

T.C.
YEDİTEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF NUTRITION AND DIETETICS

**DETECTION OF OBESITY IN FIRST GRADE OF
STUDENTS ENROLLED IN AN ELEMANTARY
SCHOOL AND EFFECT OF 3 MONTHS WEIGHT
CHANGE OF NUTRITION EDUCATION GIVEN
TO THE PARENT**

MASTER THESIS

FATMA ÇETİNEL AVLAYICI

İstanbul-2019

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ONAY

Bu tez Yeditepe Üniversitesi Lisansüstü Eğitim-Öğretim ve Sınav Yönetmeliğinin ilgili maddeleri uyarınca yukarıdaki jüri tarafından uygun görülmüş ve Enstitü Yönetim Kurulu'nun 18./12./2019... tarih ve 2019/19...-0.6..... sayılı kararı ile onaylanmıştır.


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DECLARATION

I hereby declare that this thesis is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree except where due acknowledgment has been made in the text.

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02.12.2019.



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LIST OF ABBREVIATIONS

WHO	World Health Organization
BMI	Body Mass Index
NPY	Neuropeptide Y
TURDEP	Turkish Diabetes Epidemiology Study
PEM	Protein Energy malnutrition
MONICA	Monitoring Trends and Determinants in Cardiovascular Disease
NHANES	US-National Health and Nutrition Examination Survey
CDC	Centers for Disease Control and Prevention (CDC)
AHA	American Heart Association
ADA	American Diabetes Association
RDA	Recommended Dietary Allowances
KG	Kilogram
G	Gram
HBM	Health Belief Model
PBT	Planned Behavior Theory
TM	Transtheoretical Model
ECHO	Commission ending childhood obesity

ABSTRACT

Çetinel Avlayıcı F (2019). Detection of Obesity In First Grade Of Students Enrolled In An Elementary School And Effect Of 3 Months Weight Change Of Nutrition Education Given To The Parent. Yeditepe University, Institute of Health Science, Department of Nutrition and Dietetics. MSc thesis, Istanbul.

Childhood obesity is that one of the most common chronic diseases of childhood. Studies show that obesity prevalence is increasing day by day. There are many factors that cause obesity. However, this study was conducted to measure the obesity of the first-grade primary school students. 154 people participated in that study. Students's families were informed and included in the study. All sections of the school were searched. 65 out of 154 people were found to be overweight and obese. The primary responsible persons of these 65 people were called to the school and a training was given and height- body weight measurements were taken. Only 7 parents have joined to the education. Weight loss was observed in 1 of the 7 students. The fact that the number of volunteer family for education is quite low, the results of the education have taken another direction. After 3 months, children were measured in height and body weight again. Only one student lost weight among 7 students. If parents and teachers work together, the education will be more successful. Teachers need to inform the family and support the process of participation in the education, and the family should be able to participate in the education and use the information acquired in their daily life. The duty of the educator is to organize understandable educations in which the families will want to participate.

key words: obesity, childhood, family education

TURKISH ABSTRACT

Çetinel Avlayıcı, F (2019). Bir ilköğretim okuluna kayıtlı 1. Sınıf öğrencilerinde obezitenin saptanması ve veliye verilen eğitimin 3 aylık ağırlık değişimine etkisi. Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü. Beslenme ve Diyetetik Bölümü, Master Tezi. İstanbul.

Çocukluk çağı obezitesi, çocukluk çağının en sık görülen kronik hastalıklarından birisidir. Yapılan çalışmalar obezite prevalansının gün geçtikçe arttığını göstermektedir. Obeziteye sebep olan birçok faktör vardır. Ancak bu çalışma ilköğretim 1. Sınıf öğrencilerinde aileye verilen eğitimin beden ağırlığı üzerindeki etkisini araştırmak amacıyla yapılmıştır. Araştırmaya toplam 154 kişi katılmıştır. Öğrencilerin aileleri bilgilendirilerek çalışmaya dahil edilmiştir. Okulun 1. Sınıfa kayıtlı tüm şubeleri taranmıştır. 154 katılımcının 65'inin fazla kilolu veya obez olduğu saptanmıştır. Bu 65 çocuğun bakımından primer sorumlu kişiler okula çağırılıp bir eğitim verilmiş ve boy ve beden ağırlığı ölçümleri alınmıştır. Yapılan eğitime sadece 7 öğrenci velisi gelmiştir. Eğitime gönüllü olan aile sayısının oldukça az olması eğitimin sonuçlarını başka bir yöne taşımıştır. 3 ay sonra eğitime gelen velilerin çocukları tekrar ölçülmüştür. 3 ay sonraki ölçümlere göre kilo kaybı 7 öğrenciden sadece birinde görülmüştür. Verilen eğitimlerin başarıya ulaşmasında aile ve öğretmenin birlikte çalışması önemli rol oynamaktadır. Öğretmenlerin aileyi bilgilendirmesi, eğitime katılım sürecini desteklemesi gerekmekte, ailenin ise eğitimlere katılımı sağlayıp edindiği bilgileri günlük hayatında kullanması gereklidir. Burada eğitimciye düşen görev ise ailelerin katılmak isteyeceği, anlaşılır eğitimler düzenlemektir.

anahtar kelimeler: obezite, çocukluk çağı, aile eğitimi

1. INTRODUCTION AND AIM

Obesity is a metabolic disease occurring when the body fat level exceeds the proper level. The body fat causes many diseases such as coronary heart diseases, type 2 diabetes, cancer, hypertension and respiratory diseases (1).

Obesity, a significant community health problem on a global scale, is increasing each passing day in both developed and developing countries. A World Health Organization Working Group has developed a major international collaborative study with the objective of measuring over 10 years, and in many different populations, the trends in, and determinants of, cardiovascular disease. Increases in prevalence of overweight and obesity among both adults and children have been observed in many countries throughout the world (2).

According to the studies conducted by Turkish Diabetes Association, Turkish Diabetes Epidemiology Study (TURDEP) - I and TURDEP-II in 1997-98 and 2010, while 15% decrease was observed in healthy individuals with body mass index (BMI) between 18.5-24.9, 8% increase was observed in obese individuals with body BMI between 30-34.9.

In 12 years, it has been observed that obesity increased by 34% in females and 107% in males in Turkey from TURDEP-I to TURDEP-II (3).

Prevalence of childhood obesity has significantly increased in recent years both in Turkey and worldwide (4). Simple (exogenous) obesity constitutes greater than 99% of obesity cases in childhood. The most serious outcome of obesity in childhood is that this condition persists in adulthood and becomes permanent (5). Unfortunately, the long-term chance of success in the treatment of obesity in childhood is not high (6). Therefore, it is the most rational way to detect obesity in the early period by monitoring the body mass index along with other growth parameters in childhood and to prevent obesity with active participation of the family (6).

The aim of this study was to determine overweight and obesity in first grade students in an elementary school in Aydın province and evaluate the BMI of the primary responsible persons for the care of obese and overweight children. Parents were given nutritional education and it was aimed to observe how this education will create results for children in 3 months period.

2. GENERAL INFORMATION

2.1. Obesity

Obesity is an energy metabolism disorder caused by excessive fat storage in the body and may cause mental and physical problems. The most important reason for obesity is consuming more energy than required. The regulation of body fat tissues and the etiology of obesity are multifactorial and are affected by genetic structure, developmental cases and environmental stimuli. Changes in nutrition and activity habits cause more frequent obesity cases (7).

2.2. Childhood Obesity

In recent years, obesity, one of the most common chronic diseases of childhood, is a significant community health problem affecting 25-30% of children and adolescents (5). In this age group, obesity is of concern and the annual increase is growing (8). It is known that obesity begins in childhood and the likelihood of an obese child becoming an obese adolescent and adult is greater than persons with normal body weight (5). Overweight and obesity cause an increase in non-infectious disease rates and a decrease in the length of life and affect quality of life adversely (9).

2.3. Nutrition

Nutrition is the process of consciously consuming nutrients required by the body in adequate amount and at the proper time in order to increase the quality of life as well as to protect and improve health. Adequate and healthy nutrition is one of the basic conditions for an individual's healthy life, social and economic development, and welfare. While economic developments and developments in science and technology have contributed to a decrease in health problems related to malnutrition, also cause problems related to excessive nutrition and excessive energy intake (10).

2.3.1. Adequate and Healthy Nutrition

Adequate and healthy nutrition is the consuming all nutrients required for the body's growth, regeneration and functioning of the tissues, and proper use in the body. School age children should consume between 1200-2000 calories (cal) per day for healthy nutrition. In this recommended diet, 25-30% of the daily energy should be sourced from fat, 50-55% should be sourced from complex carbohydrate and 20-25% should be sourced from protein (11).

With adequate and healthy nutrition, children's school performance increases and children become more resistant to diseases. Cognitive abilities of the children also increase with healthy nutrition (12).

This period is the fastest period for growth and development in children. Children need to consume adequate nutrients at the right times and in the correct amounts for optimal growth and development (13).

2.3.1.1 Dairy Products Group

This group consisting of dairy products such as milk, yogurt, cheese (curd cheese, cottage cheese) and milk powder is a significant source of many nutrients, particularly high-quality protein, calcium, phosphorus, zinc, vitamin B2 and vitamin B12. These nutrients contain relatively low amounts of iron and vitamin C, but the absorption rate of iron is high. Vitamin A is also a significant source for Vitamin B1 and Vitamin B2. All age groups, including adult women, children and young people and elder persons, should consume the recommended amounts of milk and dairy products every day. Milk and dairy products contribute to dental and bone health and reduce the risks of cardiovascular disease, certain types of cancer and type 2 diabetes, osteoporosis and help to lower blood pressure. Individuals with a diagnosis of chronic disease such as obesity, coronary heart disease and diabetes should prefer semi-skimmed milk and dairy products. Cheese types with low salt should be consumed (14).

2-3 portions of this group should be added in the diet of school age children. Consumable examples of portions may be considered as 1 cup milk, 1 cup yogurt and 1 matchbox cheese (14).

The calorie content and nutrients in milk and dairy products are demonstrated in Table 2.1 (15).

Table 2.1. The number of calories and nutrients contained in milk and dairy products (15)

Nutrition	Portion (For 100 g) Average	Energy (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)	Calcium (mg)	Iron (mg)	Vitamin A (IU)	Vitamin B1 (mg)	Vitamin B2 (mg)	Niacin (mg)	Vitamin C (mg)
Cow's milk (semi- skimmed)	1 tea cup	64	5.5	3.5	3.0	120	0.1	150	0.04	0.21	0.1	1
Goat's milk	1 tea cup	70	5.0	3.3	4.0	150	0.2	75	1.06	0.18	0.3	1
Yogurt (semi- skimmed)	1 tea cup	59	5	3.2	2.6	120	0.1	120	0.06	0.18	0.1	1
Cottage cheese (fresh)	1 small cup	100	3.2	35.0	5.6	150	0.3	150	0.03	0.35	0.60	1
Cheese (kasseri)	3 matchboxes	404	1.4	27.0	31.7	700	1.0	1000	0.01	0.49	0.1	0
Feta cheese (Whole milk)	---	289	0	22.3	21.6	162	0.5	720	0.08	0.30	0.4	0
Feta cheese (non-fat)	---	99	0	19.0	0.7	96	0.4	14	0.02	0.30	0.1	0
Milk powder (Whole milk)	1 small cup	429	37.0	26.0	27.0	897	0.7	1080	0.24	1.31	0.7	4.0
Milk powder (non-fat)	1 small cup	360	51.0	36.0	1.0	1235	0.9	40	0.35	1.80	1.0	6.0

2.3.1.2 Meat-Egg-Legume Group

The nutrients in this group provide growth and development for body and intelligence and also contain high protein (12).

