A STUDY ON INTERMEDIARY PATTERN SIZE FOCUSED FOR CHILDREN WITH OVERWEIGHT

FAZLA KİLOLU ÇOCUKLARA YÖNELİK ARA BEDEN KALIP ÇALIŞMASI

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ABSTRACT

Overweight, associated with excessive fat deposition in the body, is a problem that can cause physical and mental energy metabolism disorder and it has become a common problem in many countries with good socioeconomic level. It is known that children wear marketed in our country are manufactured by considering children with normal body size. However children with overweight especially included in obesity grade are in a position to choose all their wear among the dresses manufactured for much older ages. This affects negatively the children's psychology, brings an extra financial burden on families due to possible modification and leads to adverse effects on body movement amenities. Considering all these issues, there is an important gap in this area of production range. Size tables for the children with overweight are obtained and clothing patterns are created according to these sizes within the scope of this article. Thus, it is aimed to be produced for children with overweight or even obese and to create awareness for taking place of intermediate sizes in stores for these children.

Keywords: Obesity, Clothing pattern, Children's clothes, Movement amenities, Intermediate size.

ÖZET

Fazla kilo, vücutta aşırı yağ depolanması ile ortaya çıkan, fiziksel ve ruhsal sorunlara neden olabilen bir enerji metabolizması bozukluğu olup sosyoekonomik düzeyi iyi olan birçok ülkede ortak sorun haline gelmiştir. Bilindiği üzere ülkemizde pazarlanan çocuk giysileri, normal vücut ölçülerine sahip çocuklar dikkate alınarak üretilmiştir. Oysa fazla kilosu olan ve özellikle obezite sınıfına giren çocuklar, tüm giysilerini çok daha büyük yaşlar için üretilmiş giysiler arasından seçmek durumundadırlar. Bu da çocukların psikolojilerini olumsuz yönde etkilemekte, olası tadilat nedeniyle aileye fazladan maddi bir yük getirmekte ve vücut hareket konforları üzerinde olumsuz etkilere yol açmaktadır. Tüm bu sorunlar dikkate alındığında üretim yelpazesinin bu alanında önemli bir boşluk bulunmaktadır. Bu makale kapsamında fazla kiloya sahip çocuklara yönelik ölçü tabloları oluşturulmuş ve bu ölçülere göre giysi kalıpları çalışılmıştır. Böylece kilolu, hatta obez olan çocuklar için üretim yapılması ve mağazalarda bu çocuklara yönelik ara bedenlerin yer alması için farkındalık oluşturulması amaçlanmıştır.

Anahtar Kelimeler: Obezite, Giysi kalıbı, Çocuk giyimi, Hareket konforu, Ara beden.

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1. INTRODUCTION

Obesity arises with accumulation of excess fat in the body in case of wasting the received energy. Clinically, the ratio of the weight to square of height gives the body mass index. Body mass index in adults over 25 is defined as overweight and over 30 it is defined as obese. In children by using the percentile curves prepared according to age and gender; over 85 are classified as overweight and those over 90 are classified as obese. In addition, other diagnostic methods using the body weight for age, weight for height, measurement of skin fold thickness and measurement of body composition in terms of fat content are available (1).

One of the most important factors leading to obesity is eating habits. Parallel to decrease of homemade food consumption, places that offer prepared food to meet the increasing demand for food consumption are increasing every day. Foods with flavor enhancers particularly among the children are very attractive choices for children. As a result, some children are accessing a weight more than the normal state (1).

Although, finding clothes to children with normal body size does not cause trouble, because of their overweight many children are obliged to choose the clothes with a body size which is not suitable for their age. When weight increases, the clothing issue shows further increase. At this stage the upper part of the large body clothing, arms and hemlines are longer than necessary.

Frequently, large size clothing is preferred with elastic waist tracksuit style on lower clothes. Wearing classic trousers made from fabrics such as school clothes cannot be worn since it is inevitable to go through the necessary process modifications. Therefore, there is no point in buying readymade garments. Some companies abroad, manufacture intermediate sizes for these children. It has been concluded that there is no intermediate size sales for children with overweight as a result of observation in the clothing shops. However, major companies engaged in children's clothing production and market should have preferred alternative and manufacturing in this direction. Since there is no production for overweight children, size charts for them could not be found. In order to eliminate this situation which constitutes a major problem, studies for intermediate size are undoubtedly needed. By then pattern clothes for these children are prepared and it will be possible to implement desirable models.

