

CREATING A GARMENT PATTERN FOR THE PREGNANT ACCORDING TO THE DROP SYSTEM (Case Study)

VÜCUT ÖLÇÜLERİNE DAYALI DROP SİSTEMİNE GÖRE HAMİLE GİYSİ KALIBI OLUŞTURMA (Örnek Çalışma)

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ABSTRACT

The aim of this research is to create a correct basic pattern form for an over-garment depending on changes in their bodies. The material of the research is composed of 37,249 women who live in Adana and who bore a baby in the province in 2009. The sample is composed of 106 pregnant women who were elected from the universe using gradual method and who received support from Adana Maternity Hospital. The data was acquired through "measurement form" and developed through trial with pilot study. The arithmetic means and the percentiles of pregnant body measurements necessary for over-garment basic body pattern were found in the research. The measurement of the abdominal circumference is faced with many changes within the last trimester period. At the end of the research, a measurement form supposed to tolerate the dimensional problems in the garments. A case of the drop system and basic pattern of over-garment for pregnant women was designed according to the system with measurements obtained by the form.

Key Words: Pregnant garment pattern, Pregnant body measurement change, Pregnant apparel industry.

ÖZET

Bu araştırmanın amacı vücut değişimlerine bağlı olarak doğru bir hamile üst giysi temel kalıp formu oluşturmaktır. Araştırmanın materyalini, Adana ilinde yaşayan ve 2009 yılında ilde doğum yapmış olan 37.249 kadın oluşturmaktadır. Örneklem, evrenden kademeli yöntem ile seçilen ve Adana Kadın Doğum Hastanesi'nden destek alan 106 hamile kadındır. Veriler, pilot çalışma ile denenerek geliştirilen "ölçü formu" ile elde edilmiştir. Araştırmada üst giysi temel beden kalıbı için gerekli olan hamile vücut ölçülerinin aritmetik ortalamaları, yüzdelik dilimleri bulunmuştur. 5. ve 95. yüzdelik değerleri arasındaki farklar: Bütün boy ölçüsünde 10 cm, ön ortası yaka ucu ile kalça düşüklüğü arası ölçüsünde 10,7 cm, göğüs çevresi ölçüsünde 15,6 cm, karın çevresi ölçüsünde 21,6 cm, kalça çevresi ölçüsünde 21,6 cm'dir. Bu fark elde edilen en yüksek değerdir. Karın çevresi ölçüsü son trimester dönemi içerisinde çok fazla değişime uğramaktadır. Araştırma sonucunda, giysilerdeki boyutsal problemleri tolere edeceği düşünülen bir ölçü alma formu hazırlanmıştır. Bu form ile elde edilen ölçülere dayalı örnek bir drop sistemi ve bu sisteme göre hamileler için temel üst giysi kalıbı hazırlanmıştır.

Anahtar Kelimeler: Hamile giysi kalıbı, Hamile vücudu ölçü değişimi, Hamile hazır giyim sanayi.

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1. INTRODUCTION

According to the estimations of 2010-2015 the number of children borne per woman in the world is 2.5. The countries where the total prolificacy rate is the lowest are: Niger (6.9), Somali (6.3) and Afghanistan (6); the countries where total prolificacy rate is

the highest are: Japan, Austria (1.4), Bosnia-Herzegovina (1.1) (1). Turkey where this rate is 2.1 is the 114th among 186 countries (2). Turkey where the number of births from 2009 is 1,241,617, the prolificacy rate is 2 (3). Considering according to this potential that a fertile woman shall need maternity wear on average twice

in her life, maternity wear in Turkey is a significant niche market (4). The purpose of this research is to create a correct basic pattern form for an over-garment depending on changes in the body. For this purpose the sub-problems of the research were determined as follows:

1. What are the measurement values necessary for a correct basic pattern form for an over-garment?
2. How should an example basic pattern form of an over-garment for pregnant women be?

The literature compiled from the relevant researches that could facilitate the solution of those problems was given as follows.