- a) Sheep, cattle, poultry, meats of prey animals, kidney, heart, liver, fish and other aquatic products
- b) Egg
- c) Legume
- d) Oil seeds such as hazelnut, peanut, walnut, sesame, almond.

The protein content of these nutrients is high. They are also rich in fat content. Legumes are rich in carbohydrates. These nutrients are also rich in vitamins and minerals. They are rich in many B vitamins, iron and zinc. Eggs are an example source of protein and rich in iron, vitamin A and some Vitamins B.

Portion samples to be consumed by 6-7 age group children: 2-3 cooked red meat with the size of meatballs, 3-4 spoons of legumes, 3-4 pieces of small chicken legs and 1 egg are considered as 1 portion. If possible, eggs should be added to the children's nutrition every day, if not they should be added every other day. Fish consumption is required at least once a week. The nutrients can be selected according to the tooth structure and taste of the child. Meat consumption should be supported by cooking meatballs, boiling meats and adding to vegetable dishes or soups. (12).

Table 2.2 shows the number of energy and nutrients of meats and Table 2.3 shows the calorie content and nutrients of legumes, peanuts and similar foods (15).

Table 2.2. The number of energy and nutrients obtained by 100 grams of various edible meats (15).

Nutrition	Portion (For 100 g) Average	Energy (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)	Calcium (mg)	Iron (mg)	Vitamin A (IU)	Vitamin B1 (mg)	Vitamin B2 (mg)	Niacin (mg)	Vitamin C (mg)
Cattle (semi-skimmed)	1 portion fillet	240	0	18.7	18.2	8	2.6	0	0.06	0.16	4.3	0
Sheep (semi-skimmed)	---	267	0	17.0	21.0	8	2.2	0	0.10	0.20	0.2	0
Chicken	---	149	0	19.0	8.0	15	1.5	0	0.08	0.16	9.0	0
Goat	---	157	0	18.4	9.2	1	2.2	0	0.17	0.32	5.6	0
Kidney	1-2 pieces	131	0.8	16.0	7.0	13	6.0	1000	0.35	2.50	7.0	12
Liver	3- matchbox size	136	4.5	20.0	4.0	10	8.0	25000	0.30	3.00	13.0	20
Sausage	2-3 pieces	309	1.8	12.5	27.6	7	1.9	---	0.16	0.20	2.7	---
Salami	4-5 slices	304	1.1	12.1	27.5	7	1.8	---	0.16	0.22	2.6	---
Fish (semi-skimmed)	1 portion	149	0.0	19.0	8.0	50	1.1	100	0.10	0.20	3.0	0
Egg	2 pieces	159	0.7	12.8	11.5	54	2.7	100	0.14	0.37	0.1	0

Table 2.3. Amount of energy and nutrients obtained by 100 grams of edible legumes, peanuts and similar foods (15).

Nutrition	Portion (For 100 g) Average	Energy (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)	Calcium (mg)	Iron (mg)	Vitamin A (IU)	Vitamin B1 (mg)	Vitamin B2 (mg)	Niacin (mg)	Vitamin C (mg)
Broad Bean	1/3 cup	354	53.7	25.0	1.7	77	6.0	100	0.53	0.30	2.5	6
Beans	---	349	55.9	22.6	1.6	86	7.6	15	0.54	0.19	2.1	3
Chickpea	---	376	56.7	19.2	6.2	134	7.3	45	0.46	0.16	1.7	1
Lentil	---	351	57.4	23.7	1.3	68	7.0	100	0.46	0.15	1.7	1
Pea	---	346	61.6	23.7	1.8	64	4.8	100	0.72	0.15	2.4	4
Nutmeat	3/4 cup	634	16.7	12.66	62.4	209	3.4	---	0.06	0.05	2.1	Less
Peanut	2/3 cup	59	18.8	25.5	44.0	66	3.0	30	0.91	0.21	17.6	1
Walnut kernel	1 cup	704	13.5	15.0	64.4	84	2.1	40	0.40	0.20	1.5	3

2.3.1.3. Vegetable and Fruit Group

The composition of most of the vegetable and fruit are composed of water. In addition, fruits and vegetables are rich in minerals and vitamins, folic acid, betacarotene which is the precursor of vitamin A; Vitamin E; C; B12; calcium; potassium; iron; magnesium; fiber and antioxidants. All kinds of edible parts of plants fall into the group of vegetables and fruits.

Nutrients in vegetable and fruit groups contribute to the elimination of harmful substances from the body; growth and development; cell regeneration and resistance; tissue repair and diseases; and reduce the risk of obesity and chronic diseases due to unhealthy nutrition. At least five portions of vegetables and fruits should be consumed (17).

2.3.1.4. Bread and Grain Group

Bread and grain group is rich in vitamins B1 and other B Vitamins except for B12. This group also contains minerals, carbohydrates and proteins. Bread and grain group is the commonly consumed group as the primary energy source of Turkish people. Food types in this group are grains such as wheat, rice, corn, rye and oats and

flour, bulgur wheat, coarsely ground wheat, cereal and similar products. Nutrients made from grains as the shell and core of which are not separated, are rich in vitamins, minerals and fiber. Consumption of foods with high fiber content provides smooth intestinal movements.

Whole grain products should be consumed in six portions a day (18). For adequate and healthy nutrition, it is important to eat nutrients without skipping three main meals. Growing children should eat snack. In fact, breakfast is the most important meal for everyone including children. There is a 12-hour period between dinner and breakfast. During this time the body uses all the nutrients. For children who do not have breakfast in the morning, school success and resistance to diseases decrease and fatigue, exhaustion and weakness may arise (18).

2.4. Measurement Methods of Childhood Obesity

2.4.1. Direct Measurement of Fat in the Body

2.4.1.1 Calculation of Body Density by Underwater Weighing (Hydrodensitometry):

It is considered as the “gold standard”. Different density lean tissue and fat tissue are determined by underwater weighing. However, it is very difficult to apply in some patients, especially in children (19).

2.4.1.2. Determination of Total Body Fluid By Isotope Dilution:

Total body fluid can be detected by isotope dilution method using 2 or 3 valent hydrogen isotopes. The amount of fluid in the lean tissue mass is considered as constant and then calculated (72%) (19).

2.4.1.3. Measurement of Total Body Potassium:

Since potassium is found in the lean tissue compartment in the body, measurement of body potassium gives anticipation about lean tissue mass (20).

2.4.1.4. Determination Of Bioelectrical Conductivity Of The Body

Bioelectrical impedance analysis method: it is a method based on the difference of electrical permeability of lean tissue mass and fat tissue. The individual stands barefoot on metal foot plates. An electrical current with a very low voltage is transmitted from one leg to another. Since fat tissue conducts the electrical current very weakly, body fat is calculated by measuring the resistance against the current. This method has +/- 3% error margin. For accurate measurement:

- 1- Eating and drinking should be avoided 4 hours before the measurement.
- 2- No exercise before 12 hours.
- 3- The bladder should be completely discharged before the test.
- 4- No alcohol before 48 hours.
- 5- Diuretics should not be taken (21).

2.4.1.5. Magnetic Resonance Imaging

The individual is accommodated in a strong magnetic field and exposed to radio frequencies. Signal strength is determined by the dilution and relaxation properties of fluid and fat in the tissues examined. The use is limited due to the limited availability of the device, high costs and the high amount of time spent on analysis (22).

2.4.1.6. Evaluation of Dual Energy X-Ray Absorption

With the dual body X-ray absorptiometry method, the entire body is scanned linearly by using low-energy X-rays for 5-20 minutes. As a result of two gamma rays being captured by the body tissues, body fat tissue, lean body tissue and total body bone mineral level can be determined. It can be used in infants and children since it is emitting low dose of radiation. It is one of the most reliable methods for determining body composition (23).

2.4.1.7 Ultrasonography Technique

It is a method based on the evaluation of high frequency sound waves by sending them to the body and detecting their reflections from different tissue surfaces. The absorption frequency of the sound is directly proportional to the tissue absorption coefficient and tissue thickness. Advantageously, the device's cost of operating is low and it has no side effects on the individual's health. However, it is disadvantageous that the individual using the method requires special training and that the error margin of the method varies according to the knowledge and ability of the individual (24).

Body fat can be measured directly by these methods. However, since obesity has become a common problem, these measurements have not administered on clinical practice. Evaluations should be inexpensive, secure and easily repeatable. In addition, many of these methods are not suitable for use in children (25).

2.4.2. Indirect measurement of fat in the body

2.4.2.1. Body weight according to height

When evaluating the child for obesity, the height of the child should be taken into account. The ideal body weight of the child can be found in tables containing height and body weights and arranged by age and sex. According to this evaluation factor, BMI - percentile value below 5 indicates malnutrition (protein energy malnutrition = [PEM]), 5 to 85 indicates normal body weight, 86 to 95 indicates overweight and over 95 indicates obesity. Body weight in the 50th percentile of the age at which the height is in the 50th percentile is the ideal body weight of that child (26).

2.4.2.2. Body circumference measurements

Body circumference measurements provide information about lean body tissue, adipose tissue mass and energy sources. Frequently, the measurements for upper-middle arm, waist, hip, thigh and calf circumference are carried out. The waist/hip proportion helps to indicate fat distribution and to determine the risk of cardiovascular disease. However, this measurement is not widely used in children and the proportion above 0.8 is an indicator of obesity (27).

2.4.2.3 Skinfold thickness

In obesity, a portion of the fat is accumulated under the skin. Skinfold thickness measurements are carried out with a special tool called caliper in order to determine this fat tissue. Triceps, biceps, subscapular and supriliac areas can be measured. According to age percentile values, the percentile above 85 is considered as obesity. However, this method requires experience and is difficult to administer (28).

2.4.2.4 Body mass index

Body mass index is the most practical method used in the evaluation of obesity. It is determined by the ratio of body weight (kg) to the square of the height (m) ($BMI = \text{weight (kg)}/\text{height}^2 \text{ (m}^2\text{)}$). The percentile tables have been determined according to age and sex in children. According to these tables, children over 95 percentile are considered as obese (29).

2.5. Development of childhood obesity

The appetite center of the hypothalamus plays an important role in the mechanism of obesity-causing eating habits. In humans and animals, the ventromedial hypothalamus is the center of satiety, and the lateral hypothalamus is the center receiving the fasting signals. Peptides affecting nutrition consuming are cholecystokinin, urocortin and neuropeptide Y (NPY). While cholecystokinin and urocortin reduce nutrition consuming, NPY increases nutrition consuming. NPY is found in many parts of the brain, especially in the hypothalamus, hippocampus, cortex and brain stem nucleus. In many obesity models, there is an increase in NPY and NPY mRNA in the paraventricular and arcuate nucleus arches. NPY increases corticotropin-releasing hormone and corticotropin secretion and is in constant interaction with insulin. Despite hyperinsulinemia in obese children, normal glucose levels indicate the presence of insulin resistance. In the absence of precaution, glucose tolerance may be impaired and hyperglycemia may develop due to insulin resistance. There is a significant increase in insulin with the increase in body weight. Despite the increase in fat cell mass and the increase in insulin need, the decrease in the number of receptors leads to insulin resistance. Therefore, the emergence of type II diabetes mellitus, the frequency of which

has increased in recent years, in obese children is getting easy especially in adolescent age. Leptin, which prevents body weight gain by inhibiting the synthesis and release of NPY and encoded by the ob gene, plays an important role in the regulation of body weight and metabolism. As a satiety factor, leptin reduces nutrition consuming and increases energy expenditure. Leptin reduces appetite by reducing NPY synthesis and release. Serum leptin levels may be increased in obese individuals due to resistance to leptin signal impairment or leptin effect (30).