This project is the study of garment patterns for overweight children in the 6-10 age range and aimed to the creation of intermediate bodies. Therefore, most important step would be taken for children in this age group as community group to manufacture clothing with intermediate physical properties having the correct measures.

2. LITERATURE REVIEW

There is hardly any study for obese children's clothing. Therefore, references are not directly supporting the objective and content. The updated reference values were determined to be used in the evaluation of Turkish children's growth In this study with the aim comparison of US children's current value with local values obtained 30 years ago, body weight, height and head circumference respectively were measured and observed in well-child clinic among 2391 boys and 2102 girls. Results showed that children with high socioeconomic status in Turkey have high value is similar to the value of US children and our children were taller than previous local values. Body weight and body mass index values were increased from previous years, starting from the age of puberty. This indicates the existence of the problem of obesity in our society (2).

In another study, 52 obese children and adolescents aged 6-16 years were surveyed to investigate the properties of their choice in clothes were applied. According to the findings in the children shopping in this age group, it is determined that body measurements should be close to the appropriate, importance was given not to prevent movement, type of clothing was trousers, and that they prefer the blue of the colors and elastic fabric types. In terms of the preferred features of trousers, the girls preferred denim trousers, for boys, models with pockets stood out. For shirts, slop was preferred (3).

At an elementary school in the district of Mamak in Ankara, weights and heights of 1510 children aged between 6 and 17 were measured to calculate body mass index (BMI) and relative body mass index (RBMI). The result of the study determined that obesity is a major problem in school children that besides genetically predisposal to obesity; feeding habits and lack of physical activity were the factors in the formation of obesity (4).

Students mostly suffer from dental diseases The second problem has been involved in obesity Among the screened 299 children between 6-15 years of age, anthropometric measurements were taken and genetic factors, eating habits, physical activity, television viewing and computer use time has been questioned. Although obesity can be seen in all ages, later years of childhood obesity is important since it prepares the ground for the development of complications for later years. Familial factors that may cause obesity in the study, dietary habits, physical activity, such as television and time spent in front of computer features were questioned and their effects on obesity were examined (5).

In another study in the evaluation of obesity and body mass index (BMI), waist circumference is also considered as added value (6).

In central Kayseri, prevalence of obesity in primary school students were investigated and according to the results obtained it has been tried to determine the factors that may affect obesity; it is stated that about one-fifth are faced with the problem of obesity (7).

A study conducted in Cubuk, Ankara in order to determine the prevalence of overweight and obesity in the district of 180 students in the 11-13 age; weight, height, triceps measures were taken. According to the findings, in overweight and obesity rates of 24.2% and 7.7%, respectively for boys, and for girls, they were found to be 26.7% and 4%. In case not taking any measures in childhood obesity in addition to have serious health risk, in the development of obesity in childhood, it plays important role for the obesity in adulthood (8).

3. GENERAL INFORMATION

There are many factors for a child to enter the obesity class. In many countries, families do not have sufficient information about healthy living. Today's children, with mobile devices and games in virtual environments, have increased dependence on technology which restricts their movement. Orientation to the working families increased consumption of prepared foods.

One way nutrition with obesity problems has been declared as one of the serious health problems of the 21st century by the World Health Organization. Children with this problem enter puberty at an early age, and asthma has been found to occur more frequently with some joint diseases. Several heart disease, high blood pressure, high cholesterol and fatty changes in the vessel became apparent at an early age.

Providing a good measure of comfort of motion in order to make clothing patterns should be appropriate to the size of

this person. But as well as being visually aesthetic comfort, their age should be able to be able to buy clothes in the appropriate model. For all of this to take place, it is better to take some basic measures from children so that these measures help to calculate the auxiliary measures and the necessary measurement tables for drawing patterns are needed to be created separately for each age group. These measures which will be used to create clothing patterns and fabrics should be revised taking into account the structural features. Thus, obesity problems experienced in buying clothes for children living with such problems should be minimized. This works together with families, children without the need for modifications, will be able to dress more economical and effortless manner. So dealing with the problems brought about obesity in terms of health will not experience the psychological pressure that may arise from clothing.

Studies have revealed that 1/3 of adult obesity begins in childhood and adolescence periods (9). Especially in childhood between the ages of 4-11, starting overweight gain during adolescence is increasing (4). And in girls compared to boys during primary school age in adolescence is seen in patients with higher rates of obesity (10).

3.1. Body Proportions and Development in Children

The first studies on the body measurements at the world have been associated with proportion of body parts. Head to body ratio is one fourth for babies, one fifth for preschool children and one sixth for the children in school. Head is one seventh of all body for the children in adolescence. Body proportions with respect to height can be seen in Fig. 1.

