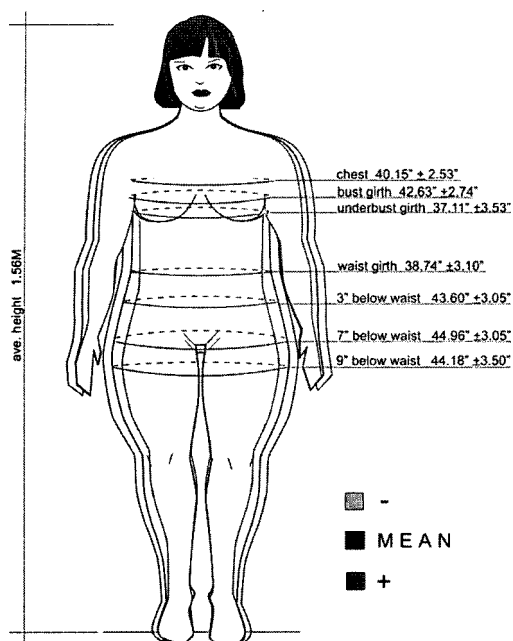
V. Result and Discussion

In this study, 95% of subjects belong to the obese or those with BMI $\geq$ 30. The remaining 5% is at 40 BMI. Average BMI is 33 $\pm$ 3.02. The mean age of the population was 30 $\pm$ 9.72 years. The average height is 1.56 meters $\pm$ 0.07. The average weight is 80.15 $\pm$ 10.22 kg.

The above measurements complete the data to compose the body figure as seen in Fig. 1. All measurements were used to plot the silhouette of the body shape. Plotting the points for the full

---

[8] J. Connel, E. L. Brannon, P. V. Ulrich, A. B. Presley, M. Grasso, J. H. Early, and S. Gray. "Understanding Fitting Preferences of Female Consumers: Development of an Expert System to Enhance Accurate Sizing Selection," *National Textile Center Research Briefs- Integrated Enterprise Systems Competency*, (2001).

[9] B. Farmer, and L. Gotwals. *An Individualized Approach to Pattern Design: Concepts of Fit.* (New York: Macmillan Publishing Company, 1982).

chest 40.15" ± 2.53"
bust girth 42.63" ±2.74"
underbust girth 37.11" ±3.53"

waist girth 38.74" ±3.10"

3" below waist 43.60" ±3.05"

7" below waist 44.96" ±3.05"

9" below waist 44.18" ±3.50"

ave. height 1.56M

▨ -

■ MEAN

■ +

⟨Fig. 1⟩ Body Measurements Derived from the Survey and Variations.

body was done to clearly show three body measurements charts given the range derived. The mean figure can be considered the middle size while the minimum and maximum are the small and large sizes. The full range shows the three possible sizes based on actual body measurements collected.

The representative figure shows a pear-shaped body type. Sometimes called the Modigliani shape; it is characteristically a figure with narrow shoulders (often sloping), a small bust shapely waist, generous lower hips, and full thighs. Looking at the figure illustrated, the figure is fullest at the lower torso-wide hips that need to be balanced with the shoulder area. As discussed earlier, the most important factor is the distribution of weight on the frame and not the volume of the weight.[10] Working with sizes and measurements can define the distribution based on the lengthwise and circumferential measurements.
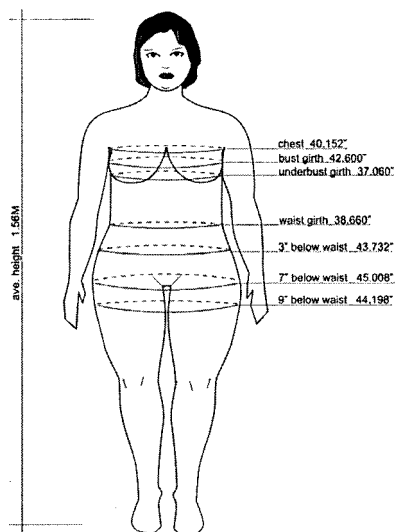
I. Measurement by Body Shape

The full figure body shapes have been derived from the raw anthropometric data. Key dimensions highlighted provide the points used to plot the silhouette of the figure. The body proportions are based on the rectangular-8 shape, the pear, barrel and the box shapes. The overall contours of the subjects belong to the pear and the barrel shapes.

The pear shape is the predominant shape. ⟨Table 1⟩ shows the specific measurement of 90 (95.7%) subjects belonging to the pear shaped group. ⟨Table 2⟩, on the other hand, shows the measurements of 4 (4.3%), subjects with barrel-shaped contour.