2.6. Factors influencing the development of childhood obesity

Many factors influence the occurrence of obesity. Such as; genetic factors, age, sex, nutritional habits, physical activity (31).

2.6.1. Genetic factors

Obesity in the family is a risk factor for the child. If both parents are obese, the risk of obesity in the child may increase up to 80%. Since the nutritional habit starts in the family, the family also contributes to obesity. Obesity is more likely to occur in children of a family with malnutrition (30).

Genes causing obesity do not directly cause obesity in children. However, when the environment in which the child exposed changes, the possibility of obesity increases (32).

Single gene defects which may cause obesity have been identified. The amount of leptin released from adipose tissue identified by Zang et al. in 1994 and coded via ob gene is regulated according to the amount of adipose tissue in the body. The effect of leptin on the hypothalamus is responsible for fat and carbohydrate metabolism. It is known that leptin is also released from stomach, epithelial cells and placenta in addition to white adipose tissue (33). The actual effect of leptin suppresses appetite by effectively influencing the hypothalamus. In other words, while leptin level decreases in fasting, leptin level increases as a result of overnutrition (34). Leptin-induced obesity occurs when there is resistance to leptin receptors or when there is a decrease in leptin production.

2.6.2. Age

In the first year of life, the size of the fat cells increases approximately twice, but obesity in this period is not a good indicator in deciding whether obesity is going to develop in the future. The second period of childhood is between the ages 4-11. Obesity in this period is important in terms of the continuation of the obesity in the later period (35). Obesity is 5 times more likely to develop in obese infants than normal infants at age 5. Although it is possible that spontaneous recovery of obesity in infancy with growing, the risk of obesity beginning in childhood and adolescence is still high in adulthood (36).

2.6.3 Sex

The prevalence of obesity is higher in both sexes and is more common in women. The risk of beginning and continuation of obesity in adolescence period is higher in women (19).

2.6.4. Nutritional habits

Nutritional habits such as formula feeding during infancy, early transition to supplementary nutrients, shifting of nutritional habits to fast-food, increasing fast-food nutrition, random meals, snacking between meals affect obesity occurrence (37). Overnutrition of fat and carbohydrates in the diet or eating more food increases obesity. Not only the child's own nutritional habits but also the family's nutritional habits are affecting the obesity.

Excluding the four main factors in the development of obesity, the relationship between mother, father and child and the relationship between the child and his/her friends are also significant factors (10).

2.6.5. Physical Activity

Advances in technology and transportation have reduced the need for physical activity in daily life and television, electronic games and computers have increased the screen time spent as sedantary among children. Physical inactivity and sedanter behaviours leads to negative health indicators including negative cardiometabolic and negative psychosocial health besides obesity (38).

2.7. Complications of obesity

Obesity causes many health problems due to negative effects on body systems (endocrine system, cardiovascular system, respiratory system, gastrointestinal system, skin, genitourinary system, musculoskeletal system) and psychosocial status (39).

Health problems/risk factors caused by obesity may be listed as

- Insulin resistance - Hyperinsulinemia
- Type 2 Diabetes Mellitus
- Hypertension (high blood pressure)
- Coronary artery disease
- Hyperlipidemia - Hypertriglyceridemia (Elevation of Blood Fat)
- Metabolic syndrome
- Diseases of the gall bladder
- Some types of cancer (gallbladder, endometrium, ovarian and breast cancers in women, colon and prostate cancers in men)
- Osteoarthritis
- Paralysis
- Sleep apnea
- Fatty liver syndrome
- Asthma
- Respiratory difficulty
- Complications of pregnancy
- Menstruation irregularities
- Excessive hair growth
- Increased surgical risks
- Mental problems (such as Anorexia neurosis (not to eat) or Bulimia neurosis (not to benefit from the foods s/he eats because of vomiting), Binge eating, night eating syndrome and trying to provide psychological satisfaction by excessive eating may occur)
- Social inharmoniousness
- Skin infections, fungal infections of the groin and feet, especially due to excessive subcutaneous fat tissue as a result of losing and gaining weight frequently

- Musculoskeletal problems (39).

2.8. Obesity prevalence

2.8.1. Obesity prevalence in the World

Obesity, a significant community health problem on a global scale, is increasing each passing day in both developed and developing countries. It has been reported in the 12-year long Monitoring Trends and Determinants in Cardiovascular Disease study (MONICA) conducted in 6 separate regions of Asia, Africa and Europe by World Health Organization that the prevalence of obesity increased by 10-30% in 10 years (26).

According to the US-National Health and Nutrition Examination Survey (NHANES) study conducted by the Centers for Disease Control and Prevention (CDC) in the United States, where obesity is the most common, it was reported that the prevalence of obesity ($BMI \geq 30$) was 33.2% in women and 31.12% in men in 2003-2004 and 35.3% in women and 33.3% in men in 2005-2006. The prevalence of overweight in adults in Europe varies between 28-78% in women and 32-79% in men. The countries with the highest overweight rate are Albania, Bosnia and Herzegovina and the United Kingdom (Scotland area). Turkmenistan and Uzbekistan are the countries with the lowest prevalence. The prevalence of obesity in these countries varies between 7-36% in women and 5-23% in men (40).

2.8.2. Obesity Prevalence In Turkey

According to the studies conducted by TURDEP-I and TURDEP-II in 1997-98 and 2010, while 15% decrease was observed in healthy individuals with body mass index (BMI) between 18.5 and 24.9, 8% increase was observed in BMI between 30 and 34.9 (3).

In 12 years, it has been observed that obesity increased by 34% in females and 107% in males in Turkey from TURDEP-I to TURDEP-II (3).

2.9. Treatment of obesity

2.9.1. Dietary Treatment

Dietary treatments used in obesity should be individualized. In addition, other methods used to support the treatment are also available.

Firstly, a very good nutritional medical history should be taken in order to be successful in the treatment. In this history, it is necessary to learn what a person eats; how many meals are consumed a day; how many hours are spent for meals; what nutrition s/he likes and dislikes; what motion and environment s/he eats; who makes the meals; and how dishes are prepared. Daily physical activity should also be examined. There are benefits of working as a group apart from one-to-one interviews to learn the causes of obesity and to find a solution. These group studies are conducted with the participation of 8-10 people and they discuss on the matter of subject for 1.5-2 hours. This method can be used, especially in places where a large number of patients are served. In this training, the current status of the patient is determined first and a common consciousness environment is created. In order to begin training, the individual has to be aware that his/her old habits are right or wrong and s/he must be ready to gain new nutritional habits. It is beneficial to learn what the patient consumes before the treatment with the nutrition consumption record and to gather information about the nutritional habits. In addition, this record leads the patient to play an active role in the treatment, increase motivation and encourage other behavioral changes (41).

International organizations, which make recommendations on health and obesity, recommend a healthy and low-calorie diet with sufficient protein, vitamins, minerals and fiber of various nutrients and the distribution of energy to macro nutrients in the treatment of obesity and inexpensive weight-loss programs including exercise and behavior modification treatment (42).

2.9.1.1. Energy

Diets administered should be written by knowing the height, body weight and physical activity levels of the individual. Daily energy consumption should be calculated in such a way that the individual loses 0.5 kg per week and the diet program should be prepared accordingly. In a diet planned in this way, more weight loss is achieved from fat mass instead of lean body mass. The individual's basal metabolic rate should be calculated and insufficient energy should not be provided. The diet should be

high energy as much as possible, at least at the level of basal metabolism, so as to ensure long-term weight-loss. According to the recommendations of American Heart Association (AHA) and American Diabetes Association (ADA), 55-60% of daily energy should be obtained from carbohydrates, 25-30% from fats and 15-20% from proteins (43).

2.9.1.2. Carbohydrate

When calculating the carbohydrate content of the diet, complex carbohydrates such as legumes and whole grain products should be increased and simple carbohydrates such as sugar should be reduced. Since the fiber content of oligosaccharide and polysaccharides is high, it delays gastric discharge and provides a feeling of satiety. It is very important that these nutrients take place in the diet. It is known that various types of fiber, especially water-soluble fiber, have a positive effect on the prevention and treatment of diabetes, heart diseases and certain types of cancer. The recommended amount of fiber per day should be 25-35 gr (41).

2.9.1.3. Protein

The protein content of the diet should be 15-20% of the energy according to the recommendations of the Recommended Dietary Allowances (RDA) and saturated protein sources should be benefited more. In order to meet the vitamin B12 need, approximately 30-40% of the total protein should be obtained from animal origin nutrients. 40-70% of this animal origin protein should be obtained from skimmed milk and dairy products and 20-30% should be obtained from low-fat meat, fish and eggs. It is recommended that 25% of the remaining total protein should be obtained from legumes; vegetables; and nuts and seeds (41).

2.9.1.4. Fat

Daily consumption of 25-30% of the recommended energy should be provided from fats with saturated fats (<10%), polyunsaturated fats (7-10%) and monounsaturated fats (10%). Fats are important in terms of the use of fat-soluble vitamins (A, D, E, K) and for contribution to energy in protein biosynthesis and they should be included in the diet. According to a study conducted, it is stated that fats promote the nutritional consumption. Fats tend to store in the body more than

carbohydrates and protein. Particularly low-fat nutrients are recommended for individuals who want to lose weight. Many studies examining the effect of diet on blood lipids have demonstrated regular weight loss in groups consuming a low fat/high fiber diet (44).

2.9.1.5. Vitamins and Minerals

A program should be established to meet daily vitamin and mineral needs in weight-loss diets. Low-calorie weight-loss programs prepared sufficiently and healthily are complete. However, diets with very low energies may cause deficiencies in terms of group B vitamins, iron and calcium. Vitamin and mineral supplements may be needed in individuals consuming less than 1200 kcal of energy per day, vegan vegetarians and those intolerant and allergic to certain nutrients, smokers and alcohol users (45).

2.9.1.6. Fluid Intake

Water is required for the cells to perform their vital activities and body functions. We need to receive water from food and drinking water which we have lost through respiration, urine, sweat and feces in order to maintain the fluid balance of the body. By consuming 2-3 liters of water per day, metabolic wastes are removed from the body and also water consumption is essential to prevent constipation (44).

2.9.1.7. Number of meals

For the regular functioning of metabolism, small portions should be consumed in our meals and individuals are fed frequently. This created meal pattern based on frequent meals increases thermogenesis and consequently increases the energy spent. This meal pattern also reduces hypoglycemic attacks and related symptoms such as irritability, malaise and palpitation. Meals should consist of 6 meals with 3 main meals and 3 snacks and 3-4 hours intervals should be available between them. Such diets may prevent overnutrition in meals and fasting (41).