4. MATERIAL AND METHOD

4.1. Material

Overweight children in the 6-10 age range

Research data were obtained from 7 schools connected to Republic of Turkey Ministry of Education, in the city of Izmir from 375 overweight children through the range of 6-10

years selected by random sampling. There is no gender discrimination in children up to size 146 (11). Normally, children between the age of 6 and 10 are not more than size 146. In this study, since overweight children are observed, oversized is frequently seen. Gender difference is not considered for drawing of patterns in this age group since physical development of children has not complete yet.

Digital scale

Body weight is measured by digital scale. It is controlled with frequent intervals by placing on flat and hard ground.

Stadiometer (Height measuring on foot)

Height is measured on foot by stadiometer. During measurement it was provided that feet should stand side by side and children stood upright. Height gauge is provided to have contact with head, shoulders, back, hip, shank and heels.

Tape measure

Total of the circumference has been taken with a tape measure. Care was taken during the measurement that the tape measure should not be kept too tight or too loose.

CAD System

Wear patterns are graded with the help of GERBER CAD system in Version 9.

4.2. Method

Within the working context, measurements were taken from minimum points of children and secondary measurements were taken by calculation as far as possible as for not disrupting the educational program for children and ensuring the short duration of the process. At 6-10 age range, there was no sex discrimination in measurements taken from children. Attention was paid to number of measurements show a homogeneous distribution in terms of gender.

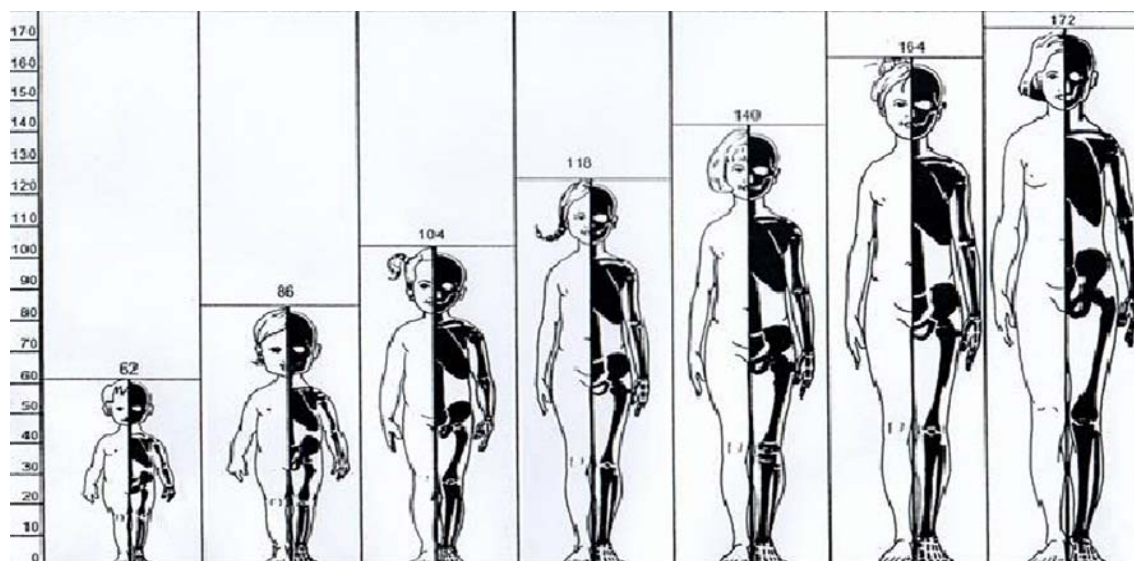Measurements were taken according to Müller system in this study. Measuring sites are shown in Fig.3.

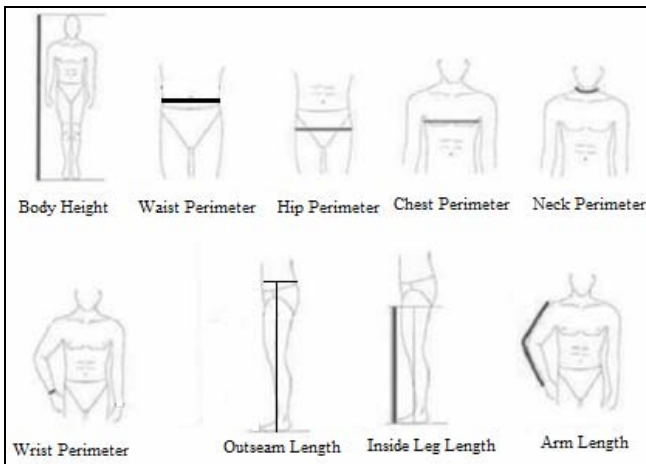**Figure 1.** Body proportions and development in children (11).