Physical and Postural Changes in Pregnancy

Pregnancy is a special period that changes normal human physiology significantly (5). In total 4-4.5 kg. of fat is accumulated in the abdominal wall and hip region (6, 7). The weight gained within this period may be as much as 25% of the pre-pregnancy weight. This amount is on average \pm

12.5 kg in every woman and usually emerges in the second half of pregnancy (8). In the measurements of eighty American women in the fourth, sixteenth and thirty sixth weeks of pregnancy, the mean of weight gain was 17% (9). The regions of the body where the women gain the most weight are in the hip and breast; breast and hip circumference is (21.3%), breast circumference is (18%), hip circumference is (16%) (10).

According to the study performed by Bye and Sohn (2009,a); the data acquired from 7 body examinations through three-dimensional examination were given in Figure 1. Accordingly the highest increase is observed in abdominal circumference as of the 6th month. In each examination the body shape changes were detected to progress.

Upon the increase in the body weight; the depth of waist cavity inclines 0.5 cm inwards the hip angle increases by 2.8 cm outwards as of the 36th week (9). Upon the development of the fetus, the standing position of the pregnant woman changes. Increase in the load of abdominal muscles and vertebral column causes the position of the head to shift backwards (12; 13; 14). Those changes have a negative effect on the organism and movement administration that provides postural balance as well (Figure 2).

Psychological and physical adaptation problems suggest that it is necessary to consider on the pregnant comfort (15). Physical and postural changes occur differently in every woman (16). The abdominal shapes change depending on pre-pregnancy body shape, body type, and weight (Figure 3).

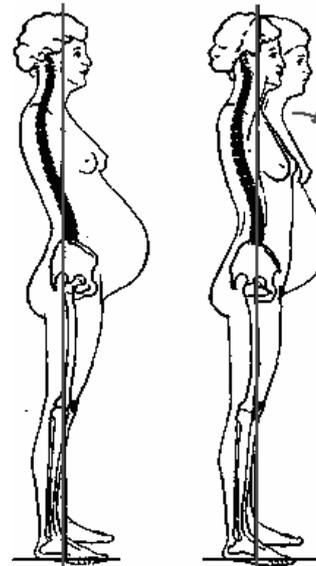
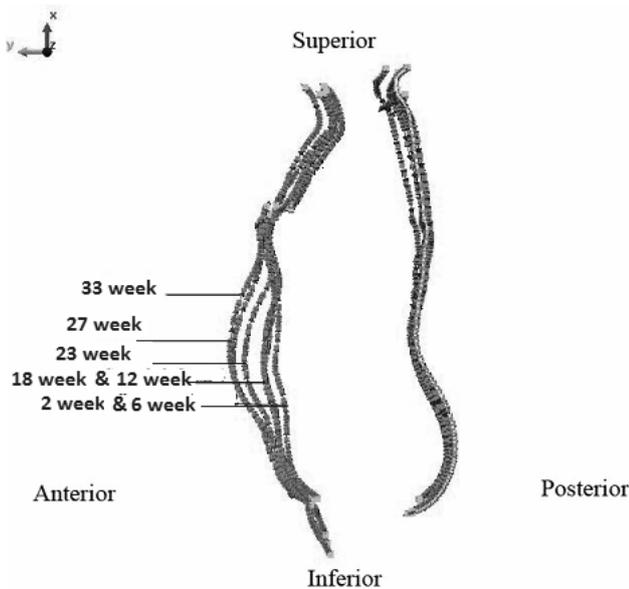


Figure 1. Overlaid lateral views of the seven body scans (11)

Figure 2. Static of the body and postural alteration during pregnancy (9)