2.9.2. Bariatric Surgery Treatment

Bariatric surgery is divided into two categories. These are as follows:

1. Restrictive interventions limiting the calorie intake by reducing the stomach reservoir.
2. Malabsorptive interventions in which the length of the small intestine is reduced.

Restrictive interventions: adjustable gastric banding and vertical banding gastroplasty.

Malabsorptive interventions: single bilopancreatic diversion or with duodenal switch.

Both restrictive and malabsorptive intervention: Roux-en-Y gastric bypass (46).

Surgical methods are not administered in the routine treatment of childhood and adolescent obesity. However, the methods which can be administered in adolescents, who have more than 120% of BMI 95 percentile or more than 35 kg/m² and, who fail to respond to lifestyle change treatment, are available (47).

2.9.3. Medication

Medication, which is one of the most important procedures in obesity treatment, has emerged because of the difficulty in weight-loss and the maintenance of current body weight after the weight-loss (48).

Indications for pharmacological treatment in obesity:

1. The cases where BMI is >30 kg/m² and diet, exercise and behavior modification treatments are administered and weight loss or maintenance cannot be realized,
2. The patients whose BMI is 27-29.9 kg/m² and who has comorbidities (type 2 diabetes, coronary artery disease, cerebrovascular disease, hypertension, dyslipidemia),
3. The individuals whose BMI is 25-29.9 kg/m² and with waist circumference 102 cm in men, 88 cm or above in women (48).

In cases where pharmacological treatment is contraindicated in obesity:

- Hypersensitivity to active substances
- Pregnancy and lactation periods
- Pediatric cases: There is no long-term safety data. However, it can be performed by experienced centers in children with severe comorbidities such as sleep apnea, increased intracranial pressure.

Medication use is not preferred in the routine treatment of childhood and adolescent obesity. Studies on the administration of metformin, orlistat and sibutramin in adolescents show a decrease in BMI. However, sibutramin is not recommended because it increases cardiovascular risk factors. Gastrointestinal side effects are reported in studies with orlistat and metformin (47).

2.9.4. Exercise Therapy

One of the most important causes of obesity is lack of physical activity and sedentary life. According to the report of the WHO released in 2002, 1.9 million deaths in the world are associated with the lack of physical activity (49).

Physical activity is essential to regulate energy balance after evaluating whether there is a cardiopulmonary problem. Physical activity is very important for reducing deaths due to health problems caused by obesity.

When physical activity is administered in a regular and healthy diet, it helps to preserve body muscle mass, approach BMI to the ideal rate and reduce fat tissue loss. The average exercise for at least 30 minutes per day provides an energy consumption of 840 kJ (200 kcal). It is stated that the exercises performed at least 5 days a week are the most efficient way and that the exercise program should be continued for at least 2 months in order to provide the loss of fat tissue (50).

2.9.5. Behavior Modification Treatment

It is recommended to use behavioral treatments to increase compliance in individuals who have difficulty in following physical nutrition recommendations while increasing physical activity. Behavior modification treatment in the control of body weight is a treatment aiming to positively modify or reduce negative behaviors related to nutrition and physical activity which cause overweight gain and to make them a way of life by promoting positive behaviors (51).

The behavior modification program includes three components: self-monitoring, control of stimuli, and self-rewarding technique. These components are aimed at eliminating the overnutrition, reducing the amount of nutrients consumed, regular consuming and gaining lifestyle behavior modifications (51).

Only behavior treatment is not sufficient to treat moderate and severe obesity. However, this treatment modifies the lifestyle of obese individuals and increases their desire to lose body weight in all weight-loss programs. Behavior strategies provide body weight loss by 4% in 4-12 months compared to achieve loss by healthy nutrition and exercise. When behavior treatment is completed, patients usually regain 1/3 of their body weight (50).

2.9.5.1. Behavior Treatment Principles

In this method, patients are asked to keep their own food-drinking and physical exercise records and in this way, they learn how to control their impulses and a target behavior is determined in each interview and an agreement is reached about this target. In each interview, the matters discussed in the previous interview and the determined target behaviors are reviewed and various solutions are produced for the problems experienced and positive feedback is given related to the targets achieved (52).

2.9.5.1.1. Interview Types in Behavior Treatment

Particularly in pre-adolescents, family-based programs involving parents have been shown to be more effective (53).

Group therapy was found to be more effective in lowering BMI in studies comparing individual and group behavioral therapies in children (54,55). It has been shown that taking parents and children in group therapies separately is more effective than taking them together (54).

In Turkey, individual based treatment methods including interviews with family and children are generally used in the management of obesity. In a study conducted by Garipoğlu M. et al. in 2009, family-based group therapy and individual treatment efficiency were compared in the treatment of obesity in children, and family-based group therapy was found to be more effective (54).

2.9.5.1.2. Interview Frequency and Duration in Behavior Treatment

There is no data indicating how often the optimal frequency of interviews should be exactly. However, since the behavior treatment method is based on timely feedback, interviews are usually carried out for 45-90 minutes in the first 2-3 months at 1-2 weeks intervals, and then the frequency of interviews is reduced and 4-12 months follow-up is carried out (52).

2.10. Family Education Models

In order to improve the quality of life of families and to raise educated individuals, each society develops different models and tries to reach families (56).

2.10.1. Home-Based Education

Family is the main objective of home-based family education in the development and education of the child. Parents are the first teachers of the child to help develop many developmental skills such as walking, speaking, and knowledge about their environment. For this reason, home-based education targets to raise awareness of parents who contribute to the development of the child (57,58). The home-based family education program is implemented in a way that the educators visits the family at home periodically. During home visits, families are provided with information and guidance on creating a home environment that will help the child to be healthy, eat well and develop their skills in all areas (59,60). Parents support the development of the child and develop positive sense of self by realizing their own abilities (61). Many home visit-based family programs are in operation in Turkey and around the world. Home-based family education programs implemented in Turkey are as follows: The Mother-Child Education Program (AÇEP), Gazi University Family-Children Education Program and Mother-Father Child Education Project. Home-based family education programs implemented around the world are as follows: Early Childhood Stimulation Through Parent Education Project, Home Instruction Program for Preschool Youngsters HIPPY and The Mother-Child Home Program (62).

2.10.2. Institution-Centered Family Education Program

The Institution-Centered Family Education Program is based on the interaction of parents and educators. This program is conducted in the way of informing the parents by organizing group meetings in the institution on specific days of the week. On the days when the meetings are not organized, parents are provided with the educational materials to study with their children at home. In addition, educators visit families twice a month to support families related to educational techniques. The institution-centered family education may be conducted in the way of parents coming to educational institutions with their children on specific days of the week. In this implementation, children may participate in teacher-guided activities in another class while parents continue their education (63).

The institution-centered family education targets to inform parents about the development and care of the child in early childhood at a low cost. Moreover, more families can be reached in a short period of time and it is ensured that parents with

children of similar age group can share with each other (61). The institution-centered family education program is implemented in Turkey through such programs: Mother Education Program, Parent School, Parent Support Programs, Women and Children Centers, Family Education Program for 0-18 years. In various countries, the institution-centered family education programs are: Early Childhood Stimulation Through Parent Education Project, The 17 Preschool Program, Avence Parent-Child-Program (61,62).

2.10.3 Home Schools

Home school is an educational alternative that is starting to be considered as a good alternative to modern school in many countries of the world and covers the time course from preschool age to university. The home school education may be given at home, in the park, in the museum, in the garden, in the market and, to be brief, in everywhere. It has been pointed out that “the whole world is an educational experience for a preschool age child” (64).

In home school implementation, children are systematically educated at home and generally do not attend the school. The primary teachers of the children are parents, and all responsibility for the children belongs to the parents. Families decide what children learn and how much will children learn. The matter which needs to be emphasized here is that the existence of well-equipped parents understanding the importance of education is significant and this ensures that the quality of education to given is qualified. Before the start of home school implementations, parents should be informed by attending the home school seminar, meeting with other families with school implementation and spending time with them during their education, participating in support group meetings in their regions, buying home school books and magazines and being prepared. Advantages of home school implementations such as passing the values in the family to children, using computers and the internet effectively, availability of support groups consisting of other families providing this education and various publications on this matter play a very significant role in the spread of the implementation (65).

2.10.4. Child-to-Child Education

The child-to-child education program was formed by the Maternal & Child Health Research Institute in London as a branch of the studies for the International Year of the Child. With the child-to-child approach, it is targeted that children transmit what they have learned to other children at home, school or outdoors. Because of the intense interest of children in siblings in rural and shanty settlements, it is thought that the child-to-child education approach may be significant in spreading pre-school education. In order for older children to take care of their younger siblings, they should be encouraged to actively participate in the learning process, to provide perceptible information and to implement what they have learned immediately, and to make connections between school, home and society (61,66).

2.10.5. Distance Education

It is targeted to reach children and their families who cannot benefit from preschool education opportunities due to geographical difficulties, through written texts, booklets, brochures, computer, video recordings, television and radio links to inform them about child development and child education (60). In order to benefit from educational services, it is possible to provide learning environments which are suitable for the needs and be more flexible than face-to-face education by eliminating the difficulties such as being at certain age and education levels and being in certain centers. However, due to a one-way communication, the behavior and reactions of the family cannot be determined and it cannot be checked whether the target group is reached (61). Some universities in our country have distance education implementations. In addition, “Family Letters Project” implemented by the Mother-Child Education Foundation and “Play with me?” television program is one of the examples of distance education (61).

2.10.6. Mobile Services

Mobile buses travel to the places where the children do not benefit from pre-school education services and aim to prepare the children for primary education by implementing the education program by the pre-school teacher in a certain period of time. The mobile kindergartens are intended for children who do not attend

kindergartens for financial or family reasons and it is an integrative program covering all aspects of childcare, including families. The program tries to support the physical, cognitive, affective and social development of children by considering their cultural characteristics (60).

2.11. Nutritional Education and Behavior Models/Theories

Learning may be defined as a dynamic process arising in accordance with needs, is formed as a result of education, knowledge, experience and observation and creates positive and desired changes in both behavior and thought and ensures the sustainability of these changes. As can be understood from the definition, learning, education and knowledge are intertwined concepts. Obtaining new information is possible through education. However, focusing on behaviors rather than knowledge level in nutritional education provides more effective results. For this purpose, behavior models and theories may be beneficial in nutritional education. Although there are various differences between behavior theories and models, each one actually targets to lead the individual to a single objective (positive behavior intended). For this purpose, some behavior theories and models which may be adapted to health are as follows (67).

2.11.1 Health Belief Model

The Health Belief Model (HBM) is the oldest of all theories discussed (68). Nowadays, HBM is used to intervene in medical screening, disease, disease role and preventive behaviors. According to the Health Belief Model, the possibility of a person taking action to prevent the disease depends on the person's understanding that:

- The person may also catch the disease (Perceived sensitivity),
- The consequences of the disease may be serious (Perceived seriousness),
- Preventive behavior may prevent the disease effectively (perceived benefit), and
- The benefit of mitigating hazards/risks is far greater than that of taking action (perceived obstacle) (69).

These four factors, which are influenced by mediating variables, affect the known dangers of the disease and the symptoms for its consequences. Moreover, it affects the possibility of displaying protective health behavior indirectly. The most significant variable obstructing preventive health behaviors is the difference between

perceived obstacle and perceived benefit. If perceived sensitivity, seriousness, and benefit reduce the effects of perceived obstacles, behavior is achieved (70).