Figure 2. Measuring sites (17)

Body height: Vertical distance from highest part of the head to the ground for someone without shoe.

Waist perimeter: Perimeter measurement taken parallel to the ground from the narrowest place of the waist region of the body.

Hip perimeter: Perimeter measurement taken parallel to the ground from the largest place of the hip.

Chest perimeter: Perimeter measurement taken parallel to the ground from the largest place of the chest.

Neck perimeter: Measurement of the neck perimeter.

Wrist perimeter: Wrist perimeter taken from the wrist bone.

Outseam length: Length measurement taken from the waist to sole.

Inside leg length: Distance from sole to the crotch.

Arm length: Measurement from point of the shoulder to the wrist bone when arm is lightly twisted.

After measurement, separate measure tables are formed according to products that require pattern study. Auxiliary measurements necessary for product sewing were found by calculation. After all the measures are determined for manufacturing of a clothing, wearing patterns oriented for overweight children were sequenced by studies at CAD system.

5. FINDINGS

Body structure shows differences depending on child's genetic structure, environment, and eating habit. For this reason numbering should be done according to height not according to age. Measurements in this study content were 116 cm for minimum height and 164 cm for maximum height. In this study weight and height measurements of 1900 children were done and among them 375 children were overweighed with respect to others. Thus, more detailed measurements were taken from them. With the averages of the measurements taken, body size table was formed (Table 3).

In every situation shoulder width is narrower than chest width. In order to learn the ideal difference between them, sweat shirts with different shoulder width measured patterns were prepared and sewn and finally it was decided that the ideal difference should be 3 cm. for each size. Thus shoulder width can be formulated (19, 20) as:

Shoulder width = (D/ 2) -3

For sweatshirt manufacturing pattern, an addition of 2 cm was done to chest width and shoulder width measures.

Head height for 116- 122 -128 bodies =A/6, 5

Head height for 134 -140- 146 bodies = A /7

Head height for 152- 158- 164 bodies = A/7, 5

These head height values are rounded up in ascending sort properly.

Sweatshirt height is found by subtracting head height and inner leg height from total height.

Armhole measure is found by subtracting outer leg and two head height from total height.

E is the collar circumference measure. For calculation of a collar circumference of a sweatshirt, diameter of the circle is used. Collar clearance should have a value so that head can be easily passed through. Calculation formulae changes depending on the type or correctly elasticity of the fabric. Collar circumference = Circumference of a circle = 2πr (17, 18).

Collar circumference = 2πr = E

Collar clearance = 2r = E/ π

Table 3. Body measurements and averages corresponding to body

SIZES		116	122	128	134	140	146	152	158	164
BODY HIGHT	A	116	122	128	134	140	146	152	158	164
WAİST CIRCUMFERENCE	B	68	70	74	76	78	83	89	95	108
HIP CIRCUMFERENCE	C	74,5	76,5	80	82	87	89,5	98	103	115
CHEST CIRCUMFERENCE	D	69	70,5	74	76,5	80	82,5	92	96	104
NECK CIRCUMFERENCE	E	28,5	29	30	30,5	31,5	32	34	36	39
WRIST CIRCUMFERENCE	G	15	15,5	16,5	17	18	19	20,5	21	21,5
OUTSEAM LENGTH	L	70	72	77	82	85,5	89	95	99	102
INSIDE LEG LENGTH	I	51	52	56	60	63	66	71,5	75	77
ARM LENGTH	F	42	44	46	48	50	51,5	55	58,5	61,5

For the ease of movement 2 cm was added to the neck opening

4 cm was added to the cuff circumference.

Back deep neckline measure is accepted standard as 2 cm for each body. Front deep neckline measure is accepted standard as 7 cm for each body. Shoulder decrease is accepted 1.5 cm for bodies 116-122-128, 2 cm for bodies 134-140-146 and 2.5 cm for bodies152-158-164. Table 4 shows the obtained measurements for sweatshirt drawing.

For the calculation of armhole height, back and front armhole circumference were measured and this measure was found by subtracting 5 from one third of circumference. Measures used for sweatshirt drawing are given in Table 4.

Basic patterns of sweatshirt and pants for 116 size are studied in this research. Drawings of these patterns with seam allowance are given in Figure 4 and Figure 6 respectively. Tables for other sizes are obtained and grading process is carried out for larger size according to these tables (see Figure 5 and 7).