The pear-shaped subjects' measurements were used to form the figures from the mean measurements. From the data, the small and large pear-figures were also plotted. Majority of subjects belong to this derived body shape, which is described as bottom heavy. The pear shape has a narrow top and usually a narrow shoulder that continues to the waist where it bells over round hips or large bulging thighs. The barrel

chest 40.152"
bust girth 42.600"
underbust girth 37.060"

waist girth 38.660"

3" below waist 43.732"

7" below waist 45.008"

9" below waist 44.198"

ave. height 1.56M

⟨Fig. 2⟩ Pear-shaped Body Type

---

[10] M. Kefgen, and P. Touchie-Specht. *Individuality in Clothing/Personal Appearance: A Guide for the Consumer,* (New York: Macmillan, 1971).

⟨**Table 1**⟩ Anthropometric Data (in inches): Pear-Shaped Body Type

Body Dimension	n	Minimum	Maximum	Mean	Standard Deviation
Chest	90	35.0	48.0	40.1	2.54
Bust Girth	89	36.0	48.6	42.6	2.78
Under Bust	90	21.5	44.5	37.0	3.58
Waistgirth	90	32.0	49.0	38.6	3.03
Back To Waistline	90	14.4	23.6	18.7	1.87
Front To Waistline	90	7.0	24.1	20.2	2.18
Hipgirth 3	90	37.5	55.5	43.7	2.86
Hipgirth 7	90	35.5	59.5	45.0	3.19
Hipgirth 9	90	31.5	59.2	44.2	3.54
Shoulder Length A	90	10.1	16.0	13.2	1.08
Shoulder Length B	90	8.0	12.3	10.3	0.84
Shouldlc	90	12.0	19.0	15.2	1.38
Sleeve A	90	11.3	18.0	14.1	1.11
Sleeve B	90	9.1	13.2	10.8	0.69
Sleeve C	90	5.8	8.7	6.9	0.48
Uwleft	90	4.0	11.0	7.6	1.35
Uwright	90	3.5	11.0	7.6	1.36
Stowline	90	10.9	23.2	18.4	1.81
Cterfrnt	90	10.0	18.3	15.3	1.59
Shldbust	89	9.0	15.6	11.7	1.14
Ctrfbust	89	6.3	18.2	8.9	1.35
Back A	89	13.1	19.0	16.1	1.10
Back B	89	13.7	19.7	16.4	1.19
Back C	89	13.5	19.8	16.4	1.22
Shldshld	90	13.6	19.0	16.9	1.04
Backwidt	90	13.6	19.5.	16.4	1.25
Flength A	89	32.3	48.1	36.9	2.34
Flength B	89	27.8	47.8	38.1	2.63
Flength C	90	33.2	46.5	37.7	2.17
Flenght D	87	26.5	45.0	37.5	2.34
Skirtl	87	19.2	34.0	22.9	2.24
Crvwrist	87	19.5	30.2	25.6	1.99
Tgirth	89	9.5	35.3	26.1	3.17
Oleglght	90	42.0	45.0	43.5	2.12
Ileglght	90	22.5	36.4	26.9	2.79
Anklegrt	90	7.9	23.8	10.1	2.22
Neckshld	90	4.1	7.0	5.3	0.64

⟨**Table 2**⟩ Anthropometric Data (in inches): Barrel Shaped Body Type

Body Dimension	n	Minimum	Maximum	Mean	Standard Deviation
Chest	4	37.0	42.5	40.0	2.54
Bust Girth	4	41.8	45.5	43.2	1.62
Underbust	4	36.3	40.1	38.2	0.85
Waistgirth	3	37.0	46.2	41.0	4.69
Back To Waistline	4	14.5	20.2	17.6	2.49
Front To Waistline	4	19.5	22.3	20.7	1.21
Hip Girth 3	4	34.8	46.7	40.5	5.56
Hip Girth 7	4	35.0	48.5	43.9	6.29
Hip Girth 9	4	42.0	47.4	43.7	2.50
Shoulder Length A	4	13.8	16.5	15.1	1.32
Shoulder Length B	4	9.3	11.0	10.2	0.78
Shouldlc	4	14.0	16.0	14.8	1.0
Sleeve A	4	13.0	15.6	14.2	1.22
Sleeve B	4	10.7	11.8	11.2	0.49
Sleeve C	4	6.6	7.4	6.9	0.34
Uwleft	4	4.8	6.7	5.7	0.61
Uwright	4	4.8	6.7	5.9	0.81
Stowline	4	15.0	17.4	16.6	1.08
Cterfrnt	4	13.0	17.0	14.1	1.89
Shldbust	4	10.4	13.0	11.7	1.20
Ctrfbust	4	8.2	11.5	9.3	1.47
Back A	4	14.9	16.0	15.5	0.49
Back B	4	15.0	16.0	15.5	0.42
Back C	4	15.1	16.0	15.5	0.42
Shldshld	4	15.0	17.0	16.2	0.95
Backwidt	4	13.8	16.3	15.3	1.08
Flength A	4	36.0	41.5	38.1	2.39
Flength B	4	36.2	39.9	38.4	1.58
Flength C	4	36.0	40.0	38.4	1.83
Flenght D	4	36.0	39.6	38.1	1.54
Skirtl	4	22.5	26.0	23.8	1.50
Crvwrist	4	24.0	27.2	25.3	1.36
Tgirth	4	24.6	28.4	26.3	1.56
Oleglght	1	40.0	40.0	40.0	
Ileglght	4	23.6	28.1	26.8	2.14
Anklegrt	4	9.4	11.0	10.0	0.75
Neckshld	4	5.0	5.6	5.3	0.24