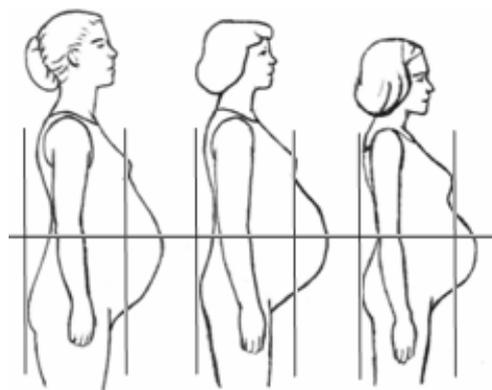


Figure 3. Abdominal shapes during the eighth month (16)

Since the abdomen and body shape of every woman at the end of the eighth month is different, the form of each garment bought exhibits a different fit and appearance in the body. According to the study of Bye and Sohn (2009,b) change in body shapes and measurements of pregnant women occur differently. For this reason, the level of satisfaction of women having the same body sizes for the same garment differs as well. Among the pregnant women, *the proportion of those who cannot find garment, suitable for their bodies is 26%, the proportion of those who cannot find the model they like is 23%, the proportion of those who cannot find garment, suitable for their bodies and the model they like is 19%* (10). The most important reason for the suiting problems in maternity wear is that garment patterns are prepared according to standard hourglass body shape measurements. Nevertheless it is known that many women have a body shape different from this. In a research conducted on the measurement of 109 pregnant women it is found that 14% of women have a V-shaped body, 23% have an X-shaped body and 63% have an A-shaped body. The differences among breast, hip, and abdominal measurements of women according to their body shapes were observed (4). All physical changes in pregnancy should be paid particular importance for comfort, suiting, and measuring while developing maternity wears in the readymade garment sector (11). Two major fit concerns were lack of a standardized sizing system in the current apparel industry (i.e., inconsistency of clothing sizes across

and within different brands) and lack of attention by industry to body shape changes (18). As it is stated in the recent slogan of Levi's, one of the blue jean companies, it is shape rather than body size which is significant. The brand examined the bodies of more than sixty thousand women and created patterns suitable for three body shapes which are "**slight-demi and bold curves**" (19). The first rule of mass garment production is suitability of measurements of products with the body measurements of the consumers. Recent research suggest, that the consumers should be categorized according to not only body size means but also their body shapes and garment patterns should be prepared according to those characteristics (4). According to the study of Bye and Sohn (2009,a) although the researches on simple maternity wears are restricted, there is no study available performed by targeting at the change of body shape in pregnancy.

2. MATERIAL AND METHOD

The material of the research is composed of 37,249 women who live in Adana and who bore a baby in the province in 2009. The sample is 106 pregnant women who were elected from the universe using the gradual method and who received support from Adana Maternity Hospital. The period that when the mean of fertility age of mothers is the highest are the period between ages of 20–29 (Table 1). Since the number of materials is higher than 25,000, within 95% reliability range and with a sample error of $\pm .10$ the size of the sample was calculated as 96 individuals (20). However the measurements of the

sample were increased to 100 in terms of meaningfulness of the results. Those women who were included in the sample accepted to participate in the research voluntarily and allowed their body measurements to be taken. All of the women were in the third trimester of their pregnancy and normal in postural and physical terms.

The data were acquired through "measurement form" developed through trial with pilot study. The measurement form was issued using the study performed by Rutter et.al. (1984); using the measurement regions selected considering the woman measurement definitions of International Standard Organization (21). The measurements were taken using a tape measure by the researcher from the pregnant women in normal standing position wearing very thin garment. Basic lines of the participants were determined using reinforcement-tape prior to the measurement. The measurements were taken in a room with suitable physical conditions. It was detected that body measurements, the definitive statistics (standard deviation, range, minimum, maximum values, arithmetic mean and 5th, 25th, 50th, 75th, and 95th percentiles) of which were acquired by being assessed in SPSS program, exhibited normal distribution and interpretations were made via the percentiles. The data were collected with a permission certificate granted by the Governor's Office of Adana, Provincial Directorate of Health, in conformity with patients' rights and in the manner that would not hinder service.