Table 4. Measures used for sweatshirt drawing (Movement amenity shares are added)

| SIZES	116	122	128	134	140	146	152	158	164
CHEST WIDTH	36,5	37	39	40	42	43	48	50	53,5
SHOULDER WIDTH	33,5	34	36	37	39	40	45	47	50,5
HEAD HEIGHT	17	17,5	18	18,5	19	19,5	20	20,5	21
T-SHİRT HEIGHT	49	51,5	54	55,5	58	60,5	63	65,5	68
ARMHOLE	14	14,5	15	16	17	18	19	20	21
COLLAR WIDTH	11	11,2	11,5	11,7	12	12,2	12,8	13,5	14,4
ARM LENGTH	43	44	44,5	48	49	51,5	53	58	61,5
WRIST WIDTH	9,5	9,5	9,5	9,75	10	10,25	11	11,5	12,5
BACK DEEP NECKLINE	2	2	2	2	2	2	2	2	2
FRONT DEEP NECKLINE	7	7	7	7	7	7	7	7	7
SHOULDER DECREASE	1,5	1,5	1,5	2	2	2	2,5	2,5	2,5
BICEPS HIGHT	4,5	4,75	5	5,25	5,5	5,75	6	6,25	6,5
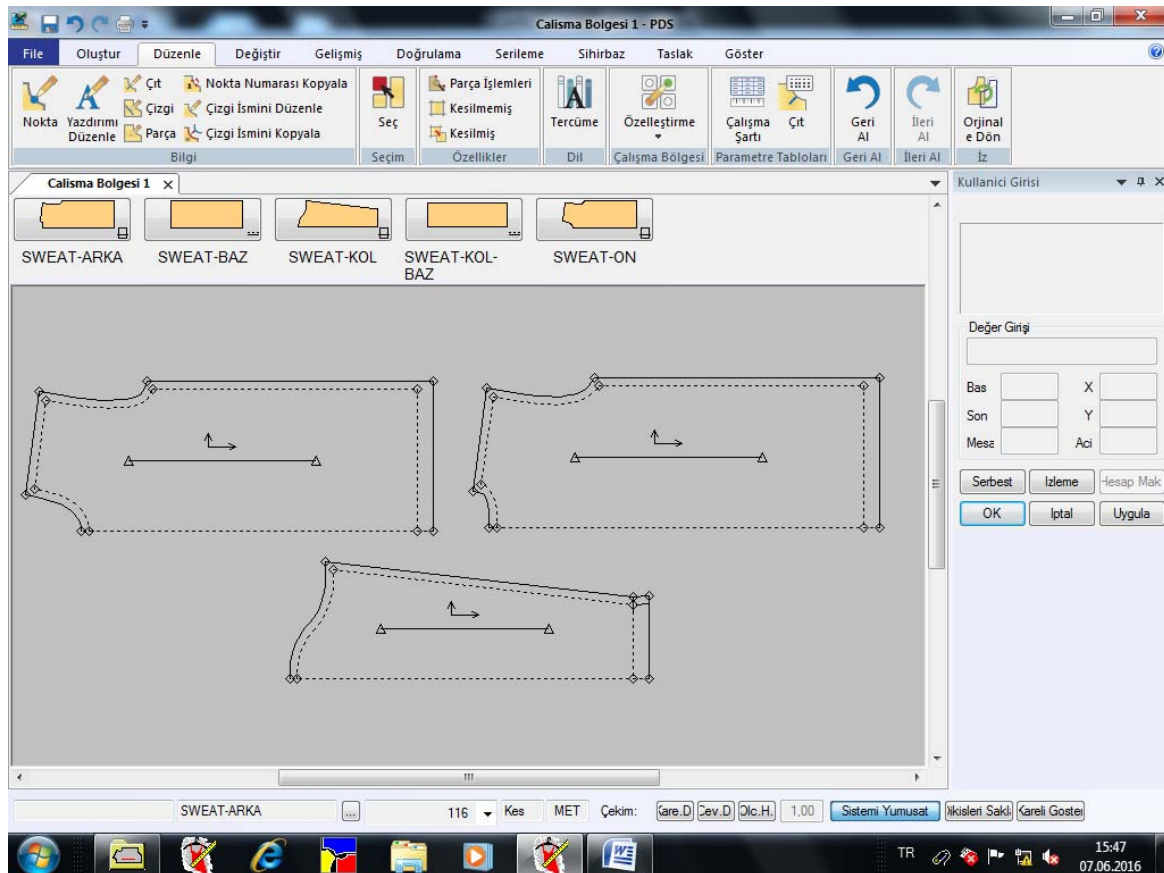
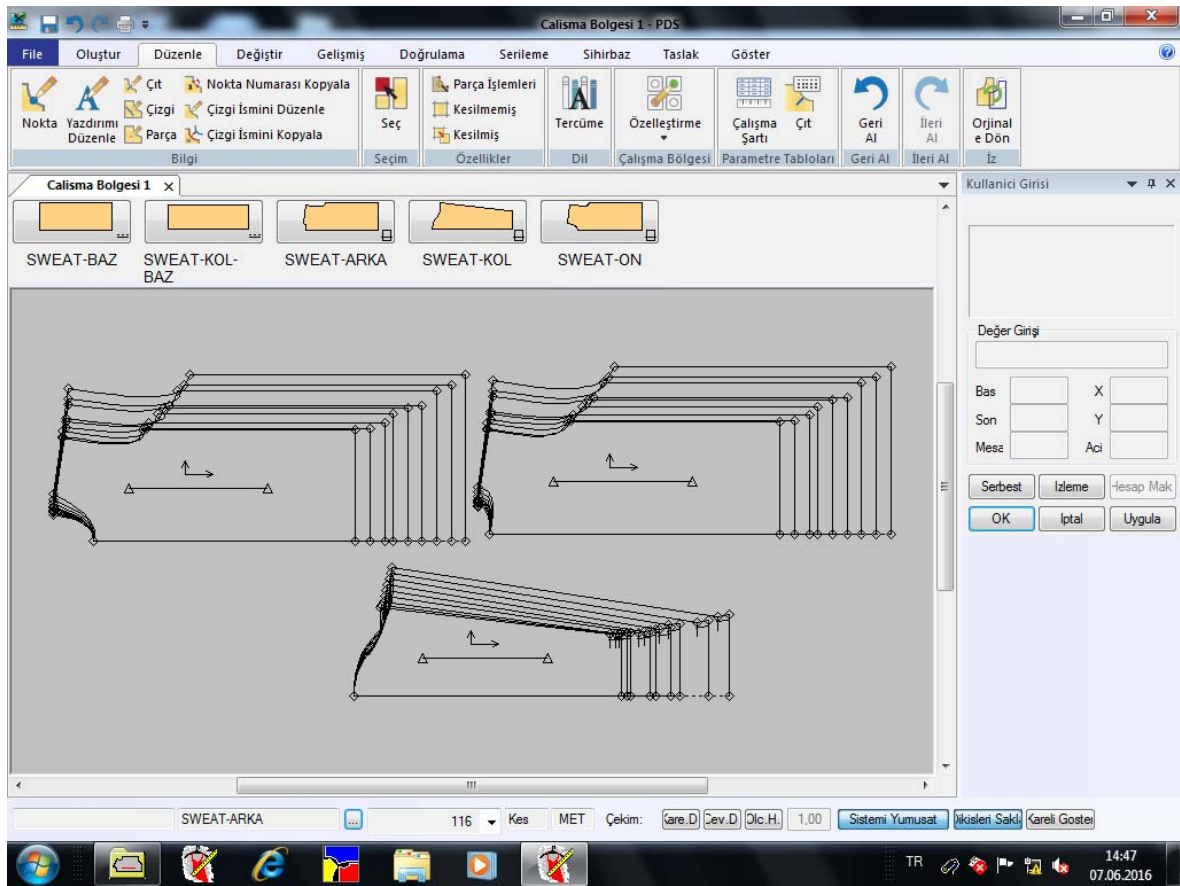**Figure 4.** Sweatshirt pattern drawn in CAD system