The contents of the main components of the model are explained below:

Sensitivity/Susceptibility perception: Personal risk or sensitivity is an important perception in individuals' health related behaviors. The more a person feels at risk, the less risky behavior they will conduct (71). In other words, if a woman has had breast cancer before, she will not forget to have a mammogram at the recommended periods (72).

Seriousness/caring perception: The seriousness or violence occurring in an individual against the consequences of a disease is how it is perceived. This perception is particularly influenced by the individual's health knowledge. If an individual has knowledge about the general scope of the disease, individual's perception will be affected accordingly. For example, when a healthy person catches the flu, maybe he will be on sick leave and rest for a few days. However, an asthmatic patient may need to be hospitalized when catching the flu. This difference constitutes the perception of seriousness (71).

Benefit perception: This is an individual's belief in the the benefit of the protective behavior proposed to prevent or reduce the severity of the disease (71). The individual perceives the positive results as benefits if taking action on sensitive matters (72).

Obstacle perception: These are obstacles perceived individually to display new behavior and adapt (71). Champion and Skinner have reported that many studies have found that perceived obstacles are the most significant factor for displaying behavior (72).

Actors for taking action: In the first structures of the HBM, the triggering reason for the act of individuals was emphasized. While perceived sensitivity and seriousness may only potentially lead to an individual seeking health, physical symptoms, environmental stimuli, or media may be the triggering factor for action (72).

Self-efficacy: Self-efficacy is the belief that an individual can attempt a behavior and succeed in doing so. It is strongly motivated by the belief that an individual can perform behavior and get positive results. In this way, this individual acts more comfortably than the individual with low self-efficacy. In addition to HBM, self-efficacy is a component of many theories such as planned behavior, maintaining motivation, and the transtheoretical model in change (73).

2.11.2. Planned Behavior Models

Planned Behavior Theory (PBT) is a sociopsychological approach to understanding and predicting health behavior identifiers and is a widely used prediction/estimation theory.

PBT predicts that the following information is needed to be understood whether a person intends to do anything:

1. What is a person's approach to doing anything (eg. exercise)? ("Attitude")
2. How much social pressure is imposed on the person to do this thing? ("Subjective norm")
3. Does the person think that he/she has full control of what he/she needs to do (eg. exercise)? ("Perceived behavior control")

Intention: Although there is no perfect relationship between behavioral intention and actual behavior, intention is used as the closest measure of behavior. This is the most important feature that distinguishes PBT from other models. Therefore, although the variables in this model are not a measure of actual behavior, they are an important element that can be used to determine (For example, in evaluating the effect of healthy nutritional education on attitude, subjective norm and perceived behavior control) the effectiveness of implementation attempts or to reveal the effect of factors on pre-implementation behavior.

Attitude is the evaluation of the person's behavior. For example: walking half an hour per week or once at least three days is used to determine the attitude regarding the behavior which is beneficial/harmful for my health or is easy/difficult.

Subjective norm: It is the calculation of social pressure for a person to do or not to do the intended behavior. The subjective norm is thought to consist of two parts. The first is beliefs about how individuals expect people to behave. For example: "members of my family believe/do not believe that I should eat healthily". The second is their positive or negative evaluation of each belief. For example: It includes an interactive evaluation of the expressions of "I care/do not care about the thoughts of members of my family".

Perceived behavior control: It is the area in which a person feels the ability to perform behavior. It has two aspects. The first is how much control the individual has over his/her behavior. For example: eating healthily is entirely up to me/is not up to me. The second is how confident the individual is in doing or not doing behavior. An evaluation should be performed. For example: "I am completely confident/not confident that I will eat healthily.

It states that individuals can do what they want to do (intentions) by making changes on these three identifier factors (Attitude, subjective norm, perceived behavior control) (69).

2.11.3. Transtheoretical Model

Transtheoretical Model (TM) based researches conducted over the last 20 years have shown that some behavior changes have common principles which may be applied to many health behaviors. TM is a deliberate behavior change model offering a large volume of research and service in many problematic behavior areas. This model describes the relationship between stages of change, change processes, decision balance or positive or negative aspects of change, conditional trust or self-efficacy in behavior change and conditional tendency to recur (74).

This model has some advantages as compared to other models. Firstly, this model deals with behavior change as a process rather than an event. It then provides important tools in both research and intervention development, by dividing the process of change into phases and investigating which variables are related to their development. The second advantage is that the clear deliberation on the measurement of the concepts provided a very solid basis for the model. Among different problem behaviors, different variables were associated with stage activities at each change stage. An unnoticed view of this model is that it is the processes of change making the movement go through change stages. Thus, although the "stage" is the most fundamental concept on which other models are built, it is commonly referred to as the "Change Model Stages", but this title is a misnomer since it only focuses on one concept of this multidimensional model. Naturally, model-based interventions are also multidimensional. TM studies have found significant similarities between different types of behavior change. However, the positive and negative aspects of behavior

change in stages of changes have shown a predictable relationship with confidence in behavior change, tendency to recur and change processes (74).

2.12. Family Education

2.12.1. Ways for adult education

While educators should understand the expectations and needs of the participants, the participants should have a clear understanding of why they are there.

Topics related to how adults learn:

- ♣ Adults want education to be associated with their own topics.
- ♣ Adults want to participate actively in education.
- ♣ Adults do not like uniformity in education and want change.
- ♣ Adults want positive feedback.
- ♣ Adults have personal concerns and need a safe environment.
- ♣ Adults want to be seen as unique individuals with different knowledge, manners and experience.
- ♣ Adults need to maintain their self-confidence.
- ♣ Adults have high expectations for themselves and their educators.
- ♣ The individual needs of adults should be considered.

The main task of the educator as facilitator of learning in androgical activities is that the andragogical process guides or directs individuals rather than the management of the learned subject as in the traditional pedagogical approach. In the androgical approach, the educator should conduct education based on seven principles:

- ♣ The most efficient learning takes place when the participant is ready to learn. Although motivation is an internal dynamic, it is in the hands of the educator to create an environment promoting the motivations of the participants.
- ♣ Learning is more effective if it is structured on what participants already know or their experiences.
- ♣ Learning is more effective if participants are aware of what they need to learn.
- ♣ Learning may be facilitated by using different educational techniques and methods.
- ♣ In order to learn skills, it is necessary to be given the opportunity to practice under observation or in a real-life environment (eg. dramatization and models, etc.).

- ♣ The closer the learning environment to reality, the more effective the learning process is.
- ♣ Participants should be given feedback on their progress. In order for feedback to be effective, it should be given immediately after the implementation and it should be positive and non-judgmental (75).

2.12.2. Adults in the Learning Process

- ♣ They have personal concerns and need a safe environment.
- ♣ They want to be seen as unique individuals.
- ♣ They need to maintain their self-confidence.
- ♣ They have high expectations.
- ♣ The individual needs of them should be considered.

Adult Learning:

Overview

- ♣ Subject-oriented learning
- ♣ Experiential learning
- ♣ Critical reflection
- ♣ Learning to learn

Adult Learning: Subject-Oriented Learning

Subject-oriented learning examines how adults learn their own learning processes, especially how they set learning goals, find appropriate resources, decide how to learn, and how they progress.

Adult Learning: Critical Reflection

Critical reflection focuses on three related processes:

- ♣ the process of questioning and relocating or assuming a new framework to the assumption that has so far been considered uncritical as common knowledge,
- ♣ the process for adults to adopt alternative perspectives for explicitly accepted ideas, actions, justification forms and ideologies; and
- ♣ the process by which adults recognize the hegemony of dominant cultural values and how self-evident interpretations of the natural state of the world actually support the interests and powers of unrepresented minorities.

Adult Learning: Experiential Learning

The belief that adult learning should be based on the experiences of adults and the fact that these experiences are a valuable resource and all the ideological colors that are currently conceivable are considered essential by adult educators.

Adult Learning: Learning to Learn

Adults' ability to learn to learn (developing skills in learning in a number of different conditions and a range of different styles) has often been seen as a challenging reason by educators studying with adults (76).

2.13. Prevention of childhood obesity

In January 2016, a committee was established under the chairmanship of WHO to end childhood obesity. This committee, the basic designation of which is Commission on Ending Childhood Obesity (ECHO), submits following recommendations (77):

- 1) Nutrition of children and young individuals with unhealthy nutrients and sugary drinks should be reduced and programs should be established to ensure that they consume healthy nutrients.
- 2) Sedentary lives of children and young individuals should be prevented and physical activity should be supported.
- 3) Guidelines should be established to provide that children grow up with healthy nutrients, sleeping and physical activity habits beginning from early childhood.
- 4) Healthy school environment, healthy nutrition literacy and physical activity guidelines should be established for school age children and young individuals.
- 5) Family-based, sophisticated and lifestyle-oriented services should be established for obese children and young individuals.

Since the reason for development of obesity is multifactorial causes, the actions to be taken for primary prevention should be discussed in social, familial and individual dimensions. The individual dimension in children is related to family and especially the mother (78).

2.13.1. Individual precautions

The fight against obesity begins when the individual is in the womb and even the prenatal weight of the mother is an important factor. Important factors for future non-

obesity of the individual: mother's normal body mass index before pregnancy, ideal weight gain during pregnancy, smoking and exercise during pregnancy. If gestational diabetes finding is observed during pregnancy, it is important for the mother to keep the diabetes under control. These findings indicate that women should be provided with healthy and balanced nutrition in order to prevent obesity in children. The mother should be aware of the fact that the infant is only breastfed for the first 6 months and after 6 months, additional nutrients may be consumed by infants. When supplementary nutrients are started to be consumed, fruit and vegetable and meat group consumption should be supported and sugar and salty foods should be avoided (79).

While monitoring children health, BMIs of children should be evaluated and the necessary information should be shared with the family beginning from the age of 2 (78). Therefore, the interventions to be conducted with the participation of the family should be planned to prevent the child and family from obesity. Children should be encouraged to spend time outdoors starting from infancy and any intervention to increase their physical activity should be performed. Active living times during the day should be supported. Elevator and vehicle usage should be reduced. Increasing activities such as walking and cycling should be aimed (80). One of the most important problems of today, the time spent on the TV should be controlled and this time should not exceed 2 hours a day (81).

2.13.2. Family-based precautions

It is not possible to consider the children's nutrition, physical activity and habits separately from the family. Therefore, the first precautions should be taken in the family. The children grow up by imitating their families. Therefore, the lack of physical activity in the family and unhealthy nutritional habits directly affect the children. The family should encourage the children regarding the physical activity. In addition, the families should be careful in choosing nutrients and should not store unhealthy nutrients at home (82).

It is important to establish healthy and regular nutritional habits in the family. It is necessary that habits such as sitting down to meal together, not skipping breakfast, not leaving the house without having breakfast, not skipping meals, serving meals on small plates should be established in the family (83).

2.13.3. Precautions related to the school and its immediate vicinity

Planning their nutritional habits is an important factor for children who spend most of the day at school. Children's access to free drinking water, orienting to physical activity appropriate for their age, and access to healthy nutrients in the cafeteria are effective factors to prevent children from obesity. The nutrients selling at schools should be examined and the sale of unhealthy nutrients at schools should be prevented (78). The Republic of Turkey Ministry of National Education stated that the sale of other beverages other than drinking water, buttermilk and pasteurized milk in schools was inconvenient as per the regulation put into effect in 2016-2017 period and fried foods, chips, all chocolate types, candy and confectionery, sweetened beverages and foods are classified as inconvenient for sale (84).