Table 1. Parity in age groups of mothers in the Adana sampling

| Universe | Mother's age | | | | | | | | | |
|----------|--------------|-------|-------|-------|-------|-------|-------|-------|-----|---------|
| | <15 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50+ | Unknown |
| 37249 | 23 | 3220 | 10439 | 11738 | 7334 | 3497 | 768 | 98 | 9 | 123 |
| % 100 | | 8 | 28 | 31 | 19 | | | | | |
| Sample | % 78 | | | | | | | | | |
| 106 | | 15-19 | 20-24 | 25-29 | 30-34 | | | | | |
| | | 14 | 39 | 34 | 19 | | | | | |
| % 100 | | 13,2 | 36,8 | 32,1 | 17,9 | | | | | |

(Adapted from: Statistics from General Directorate of Civil Registration and Nationality in 2009) (By the date of 31.08.2010)

3. RESULTS AND DISCUSSIONS

3.1. Data Analysis

According to the arithmetic means of pregnant body measurements given in Table 2, the following values were found: Height: 160.09 cm, breast circumference: 97 cm, abdominal circumference: 102.3 cm, hip circumference: 103.8 cm, collar circumference: 35.3 cm, shoulder width: 11.5 cm. In preparing readymade garment patterns, the values corresponding to 50th percentile of the measurements were used. In the research, the percentile values of the body measurements taken from pregnant women were examined on the basis of the necessity that the first datum for remedying the problems arising from pattern form should be measurements. The variables on the differences observed between percentile values of pregnant body measurements were given as follows.

For the height, it is observed that;

- While the difference between 5th – 25th and 75th – 95th percentile values is 2 cm,
- The difference between 25th, 50th and 75th percentile values is 3 cm,
- The difference between 5th – 95th percentile values is 10 cm.

In the works of preparing the pattern for readymade garment production height is categorized in three main groups according to differences of 8 cm for each which groups are short-medium-long. The difference between 5th – 95th percentile values of measurements (10 cm) is outside the group. Height difference is a factor that directly affects the appearance of the length of garments on the body. The findings verify that the change in height is the main source of height related problems in the garments.

For the measurement between front middle collars to hipline, it is observed that;

- The difference between 5th and 25th percentile values is 3.7 cm,

- The difference between 25th and 50th percentile values is 2.5 cm,
- The difference between 50th and 75th percentile values is 1.5 cm,
- The difference between 75th and 95th percentile values is 3 cm,
- The difference between 5th and 95th percentile values is 10.7 cm.

For the breast circumference measurement, it is observed that;

- The difference between 25th, 50th and 75th percentile values is 4 cm,
- The difference between 50th and 75th percentile values is 3.2 cm,
- The difference between 75th and 95th percentile values is 4.4 cm,
- The difference between 5th and 95th percentile values is 15.6 cm.

The difference found between 5th and 95th percentile values is 15.6 cm and it is within approximately three body measurements. Those differences are at such level that they could affect the garment forms.

Table 2. Pregnant body measurements and statistical inference (cm)