Figure 5. Sweatshirt pattern sequenced in CAD system

Calculation of Required Basic and Auxiliary Measures for Trousers Drawing

Half of the measured waist width is taken for the patterns with allowances for pants. Using elastic band around waist part is generally preferred and manufactured for the children between the age of 6 and 10. For this reason, 10 cm elastic band allowances are added to the waist width in pattern.

Hip width is obtained by taking the half value of the hip circumference. 4 cm ease allowance is added to the hip width in the pattern.

Seat length is found with respect to proportion of all height to the head height and it is ranged from 17.8 to 21.9. In order to have regular increase, the values are rounded off as in Table 4.

6. CONCLUSION

Many standard sizes. However, besides much more petite and companies in Turkey are produced in weak kids from their ages, there are overweight children and big kids. Many families, especially in the provision of school clothes, cannot dress children without passing the amendment process. These operations constitute an extra cost and burden for the family. Otherwise the children are forced to carry over not well-fitting clothes. This leads adverse effects for the comfort of their body movements and affects the psychology of children negatively.

Considering all these problems there is a gap in the field of production range. With the help of patterns obtained by this research, deriving new models and market studies shall be able to be made.

Table 4. Measures used for trousers drawing (Movement amenity shares are added)

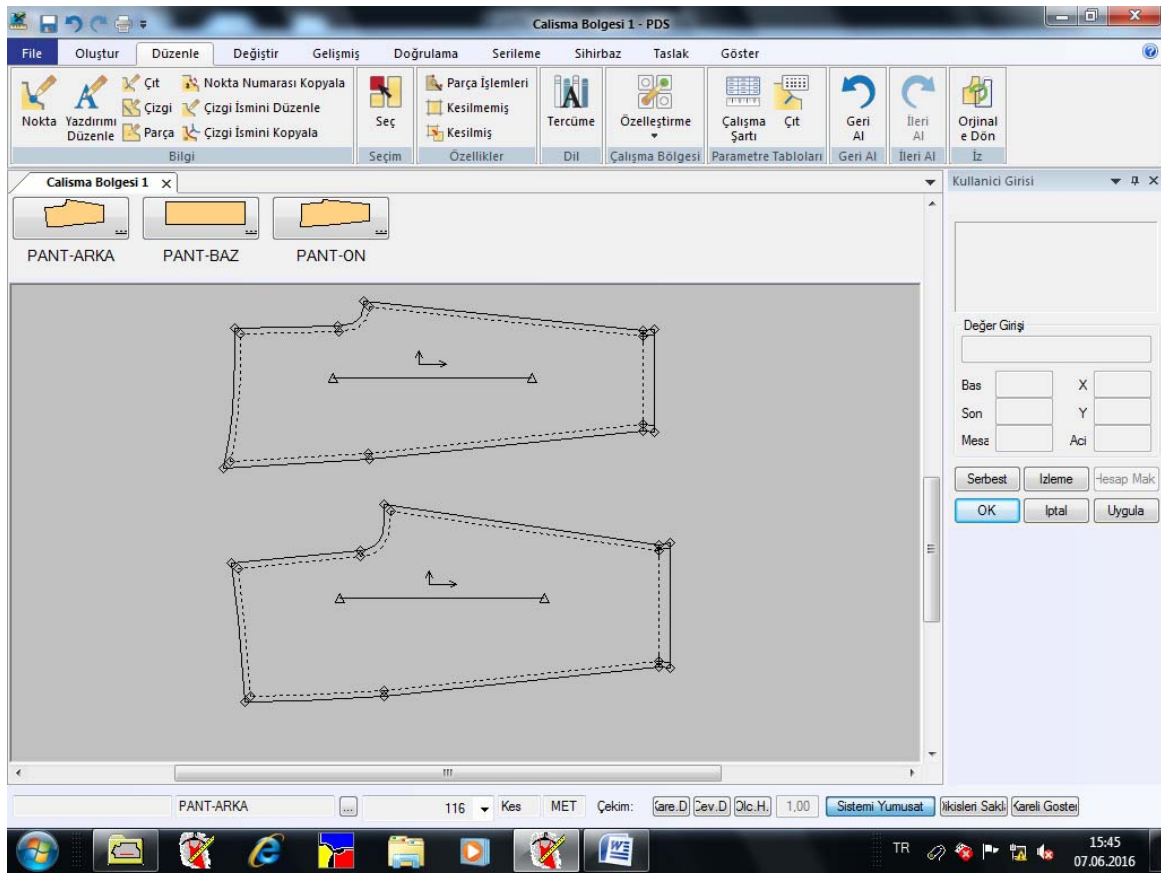| SIZES	116	122	128	134	140	146	152	158	164
WAIST WIDTH	44	45	47	48	49	51,5	54,5	57,5	64
HIP WIDTH	41	42	44	45	48	49	53	56	61
OUTSEAM LENGTH	70	72	76	79	83	87	93	98	101
INSIDE LEG LENGTH	47	53	56	60	63	66	71	75	79
HIP LOWNESS	17,5	18	18,5	19	19,5	20	20,5	21	21,5