For the prevention of obesity and healthy development, environmental regulations of schools and kindergartens should be arranged in accordance with physical activity. The education for healthy nutrition should be included in formal education programs. School officials, especially teachers, should exhibit exemplary attitudes and behaviors on this matter. Feeding times in schools should also be used for this purpose. The distribution of healthy nutrients produced in the region to the students can also play an important role in healthy nutrition. In some countries, the problem of skipping breakfast is common, thus the breakfast service program has been started in schools (78).

2.13.4. Community based precautions

Obesity is a community health problem. Therefore, it is necessary for the government to take precautions on this matter. The government should supervise and guide the food industry. Reducing fat, sugar and salt levels in processed foods and ensuring that everyone can access healthy and nutritious foods is essential to prevent obesity. In particular, the marketing of nutrients rich in sugar, fat and salt to be consumed by children and adolescents should be restricted and information labels should be attached on the products for each age group (78).

In our country, the amendment stipulating that fruit juice (nectar), lemonade, mineral and carbonated water and soda are included in the special consumption tax was adopted on the General Assembly of Grand National Assembly of Turkey in November, 2017 and the aforementioned amendment was published in the Official Gazette on 1

January 2018. Therefore, the tax on beverages causing obesity was increased and the first steps were taken to reduce consumption of these beverages (85).



3. MATERIALS AND METHOD

3.1. Place and Time of the Research

This study was carried out in Aydın between March 2018 and June 2018 on a total of 154 students in Aydın Ekrem Çiftçi primary school. Ethics Committee decision for this study was released on 23.11.2017 and the research evaluation approval of the Ministry of national Education was released in February 2018.

3.2. Including/Excluding Criterias and Participants of the Research

The study included all first-year students in this primary school, but children without systemic consent, who were less than 66 months older than 72 months and with systemic disease were excluded.

There were 344 students enrolled in the first year. 154 of them were included in the study. Children with disease requiring dietary restriction and without a consent form were not included in the study

3.3. Data Collection and Analysis

A scholl in Aydın was selected with simple random sample. All branches affiliated to the first grade of this school was included in this study. Voluntary consent form was obtained from the parents of each student. The school was visited after obtaining the necessary permissions from the provincial ministry of education. Body weight measurements were made by a digital scale and height measurements were made by portable stadiometer. BMI was calculated by dividing the body weight value (kg) by the square of the lenght value (m²). The families of children who were found to be overweight or obese according to the BMI evaluated by the World Health Organization (WHO) percentile tables were reached and invited to school. Body weight and height measurements of parents were also made and their BMI's calculated. A data collection form about childs feeding habits was completed. Parents were given a healty nutrition education. BMI's of the childrenwas reevaluated 3 months after nutritional education.

BMI and percentile values were calculated by WHO's anthroplus programme. For the evaluation of findings, SPSS v23.0 was used. Descriptive and frequency analysis were used for describe the anthropometric measurements.

3.3.1. Survey and education

The data collection form had a total of 10 questions and a food frequency measurement table. (appendix 1). The questions in the form were related to children's food preferences, frequency of food consumption and nutritional status. this form was completed by parents. The parents were taken an education about healthy eating in childhood by the researcher.

3.3.2. Anthropometric measurements

3.3.2.1. Body mass index (BMI)

BMI of students and parents were calculated by using body weight and height of students and parents with the formula of BMI: [Weight (kg) / Height (m)²] (86). Height for age, body weight for age and BMI for age values of students were calculated.

The results were assessed according to WHO's BMI Classification Table 3.1. shows WHO's BMI classification (86).

Table 3.2. shows WHO's percentile classification (87).

Table 3.1. WHO's BMI classification (86)

BMI: Body weight (kg) / Height (m²)	
BMI values (kg / m²)	Classification
<18.5	Under weight
18.5-24.9	Normal weight
25 -29.9	Pre-obesity
30 -34.9	Obesity Class 1
35-39.9	Obesity Class 2
≥40.0	Obesity Class 3

Table 3.2. WHO's percentile classification (87)

Percentile	Classification
<5	Underweight
$5 < x < 85$	Normal weight
$85 < x < 95$	Overweight
$95 <$	Obese



4. RESULTS

This study was conducted in Aydın Ekrem Çiftçi Primary School and it covers all 1st Grades. 154 people participated in the study. 56.5% (n = 87) of the students participating in the study were boys and 43.5% (n = 67) were girls.

The average height of the students participating in the study was 119.7 (minimum 102.8, maximum 133). Their average body weight was 24.7 (minimum 16.7 maximum 44.4).

57.79% (n = 89) of the students who participated in the study were between 5-85 percentile and had normal body weight.

17.53% (n = 27) were between 85-95 percentile is overweight.

24.67% (n = 38) of the 95th percentile and above was obese.

The number of students for intervention included in the study were 65 overweight and obese students, of which 41.5% (n = 27) were overweight and 58.4% (n = 38) were obese.

27 of the overweight students 18 were male and 9 were female and 38 of the obese students 24 were male and 14 were female.

Weight loss was observed in 1 of the 7 students whose last body weight was compared. Weight gain was observed in the other 6 students.

The BMI of 5 of 7 students decreased and 2 of them increased.

The families of these students are also overweight and obese. 4 of them are overweight and 3 of them are obese.

The first measurements of the first participant are 44.4 kg and 126.5 cm. In 2. measurements, body weight and height are increased from 45.9 and 129.4. Body mass index decreased from 27.7 to 27.4. The measured body weight of the parent of this participant is 91.9 and the height is 165cm and body mass index was 33.7, first degree obese was found. participant 1 skips breakfast and lunch because he is inappetent and unwilling. According to the data collected from the family, 5 meals a day and more are fed with snacks. The foods he consumes in snacks are milk, yoghurt, ready-made juices, nuts and fruits. He buys waffles, chocolate, chips in the school canteen. Ice cream ads are the most affected. The frequency of food consumption is as follows. The most common foods are white bread types and he consumes them 4-5 times a day. milk, fruits and olive oil 2-3 times a day; other dairy products, biscuits and crackers once a day;

nutrients such as rice, bulgur, pasta, couscous 5-6 times a week; processed meats, nuts, fresh vegetables 3-4 times a week; eggs, legumes, potatoes, prepared fruit juices, freshly squeezed fruit juices, butter, sugar, honey, molasses, jam, marshmallows, chocolate, wafers, breakfast cereals, chips, pastry dessert, milk dessert, ice cream twice a week; pita, pizza and pancake with spicy meat filling consumes once a month. Red meat, chicken, fish meat, tea, coffee types, alcoholic beverages, carbonated drinks, other oils except olive oil and sunflower oil, ready-made soups and dishes hamburger and doner, kebab never consumed.

Second participant's first measurements are 37.2 kg and 128.5 cm. In second measurements, body weight increased from 38.8. Height increased from 130.5. Body mass index increased from 22.5 to 22.8. The parents of this participant is 98 kg, 167 cm. Body mass index was 35, first degree obese was found. The participant does not skip 2 meals and feeds 3 meals a day. Sometimes, between meals, milk, yogurt, nuts, wafers, chocolate, fruit is consumed. He brings food from home, but he also takes toasts, sandwiches and bagels from the school canteen. Ice cream ads are the most affected. The frequency of food consumption is as follows; hazelnut, peanut almond 4-5 times a day, milk, dried fruits 2-3 times a day; yogurt, buttermilk, kefir, eggs, citrus fruits, other fruits, white bread, olive oil, butter and honey, molasses jam, sugar once a day; fresh vegetables 5-6 times a week, red meat, green leafy vegetables, black tea, chocolate, wafers, pastry desserts 3-4 times a week, chicken, turkey legumes, potatoes, rice, bulgur, pasta, couscous, bagels, confectionery, delight 1-2 times a week, freshly squeezed fruit juices, herbal teas, biscuits, crackers, ice cream and milk desserts 1 in 15 days, fish, sausage, salami, dried vegetables, noodles, mineral water, soda, pita, pancake with spicy meat filling , pizza consumes once a month , carbonated drinks, coffee, nescafe, black tea, alcoholic beverages, other oils except olive oil, instant soups and dishes, hamburger, chips, doner, kebab never consumes.

Third participant's first measurements are 30.2 kg and 122 cm. In the second measurements, her body weight increased from 30.7 and her height was 128 cm. The body mass index decreased from 20.3 to 18.7. The parents of participant is 80 kg and 180 cm. Body mass index is 28.3 so overweight was found. The participant does not skip 3 meals and only feeds 3 meals a day. Between meals, nuts, wafers, chocolate is consumed, the most affected by ice cream advertisements. The frequency of food consumption is as follows: whole grain bread once a day, eggs, legumes, rice, bulgur, pasta, couscous 5-6 times a week; yoghurt, buttermilk, kefir, red meat, processed meat,

nuts, peanuts, almonds, citrus fruits, ready-made juices, chocolate, wafers 3-4 times a week; milk, fish, all vegetables, fresh fruits, bagels, noodles, olive oil, sunflower oil, fats, sugar, honey, molasses, jam, biscuits, crackers, pita bread, pancake with spicy meat filling, pizza, doner kebab, pastry dessert, milky desserts 1-2 times a week; it consumes chicken, turkey, dried fruits 1 in 15 days, chips once a month. Offal, beverages except fruit juices; other oils except olive oil, sunflower oil, tail oil, internal oil, breakfast cereals, instant soup and food, hamburger does not consume at all.

Forth participant's first measurements are 38,3 kg and 128,5 cm. In second measurements body weight was increased from 39.3 and height increased from 130.8 cm. The body mass index decreased from 23.3 to 23.2. This participant's parent is 72 kg and 158 cm. Body mass index was 28.8 and overweight was found. The forth participant skips lunch because of lack of appetite and unwillingness to eat. 3 meals a day is fed and sometimes consumes fruit in the intermediate meals. The most frequent toast, sandwich, bagel and ice cream in school canteen. ice cream ads are most affected. The frequency of food consumption is as follows: milk group, egg, bread group, olive oil and butter once a day, meat group, nuts, vegetables, rice, bulgur, pasta, couscous, simit, chocolate, wafer, biscuit, cracker 1-2 times a week. Pita, pizza pancake with spicy meat filling consumes 1 in 15 days, the other foods are not consumed at all stated.

Fifth participant's first measurements are 31.7 kg and 127 cm. In the second measurements, the height was 127.8 cm and the body weight was reduced to 30.6. The body mass index decreased from 19.5 to 18.7. The parent of this participant is 86 kg and 176 cm tall. Body mass index is 27.7 and is overweight. The participant 5 does not skip meals and eats 3 meals a day, and eats milk, yoghurt, wafers, chocolate and fruit between meals. He gets ayran and milk in the school canteen and is mostly affected by the ice cream advertisements. The frequency of food consumption is as follows: milk group, nuts fruits once a day; red meat, chicken, turkey, egg legumes 3-4 times a week; fish, all vegetables and dried fruits, bread group, ready and fresh fruit juices, carbonated drinks, sugary foods, biscuits, crackers, chocolate, wafers 1-2 weekly, fats, instant soup, food, pita, pizza, pancake with spicy meat filling , doner kebab hamburger, chips, pastry milk dessert and ice cream consumes 1 in 15 days. Offal, tea, alcoholic beverages and fat group does not consume at all.