ave height. 1.56M

chest_40.075"
bust girth_43.225"
underbust girth_38.225"

waist girth_41.067"
3" below waist_40.525"
7" below waist_43.925"
9" below waist_43.775"
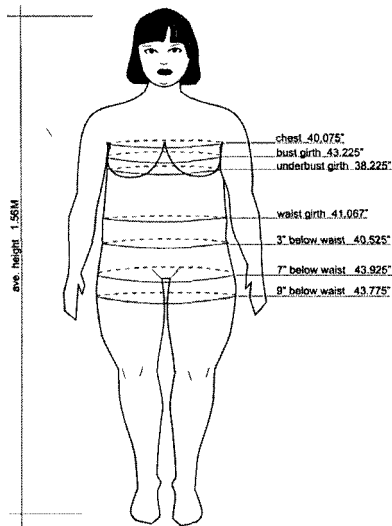
⟨Fig. 3⟩ Barrel-shaped Body Type.

shape is a body type that is profoundly heavy. The upper torso seems to be short but broader than the lower torso, which translates to a short-waisted and wide shouldered figure. Likewise, the waist is thicker in the middle than in the hips. The pear and the barrel shapes were derived figure types based on the anthropometric data collected. These body types show that weight distribution is on the lower torso for the pear and the upper torso for the barrel. The latter is also popularly known as the apple figure.

The measurements from our tables validate the body characteristics unique to these figure types. Overall, Filipino plus-size women are predominantly concerned with the darts, eases, and tucks needed to shape the figure and correct the figure distortions. The body dimensions for chest, bust, waist, and hips connected (plotted to form) to determine the body silhouette determined the predominant figure types. The measurements from the anthropometric data were collated to show key dimensions (standard of commercial suppliers) used to derive the size groups and their range of measurements.

The bigger measurements from the commercial standards extend the range of the measurements on all key dimensions. It would appear that the clothes were seen as loose fit or were graded using an international standard. This cannot be verified since the retailer designated the standard body measurements. This should be verified and revised nearest to the derived figure so that measurements are from the actual measurements collected from the intended user.

VI. Conclusion

This pioneering study will provide relevant information on the body measurements of the Filipino plus-sizes as basis for sizing, patterns, and garment designs. The anthropometric data will help ensure comfort, fit, reliability, and consistency of plus-size garments for the local market. More importantly, big women will have the privilege of being well-dressed and have good fit in their clothes. No longer voices in the wilderness!

References

Ashdown, S. and Istook, C. 2001. *Use of Body Scan Data to Design Sizing System Based on Target Markets* National Textile Center Project No. I01-B01. available from http://www.human.cornell.edu/units/txa/research/ntc

Brown, P. 1992. *Ready-To-Wear Apparel Analysis*. New York: Macmillan Publishing Company.

Connel, J., Brannon, E. L., Ulrich, P. V., Presley, A. B., Grasso, M., Early, J. H., and Gray, S. 2001. "Understanding fitting preferences of female consumers: Development of an expert system to enhance accurate sizing selection," *National Textile Center Research Briefs-Integrated Enterprise Systems Competency.*

Farmer, B. and Gotwals, L. 1982. *An Individualized Approach to Pattern Design: Concepts of Fit.* New York: Macmillan Publishing Company.

Farr, B., Stone, J., Auliff, L., Ouvenson, C., and Glock, R. "Consumer choices: Finding your best fit". Iowa State University Extension, January 1996. Available from http://www.extension.iastate.edu/Publications/PM1648.pdf

Kallal, M. J. 1985. *Clothing Construction.* New York: Macmillan.

Kefgen, M. and Touchie-Specht, P. 1971. *Individuality in Clothing/Personal Appearance: a guide for the consumer.* New York: Macmillan.

San Juan, T. "The fat market is a big market." *Philippine Daily Inquirer* 24 October 2003, G1.

Zangrillo, F. L. 1990. *Fashion Design for the Plus-Size.* New York: Fairchild Publications.