| Measurements | Code of Measurements | Place Of Measurements | Descriptive Statistics | | | | | Percentage Values | | | | | Difference Between 5 th -95 th Percentile Values |
|------------------------|----------------------|---|------------------------|-------|-----|-----|--------|-------------------|------|------|-------|-------|--|
| | | | SD | Range | Min | Max | M | 5 | 25 | 50 | 75 | 95 | |
| Basic Measurements | 1 | Height | 3.5 | 10 | 155 | 165 | 160.09 | 155 | 157 | 160 | 163 | 165 | 10 |
| | 2 | Breast Circumference (Basic Measurement) | 5 | 25 | 86 | 111 | 97 | 89 | 93 | 97 | 100.2 | 104.6 | 15.6 |
| | 3 | Abdominal Circumference | 6.2 | 28 | 87 | 115 | 102.3 | 92 | 98 | 102 | 106 | 113.6 | 21.6 |
| | 4 | Hip Circumference | 5.1 | 25 | 90 | 115 | 103.8 | 96 | 100 | 103 | 107 | 113.6 | 17.6 |
| Auxiliary Measurements | 5 | Front Collar to Hipline | 3.1 | 16 | 55 | 71 | 62.1 | 56.3 | 60 | 62.5 | 64 | 67 | 10.7 |
| | 6 | Depth of Bust | 1.9 | 10 | 20 | 30 | 24.9 | 22 | 24 | 25 | 26 | 28 | 6 |
| | 7 | Highest Point of Bust to Center Front of Waistline | 2.5 | 12 | 20 | 32 | 26.3 | 23 | 24.7 | 26 | 28 | 31 | 8 |
| | 8 | Back Length (7 th Vertebra to Waistline) | 2 | 13 | 36 | 49 | 40.61 | 37 | 39 | 41 | 42 | 43 | 6 |
| | 9 | Back Length to Hipline | 2.3 | 11 | 53 | 64 | 58.2 | 53.3 | 56.7 | 58 | 60 | 62 | 8.7 |
| | 10 | Depth of Waist Cavity | 0.9 | 3.5 | 3 | 6.5 | 4.7 | 3.5 | 4 | 4.5 | 5.5 | 6 | 2.5 |
| | 11 | Armhole Depth | 1.3 | 6 | 12 | 18 | 14.8 | 13 | 14 | 15 | 16 | 17 | 4 |
| | 12 | Shoulder Width | 0.9 | 4 | 9 | 13 | 11.5 | 10 | 11 | 12 | 12 | 13 | 3 |
| | 13 | Collar Circumference | 1.7 | 11 | 31 | 42 | 35.3 | 32 | 34 | 35 | 36.2 | 38 | 6 |
| Control Measurements | A | Depth of Breast | 2.3 | 16 | 23 | 39 | 27.5 | 24 | 26 | 28 | 29 | 30 | 6 |
| | B | Depth of Abdominal | 2.7 | 13 | 24 | 37 | 29.9 | 25.2 | 28 | 29.7 | 32 | 34.3 | 9.1 |
| | C | Depth of Hip | 2.7 | 23 | 18 | 41 | 22.2 | 19.3 | 21 | 22 | 23 | 26 | 6.7 |

For the abdominal circumference measurements, it is observed that;

- The difference between 5th and 25th percentile values is 6 cm,
- The difference between 25th, 50th and 75th percentile values is 4 cm,
- The difference between 75th and 95th percentile values is 7.6 cm,
- The difference between 5th and 95th percentile values is **21.6** cm. This value is the highest one among the differences.

Examining the findings, a significant difference is observed between 5th and 95th percentile values of the abdominal circumference measurements (21.6 cm). Those differences are a significant factor in arousal of problems in the garment forms in maternity wear the same size. In Çeğindir's study (2011), 6 cm (1.5 body size) difference in breast circumference, 10 cm (2.5 body size) difference in hip circumference, 4 cm (1 body size) difference in abdominal circumference were found;

For the hip circumference measurement, it is observed that;

- The difference between 5th – 25th and 75th – 95th percentile values is 4 cm,
- The difference between 25th and 50th percentile values is 3 cm,
- The difference between 75th and 95th percentile values is 6.6 cm,

- The difference between 5th and 95th percentile values is **17.6** cm.

Examining the findings a significant difference is observed between 5th and 95th percentile values of the hip circumference measurement (17.6 cm). Those differences are among significant factors in arousal of problems in the garment form, in pregnant women wearing the same size.

According to Çileroğlu's study (2010), it was found that in Turkish women the body type with a wide hip was dominant with a proportion of 87%, in the body types other than reverse triangle shape (22). According to Çeğindir's research (2011), 14% of women have a V-shaped body, 23% have an X-shaped body, 63% have an A-shaped body. It is considered that both the body shape of Turkish women and the fact that the weight gained in pregnancy is intensified in the lower body have a significant role in this result.