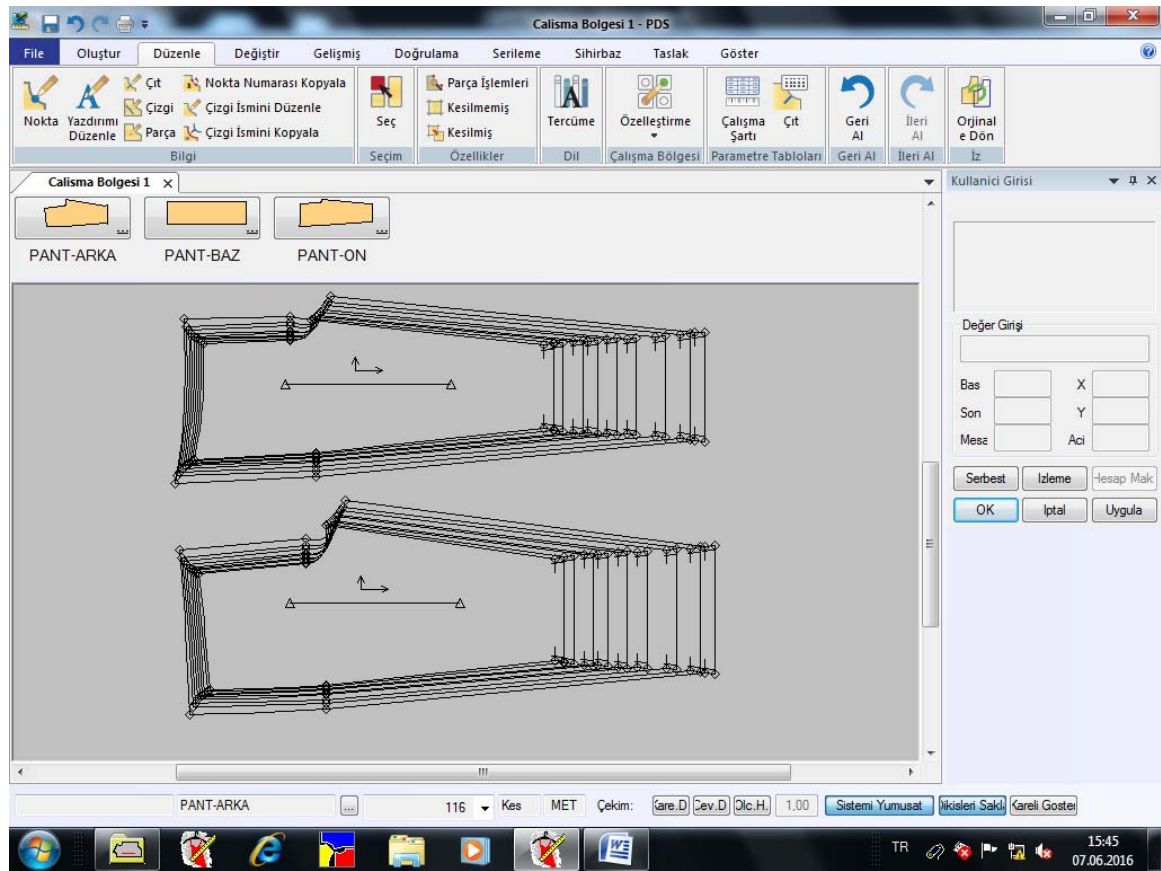**Figure 6.** Trousers pattern drawn in CAD system

Figure 7. Trousers pattern sequenced in CAD system

Research has shown that clothes have an influence on the behavior of a person. For example distressing feelings, stress, shyness, physiological changes such as anxiety, a sense of security felt because of the clothes can also create the opposite effect. Therefore, a lot of work falls into the children's clothing industry, consciously designed for overweight children according to age and body garments should be produced. The results of the research in terms of factors in overweight children between 6-10 years of age, during clothing purchases showed without any gender gap that it is important that the clothes should not block the movement of children and that clothes should fit to body size.

The most important factor that is considered in the readymade dress products is that they are prepared with measures that reflect the size of the majority of the pattern. The clothes should be functional and provide mobility and they should be prepared utilizing the anthropometric dimensions of the pattern. Available sizes, as in all the world, is growing in our country. The sharp rise in childhood obesity seen in worldwide production showed that outsized clothing for children with large body structure is inadequate. Children's clothing enterprises should be engaged in production, making up for overweight or obese children body patterns should take into overweight children as a consumer audience. As a result of production and sales of intermediate size clothing for overweight children, the department of children will be able to dress them from their age bracket. Thus similarly as their peers, overweight children will have the pleasure of being able to wear the same design. Thus, after dealing with the problem of obesity; psychological pressure that may arise from clothing will be eliminated.

ACKNOWLEDGMENT

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