The first measurements of the sixth participant are 22.8 kg and 120.3 cm. In second measurements the body weight was 28.9 kg and the height was 123.7 cm two of them have been increased. The parent of this participant is 85 kg and 180 cm, and the

body mass index of this participant is 26.2 and he is overweight. The participant 6 skips meals a day due to lack of time and eats 2 meals a day, and the food is provided in the school canteen and toast, sandwich, bagels are bought. Between meals, milk, yogurt is consumed. Most affected by the milk ads.

The frequency of food consumption of the participant cannot be given because the parent gives inconsistent information.

The first measurements of the seventh participant are 24kg and 116.5 cm. In second measurements the body weight was increased from 24.8kg and the height increased from 118.6 cm, body mass index was decreased from 17.7 to 17.6. The parent of this participant is 85 kg and 162 cm dir. Body mass index was 32.3 first degree obese was found. Participant 7 skips the lunch because of lack of appetite and unwillingness to eat. He eats 3 meals in a day and he brings food from home. He buys toast, sandwich and bagels from the school canteen and consumes fruit between meals. Ice cream ads are most affected. The frequency of this participant's food consumption is as follows: instant fruit juices, black tea, olive oil, honey, molasses pastry dessert, milky dessert, ice cream once a day, nuts, 5-6 times a week, eggs, citrus fruits 3-4 times a week; dairy products, potatoes, rice, bulgur, couscous, pasta, pretzels, confectionery, delight chocolate, wafer 1-2 times a week; red meat, vegetables, pita, pancake with spicy meat filling, pizza, chips 1 in 15 days, chicken, turkey, processed meat products, noodles are consumed once a month.

5. DISCUSSION

Growth and development are defined as a metabolic process starting from the birth and continues into adulthood with many physiological and endocrine changes. Experiencing a healthy growth and development process enables the formation of more efficient, productive and healthy individuals in adulthood and old age and increases the level of development and prosperity of societies (88).

Obesity may be summarized as the increase in fat tissue compared to body weight. Until recent years, obesity in children has not been elaborated, and the belief that “fat children are healthy children” has been widely accepted by both families and physicians. Today, it is well known that there is a close relationship between obesity and many diseases such as hypertension, cardiovascular diseases, diabetes, degenerative arthritis, thrombophlebitis, and that the life expectancy of obese people is shortened and that the onset of this condition extends to childhood in the majority of adult obesities (89).

The main responsibility for the nutrition of children belongs to the parents of the child and especially to the mothers. Educating and informing mothers about nutrition enables mothers to act with sufficient knowledge at all stages of food preparation (planning, purchasing, cooking, serving). In this way, the mother, who has the basic knowledge of healthy nutrition, can start making healthy choices for her child by starting food exchange. Moreover, healthily cooked foods can be provided to children to consume on time and sufficiently. It is thought that the implementation of nutrition programs including parents, teachers and children in educational institutions starting from preschool period, which is critical for bringing healthy eating habits to the child, will increase the healthy and conscious individuals in the society in the long term (90).

Nutrition knowledge is one of the most important factors in choosing healthy nutrition and choosing the appropriate food. Continuous nutrition education given at periodic intervals has positive results in food selection. On the other hand, 0-6 age period, which is the period in which children meet life, is also important in terms of acquiring healthy eating habits. Food selection and feeding habits are firstly modeled by parents. It was seen that healthy nutrition educations given to parents had different effects on their nutritional knowledge levels. These educations affect the food consumption of both parents and their children (90).

It is observed that the participation of families in the education process and the importance of school and family cooperation are understood in developed countries and reflected in educational policies. The legal regulations on this subject impose certain responsibilities on both the school and the educators and the families. Although the importance of the subject is understood and reflected in education policies, there are some obstacles to the participation of families in the education process. The fact that families consider unnecessary to participate in the education processes of their children (91), the lack of a role model, preferring to leave the education to school and being passive, not taking responsibility in this regard, the negative attitudes of the educators towards the families and not believing in the importance of family participation, cultural differences, families' lack of information about the educational process and their insufficiency in this regard, and lack of communication between school and family are the main obstacles (92). In addition, families' educational level, socio-economic status, their characteristics such as negative school experiences in the past and transportation obstacles affect their desire and competence to participate in the education process of their children (93). Social, cultural and economic issues affect the number of families participating in the educational process as well as the number of participation of families. Many families have limited time and opportunities due to working conditions (94).

A study was conducted with 10 teachers and 10 managers in Ankara and according to the results of the research, it is understood that teachers and managers agree that the families should participate in the education process, but most of them do not show the same sensitivity in practice. Most families seem to be reluctant and passive to participate in the educational process. Participation is often limited to activities such as family coming to school to exchange information, taking teachers' advice, and parents attending meetings when invited. Obstacles to the participation of families in the process include the negative attitudes of families and educators at first. It is understood that there are not enough studies in schools to eliminate the factors preventing family participation or to increase participation (95).

It is very important that the family reach a certain level of consciousness in ensuring family participation. Organizing informative conferences and seminars for the family and paying attention to the preparation of the activities to meet the needs of the family will increase family participation. For this, the needs of the parents should be determined by taking the opinions of the parents and the most needed issues should be

focused. In addition, through conferences to be organized, families should be provided with information on how their children will overcome the disciplinary and communication problems they face with their development and education. Because, it has been determined that the activities of providing information to the families and their knowledge about the school may positively affect the attitudes of the families against the interaction with the school. In this respect, such activities to be organized by the school administration and teachers will enable parents to develop positive attitudes towards cooperation by encouraging their visits to the school and informing them about the school and various matters. The first step in family participation is teacher-parent communication. This communication may be carried out face-to-face, by writing, telephone or small notes written by the teacher in the student's notebook to be submitted to the parent, or by sending weekly or monthly school-class newsletters to the families. Only verbal communication through students may lead to misunderstandings. On the other hand, individual interviews with parents are of particular importance for the development of students. In such interviews, parents can ask many special questions that they cannot ask in meetings and conferences and they can obtain detailed information about their children. In addition, classroom teachers should undertake counseling activities by providing information to families to improve child development and school success. Counselors and psychological counselors or advisory teachers in schools should be in contact with families and should organize informative activities on the developmental stages and characteristics of the students, the behavioral characteristics of these periods and the improvement of student success (96).

Events such as organizing social activities, television, radio programs, films, slides, videos, computers may be used in family education. Joint studies may be carried out with the participation of non-governmental organizations, the surrounding institutions and organizations. It is important for families to participate in school activities and support these activities, as well as providing a beneficial learning environment for children at home. The role of the family on this matter may be in the form of direct involvement in educational, social and cultural activities in the school, as well as by participating in the organized activities as an audience (97).

Epstein et al. conducted various interviews in the studies using behavioral treatment for the first 4 months weekly and then monthly interviews and showed its effectiveness (98).

In a study conducted by Garipoğlu M. et al. in 2009 in Turkey, family-based behavior group therapy with a total of 7 interviews at 3-week intervals for 3 months was found to be effective in the treatment of obesity (99).

Education is defined as the process of acquiring the desired behaviors in accordance with the education given on a subject in individuals rather than providing information. It is aimed to transform the information given through education, which is a dynamic process, not a static one, into a way of life by sustaining these behaviors. Studies show that adults acquire more lasting information not only by listening to an expression but also in environments where they can participate and discuss (100).

Effective and permanent nutrition education should include information about the use of nutrients in daily life rather than interesting, understandable and theoretical knowledge. Emphasizing different approaches to nutrition education that the educator will plan with awareness of the lives and habits of the individuals who will receive education, and explaining the wrong behaviors through explanation, reinforcing the correct behaviors is to make a difference in increasing the effectiveness of that education. While up-to-date information is transmitted during education, strengthening of messages with consistent and life examples is considered as one of the important motivation factors in behavior change. This educational process facilitates the overcoming of obstacles in food selection and consumption (101).

In this study that we educate families for change body weight of children; family participation was low,

It is observed that there are many different family education programs for families with different demographic characteristics in the world. Studies have revealed that families need family education on different subjects regardless of their educational level and socio-economic level. At the end of the programs conducted, it was observed that the parenting behavior of the parents changed positively. It was found that the stress levels related to parenthood decreased and self-efficacy feelings increased. In addition, the positive effects of family education programs on the communication of parents with the child and child care were identified (102).

In a study conducted by Östberg, it was tried to find out whether child-focused education reduces stress related to parenting. The study was conducted with the participation of 66 Swedish mothers together with children of the same age and sex who came to the health center for children to get help regarding their child's sleep or eating problems. Mothers have experienced too many negative experiences and problems with

child care and their stress levels are very high. “Parenting Stress Index” and “The Swedish Parenthood Stress Questionnaire” were applied to the participants divided into two groups as experimental and control groups. The employees of the program received the child’s health records after a telephone interview with the mothers and made a home visit for 1-2 hours. Questions about children’s problems and the living conditions of the family were asked. Information was received about the family’s concerns and fears. Paediatrician, dietician and nurses observed the mother-child communication and data were collected. Through regular visits, educations were given on the existing problems and mother-child communication was observed and recorded on video. At the end of the education, it was determined that the general stress score of the experimental group decreased significantly compared to the other group. In addition, it was found that the limitation of the experimental group was lower than the control group due to maternal responsibilities and they were more satisfied with their relationship with their spouses. Eating problems related to children were also decreased (103).

In a study conducted in our country, 25 students and 20 parents participated in the study. Among the parents, upper and lower BMI values of the mothers were 18.3-28.0 and the lower and upper BMI values of the fathers were 20.1-29.7. According to the demographic characteristics of the 25 children participated in the study, 10 (40.0%) of these children were girl and 15 (60.0%) were boy. The mean body weight of the children in the first education was 19.3 ± 4.6 kg and the average height was 106.3 ± 10.2 cm. The average body mass index calculated from the children’s body weight and height taken in the first education was calculated as 16.9 ± 1.9 . When the effect of parental nutrition education on the anthropometric measurements of the children was evaluated, the mean value of the height of the children was 110.0 cm after the first education, 111.0 cm after the second education and 111.0 cm after the third education. The change in height of the children was found to be statistically significant in three educational periods. The mean value of the children’s body weights was 18.0 kg after the first education, 18.0 kg after the second education and 18.0 kg after the third education. The body weight changes of the children were not found to be statistically significant in the three educational periods. The mean value of the children’s BMI was calculated as 16.7 after the first education, 16.9 after the second education and 16.6 after the third education. The change in BMI of children was not found to be statistically significant in three educational periods (90).