According to table 2, 3 cm difference was determined between 5th and 95th percentile values of shoulder width measurement, 2 cm difference was determined between 5th and 95th percentile values of collar circumference measurement and 6 cm difference was determined between 5th and 95th percentile values. The differences observed between percentile values of shoulder width measurements and collar circumference measurements have a significance level that could affect garment pattern form. In collar

circumference measurement is 3 cm and in shoulder width measurements are 4 cm, at the level that could change the appearance of the garment in the body. At the conclusion of this study drop application is suggested to using measurements of the pattern for reserve the differences.

Examining the standard deviation of the measurements, the highest deviation is (6.2 cm) in abdominal circumference measurement and then, (5.1 cm) in hip circumference measurement. The measurement having the lowest standard deviation is shoulder width (with 1 cm). In order to examine the results of the research the means of pregnant women's measurements acquired in this research were compared to pregnant women's measurements of American Society for Testing and Materials (ASTM) in Table 3 (23).

According to the comparison of ASTM standards given in Table 3 and pregnant women measurements acquired in the research; there is close similarity between ASTM's 10 body breast circumference measurement and the breast circumference measurement found in the research with a difference of ±1 cm. Abdominal circumference measurement of the pregnant women participating in the research (102 cm) was higher than ASTM standard, hip circumference (103 cm), collar circumference (35 cm) and shoulder width measurements (12 cm) were lower.

Table 3. Comparison of pregnant women's body measurements and ASTM means

| Measurements | ASTM | | Research Findings | |
|-------------------------|-------------|-------------|-----------------------------------|------|
| | 10 (Medium) | 12 (Medium) | 50 th percentile Value | Mean |
| Breast Circumference | 98.06 | 102.87 | 97 | 97 |
| Abdominal Circumference | 93.98 | 97.79 | 102.3 | 102 |
| Haunch Circumference | 111.78 | 116.57 | 103.8 | 103 |
| Collar Circumference | 36.83 | 37.78 | 35.3 | 35 |
| Shoulder Width | 13.65 | 13.97 | 11.5 | 12 |

Table 4. Comparison of different surveys' data of basic measurements (cm)

| Measurements | Manley (1997) 9 th Month | Çeğindir (2011) 9 th Month | Olivera et al. (2009) 3 rd Trimester | Bye and Sohn 27 th Week (2009) | Bye and Sohn 33 rd Week (2009) | This survey 3 rd Trimester |
|-------------------------|--|--|--|---|--|--|
| Breast Circumference | 100 | 101 | - | 104.7 | 105.05 | 97 |
| Abdominal Circumference | 112 | 111 | 102.2 | 105.4 | 107.4 | 102.3 |
| Hip Circumference | 110 | 110 | - | 116.05 | 112.3 | 103.8 |

In Table 4, the data of basic measurements found in different research studies were compared. Examining the data of the basic measurements found in this research, it was detected the mean of breast circumference measurement was 3 cm less than Manley's (1997) study and 4 cm less than Çeğindir's (2011) study. Although there is a difference of 1 cm between the mean of abdominal circumference measurement and the study of Olivera, Vieira, Macedo, Simpson, and Nadal (2009), according to Manley and Çeğindir's studies differences of 9-10 cm emerged (25).

Garment pattern fitting to the body while preparing to positively effect of the measurements drop system being preferred for minimizing gaps.

For the mean of hip circumference measurements the same values were acquired in Manley and Çeğindir's studies, in this study lower result was acquired than both studies with a difference of 7.7 cm. The data of Manley and Çeğindir's studies belong to the measurements for the 9th month. Since the data of this study belong to the last trimester period, acquiring lower results is considered to be normal. According to the measurements performed by Bye and Sohn (2009a) in the 27th and the 33rd weeks, although

meaningful increases in breast and abdominal circumferences are observed, a decrease was detected in the circumference.

3.2. Discussion and Implications

Arithmetic means of pregnant body measurements *necessary for basic pattern of an over-garment* were given in Table 2. The difference between 5th and 95th percentile values of height is 10 cm. It was concluded that height is a factor that directly affects the appearance of garment lengths in the body, and the difference between garment lengths is created for this reason. This difference is the main reason for the failure of garments of the same length and same size to respond the needs of consumers with different heights. The difference between the 5th and the 95th percentile values of the measurements between front middle collar to hipline is 10.7 cm. This difference indicates the fact that there are different front lengths in the same body size. Those results suggest that front lengths of garments should be prepared according to abdominal height. Abdominal height increases in line with widening abdominal circumference. This increase shall continue along with the continuance of widening of the abdominal circumference. The front length of

garments should be prepared by taking the abdominal height into consideration. The difference between the 5th and the 95th percentile values of the breast circumference is 15.6 cm. This difference is at such a proportion that could affect garment forms negatively. The difference between the 5th and the 95th percentile values of the abdominal circumference measurement where the highest difference arises is 21.6 cm. The difference between 5th and 95th percentile values of the hip circumference measurement is 17.6 cm. This difference is the highest value obtained. Abdominal circumference measurement changes so much within the last trimester period. Maternity wears are purchased much looser than desired in order to respond to the rapid change in the body affects the pregnant women's comfort and positive body image perception negatively.

On purpose of resolve mentioned negative a sample "drop" system prepared to try based on research data. In Table 5 from started to first 20 per cent named 1 of the drop, from 20 percent to 70 percent named 2 of the drop and after 70 per cent named 3 of the drop (Table 5). The pattern form was developed based on this drop system (Figure 5).

Table 5. A sample based on the criteria "drop"

| Measurements | Code of Measurements | Place Of Measurements | Percentage Values | | | | | Difference Between 5 th -95 th Percentile Values |
|------------------------|----------------------|---|-------------------|------|------|-------|-------|--|
| | | | 5 | 25 | 50 | 75 | 95 | |
| Basic Measurements | 1 | Height | 155 | 157 | 160 | 163 | 165 | 10 |
| | DROP | | 1 | | 2 | | 3 | |
| | 2 | Breast Circumference (Basic Measurement) | 89 | 93 | 97 | 100.2 | 104.6 | 15.6 |
| | DROP | | 1 | | 2 | | 3 | |
| | 3 | Abdominal Circumference | 92 | 98 | 102 | 106 | 113.6 | 21.6 |
| | DROP | | 1 | | 2 | | 3 | |
| | 4 | Hip Circumference | 96 | 100 | 103 | 107 | 113.6 | 17.6 |
| DROP | | 1 | | 2 | | 3 | | |
| Auxiliary Measurements | 5 | Front Collar to Hipline | 56.3 | 60 | 62.5 | 64 | 67 | 10.7 |
| | DROP | | 1 | | 2 | | 3 | |
| | 7 | Highest Point of Bust to Center Front of Waistline | 23 | 24.7 | 26 | 28 | 31 | 8 |
| | DROP | | 1 | | 2 | | 3 | |
| | 8 | Back Length (7 th Vertebra to Waistline) | 37 | 39 | 41 | 42 | 43 | 6 |
| | DROP | | 1 | | 2 | | 3 | |
| | 9 | Back Length to Hipline | 53.3 | 56.7 | 58 | 60 | 62 | 8.7 |
| | DROP | | 1 | | 2 | | 3 | |
| | 10 | Depth of Waist Cavity | 3.5 | 4 | 4.5 | 5.5 | 6 | 2.5 |
| | DROP | | 1 | | 2 | | 3 | |
| | 11 | Armhole Depth | 13 | 14 | 15 | 16 | 17 | 4 |
| | DROP | | 1 | | 2 | | 3 | |
| | 12 | Shoulder Width | 10 | 11 | 12 | 12 | 13 | 3 |
| DROP | | 1 | | 2 | | 3 | | |
| 13 | Collar Circumference | 32 | 34 | 35 | 36.2 | 38 | 6 | |
| DROP | | 1 | | 2 | | 3 | | |

4. CASE STUDY

How should an example basic pattern of an over-garment for the pregnant women be designed?

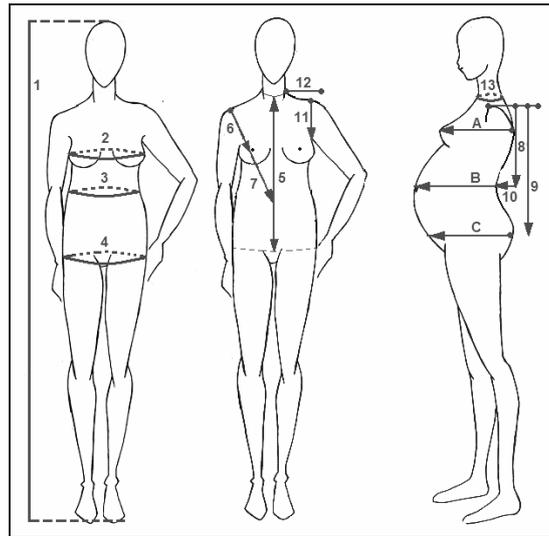


Figure 4. Measuring points and definitions

| Definitions of the Measurements | | |
|---------------------------------|---|-----------------------|
| Basic Measurements | Auxiliary Measurements | Control Measurements |
| 1. Height | 5. Front collar to hipline | A. Depth of breast |
| 2. Breast Circumference | 6. Depth of bust | B. Depth of abdominal |
| 3. Abdominal Circumference | 7. Highest point of bust to center front of waistline | C. Depth of hip |
| 4. Hip Circumference | 8. Back length | |
| | 9. Back length to hipline | |
| | 10. Depth of waist cavity | |
| | 11. Armhole depth | |
| | 12. Shoulder width | |
| | 13. Collar circumference | |

Example measuring points and definitions that could contribute to the solution of dimensional problems were developed for the purpose of answering this question (Figure 4). An example over-garment form was created using the measurements given in Figure 4 and the measurement values in Table 2 (corresponding to 50th percentile) (Figure 5). Furthermore, details on from where and how should body measurements be used on this pattern were given.

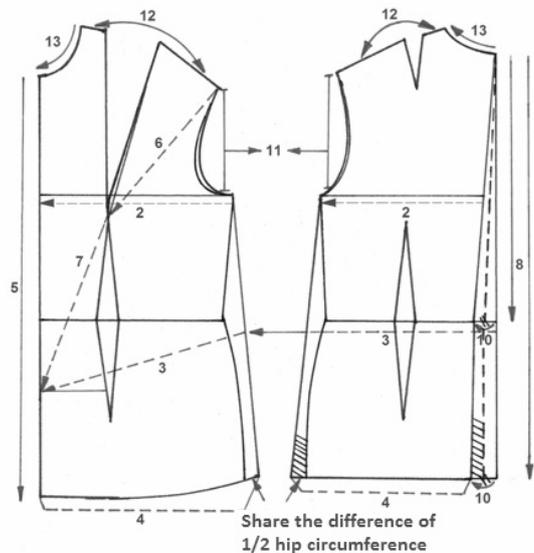


Figure 5. Basic pattern of an over-garment for pregnant women

The research result is limited by the sample. Maternity clothes shall be made with positive results in Figure 4 depending on the code of measurement in Table 2 and drop system in Table 5 with the information to be obtained from replicated measurements. The recommended base detail "drop" system. Every business shall its own focused group revising taking into account the use of this system.

In accordance with the information obtained, the following inferences can be drawn:

- Adjustable abdominal sizes of maternity garments should be designed for pregnant women as their abdominal circumference is constantly changing.
- Maternity garments patterns should not be designed by only taking abdominal circumference into consideration.

- The other body measurements and body shapes which are also changing should be taken into account.
- Maternity garment patterns with different statures at the same sizes can be produced.
- For future studies about this problem, opinions of participants trying maternity garments with the same form can be asked.
- In the future studies, 3D body scanning method can be used.

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