Another study was conducted with 74 children in a public school. In this study, the students were divided into 3 groups and the first group's families were given nutritional education three times a week for 10 weeks and after each lesson, the nutrition education documents were sent to the family. The second group received only nutritional education at school. No intervention was made to the other group (3. group). 74 children (36 boys [48.6%] and 38 girls [51.4%]) participated in this study. Anthropometric measurements of children at the beginning and post-intervention, mean body weight and height increased after intervention in the family participation group. The z-scores for body weight for age and height for age were significantly reduced, and only the height was significantly increased in the other 2 groups. After the intervention in all groups, body weight and frequency of children with normal body weight increased by age. When the height for age was evaluated in first group the frequency of short and tall children increased and the frequency of children with normal height in the second group decreased and the frequency of tall children increased. However, the frequency of normal and tall children increased in third group and the frequency of very tall children decreased. When the BMI regarding age before the intervention is evaluated, while the frequency of overweight and obese children was 29.2% in the first group, 43.7% in the third group and 35.2% in third group, the frequencies in first group and second group after the intervention decreased and the frequencies in third group did not change. It was determined that the decrease in frequency in second group is higher than first group. According to the results, the intervention caused more changes in the first group and lower obesity prevalence ($p < 0.05$) in the first group and second group, the availability of the food, the favorable changes in nutrient presentation and consumption. The results of the study show that family participation in preschool nutrition education program may increase the effectiveness of nutrition education (104).

In a pilot study on the importance of family participation in child education, Gürşimşek et al. examined the importance of family participation in the development of children at five to six years of age in various socio-economic regions and in child education. 20 children at five to six years of age and their mothers were participated in the study. In the study, while the children were getting pre-school education, the mothers participated in the meetings held three days a week and were informed about the matters related to child development and education in a 4-week period. During the meetings, the matters that were studied with children in the classroom were explained in detail to the mothers and the mothers were given information on how to reinforce these

matters in the home environment. Active participation of mothers in educational activities was ensured. In the study, the three-part form was applied as pre-test and post-test. As a result of the study, it was observed that there was a positive behavior change in the mother and children and that the children showed positive changes after studying in the fields of self-care, cleaning, nutrition and social skills, and that the sensitivity level of the family regarding the education and development of the child accelerated the development in various fields and has a positive effect on the motivation, social skills, development and primary school preparation process of preschool children (105).

In another study, 91.3% (1811 children) of all invited 8/9-year-old Tuscan children were present on the day of the study. After data cleaning, 60 more children were discarded (34 out of age range or with missing age); the remaining 88.3% (1,751 children: 922 males and 855 females) out of all enrolled children were analysed. The prevalence of overweight and obesity in children is 21.8% and 7.9% respectively. It is evident that there are more overweight (44.0%) and obese (8.3%) fathers compared to mothers (17.3% and 4.1%), in both cases, that the prevalence of obese children increases with increasing parents' BMI classes. Furthermore, the prevalence of obese children of obese mothers (30.3%) is higher than that observed in children of obese fathers (23.9%), but the difference is not statistically significant. The weighted prevalence of obese children of mothers with an excess of body weight (overweight plus obese) is 16.7%, while the corresponding value of children from fathers with an excess of body weight is 10.8%; the difference results statistically significant (106).

In their study, Davison et al. focused specifically on family participation and developed a community-based research. A family-centered childhood obesity prevention program was designed in this study. When the obesity, light physical activity, daily TV watching and diet (intake of energy and macronutrients) of children before and after the intervention were compared, significant improvements were observed after the intervention. After the program, parents were more confident in providing healthy food to their children. Research has shown that the parent's support for healthy activities, the parent's effectiveness in preparing healthy food, and the frequency of parent's supply of vegetables and fruits affect children's daily energy intake (107).

When the researches conducted are evaluated it is observed that when the level of knowledge of the families increases, their positive effects on the healthy nutrition of their children increase (108). For this reason, it is very important for parents to be

knowledgeable and conscious about healthy and balanced nutrition, to offer correct and healthy foods to their children, and to help children gain healthily eating habits. Parents need to have the true and enough information about healthy eating in order to gain the healthily feeding habits for their children.

Adults who will serve as a role model for children will not be their parents only. The teacher who is responsible for children in educational institutions will have the most important influence on the child. The importance of desired eating habits should be given importance in educational institutions as well as at home, and consistency should be ensured between home and school, and between teacher and parent. From this point of view, it is important that teachers, who have a very important place in children's life, have the correct information about healthily eating. Rossiter et al. mentioned this matter in their study and emphasized that preschool teachers should have good nutrition habits and be well-equipped as individuals (109).

In a study conducted in Artvin, 257 children aged between 36-72 months participated in the study. 47.50% of the children were girls and their mean age was 56.88 ± 1.04 months. The mean height of the children was 107.48 ± 0.74 cm, the mean body weight was 18.67 ± 0.35 kg and the mean body mass index was 16.11 ± 0.20 kg/m². 82,90% of the children were found to be normal weight, 13.20% were overweight and 3.50% were obese (110).

In another study, eating education was given to 70 students in a college in 2017-2018. Two groups of students were formed and one group was educated by dietitians and one group was educated by 4 teachers, two were educated by dietitians. In both groups, height and body weight increased significantly. Pre-education and post-education BMI also showed a significant increase (88).

In another study, a total of 299 children participated in the study. 142 boys (47.5%) and 157 girls (52.5%) participated in the study. In the evaluation conducted, the rate of overweight children was 26.7% (n = 80), the rate of obesity children was 8.4% (n = 25) and total 35.1% (n = 105) of children were found to be obese at various levels. Among the 299 students, obesity was detected in 105 students (35.1%), 47 of whom were girls (15.7%) and 58 of them were boys (19.4%) (19).

According to the study conducted in three primary schools in 3 different regions in Turkey, 112 students in one village school in Şile District, İstanbul Province, and 537 students in 6 village schools in Karakoyunlu District, Iğdır Province, and 485 students in a primary school in Göcek District, Muğla Province and thus a total of 1134 students,

who are 581 girls and 553 boys aged between 5-15 in 3 different geographical regions, were examined during the health screening. In the study, a total of 116 children (63 girls and 53 boys) (10.2%) were found to be below 3 percent according to their age. The frequency of short children was 11.6% in Şile-Istanbul, 16.2% in Karakoyunlu-Iğdır and 3.3% in Göcek-Muğla. The frequency of short children in Iğdır region was found to be statistically significantly higher than the children in the other two regions. 123 (10.8%) of the children in all regions were overweight and 60 (5.3%) were obese. The prevalence of overweight by region is 16.1% in Şile-Istanbul, 3.7% in Karakoyunlu-Iğdır, 17.5% in Göcek-Muğla, and the prevalence of obesity was found 5.4%, 0.9%, and 10.1% respectively (111).

A study has been carried out with 2009 students from 24 schools in İzmir city center and central districts. In the study, the obesity rate was found to be 8.4% in girls and 13.1% in boys, and the overweight rate was 12.1% in girls and 15.1% in boys. Height, body weight and BMI measurements of boys were statistically higher than girls of the same age. In addition, the prevalence of obesity and overweight was significantly higher in boys than in girls. The prevalence of obesity and overweight in girls increases and decreases until 11 years of age and decreases in boys from 11 years of age and increases again after 15 years of age. Obesity rate was significantly higher in girls between 9-13 years and in boys between 9-11 years compared to other age groups (112).

In our study, 43 percent of the students are overweight and obese. When we look at the measurement of families in obesity and body weight gain is observed in families. It was observed that 7 people from the families who wanted to be included in the study participated in the study to solve their obesity problems. During the education, the families wanted to get information about their body weight problems rather than the questions about the children. Families are not willing to be educated about their children. We can understand this from the participation rate. Only 1 of the children we intervened in 3-month change observed body weight loss and weight gain was observed in other students. This has led to the conclusion that education does not benefit families

In this study, which aimed the participation of families in child nutrition education and the benefit of these educations, different results have emerged. First of all, families did not participate in this study. The reason for this is that might be childhood obesity is not considered very important by families. We can easily make this inference from participating families questioning their own nutrition problems rather

than their children. In the first part of the study, the lack of feedback from voluntary consent forms distributed for the measurements of the children may be seen as the teachers did not inform their families. We can understand this because some students from some branches do not bring the consent form with them. Finally, the failure of weight loss in overweight and obese students after the education may be related to the education being performed only once. Families may not have taken this education seriously and may have continued their normal nutrition habits after the education.



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7. APPENDICES

7.1. The survey

ANKET FORMU

(BU FORMU ÖĞRENCİLERİN BESLENME ALIŞKANLIKLARINI BELİRMEK AMACIYLA VELİLER DOLDURACAKTIR.)

BESLENME ALIŞKANLIKLAR FORMU

A) GENEL BİLGİLER

1.ÇOCUĞUNUZ GÜNDE KAÇ ÖĞÜN BESLENİR?

- a) 2 öğün
- b) 3 öğün
- c) 4 öğün
- d) 5 öğün ve fazlası

2.ÇOCUĞUNUZ GENELLİKLE ÖĞÜN ATLAR MI?

- a) Hayır
- b) Evet
- c) Bazen

3.ATLIYORSA HANGİ ÖĞÜN?

- a) Sabah
- b) Öğlen
- c) Kahvaltı ve öğlen
- d) Akşam

4. ÇOCUĞUNUZ NEDEN ÖĞÜN ATLIYOR?

- a) Zaman yetersizliği
- b) Canı istemiyor, iştahsız
- c) Kilo almaktan korkuyor
- d) Ekonomik durumu yetersiz
- e) Diğer nedenler

5.ÇOCUĞUNUZ OKULDAKİ BESİNİ NERDEN TEMİN EDİYOR?

- a) Kantin
- b) Okul yemekhanesi
- c) Evden getiriyor
- d) Diğer

6.ÇOCUĞUNUZ ÖĞÜN ARALARINDA BESİN TÜKETİYOR MU?

- a) Evet
- b) Hayır
- c) Bazen

7.Çocuğunuz açıkta satın alınan yiyecekleri satın alıyor mu?

- a) Evet
- b) Hayır
- c) Bazen

8. ÇOCUĞUNUZUN ÖĞÜN ARALARINDA TÜKETTİKLERİ BESİNLER NELERDİR?

- a) Süt, yoğurt
- b) Kolalı içecekler
- c) Hazır meyve suları
- d) Şalgam suyu
- e) Kuruyemişler
- f) Sandviç, simit
- g) Gofret, çikolata
- h) Meyve

9.Çocuğunuz okul kantininden en çok aldığı besinler

- a) Ayran, süt
- b) Tost, sandviç simit
- c) Kolalı içecekler
- d) Hazır meyve suları
- e) Gofret, çikolata,cips

10.Çocuğunuz TV, radyo ve gazetelerdeki yiyecek, içecek reklamlarının hangilerinden daha çok etkileniyor?

- a) Çikolata,gofret
- b) Şekerleme
- c) Bisküvi, kraker
- d) Cips
- e) Meyve suları
- f) Süt
- g) Dondurma
- h) Puding
- i) Sakız
- j) Kolalı içecek

11)ÇOCUĞUNUZ AŞAĞIDAKİ YIYECEKLERİ HANGİ SIKLIKTA TÜKETİR?

	Günde 4-5 ve fazlası	günde 2-3	Günde 1	Haftada 5-6	Haftada 3-4	Haftada 1-2	15günde 1	Ayda 1	hiç	Toplam miktar	Günlük miktar(g)
Süt ve süt ürünleri											
Süt											
Yoğurt,ayran,kefir											
Peynir											
Et -yumurta kurubaklagil											
Kırmızı et											
Tavuk,hindi											
Balık											
Sakatatlar											
İşlenmiş et ürünleri(sucuk,salam)											
Yumurta											
Kurubaklagil											
Fındık,fıstık ,badem											
Sebze ve meyveler											
Yeşil yapraklı taze sebzeler											
Patates											
Diğer taze sebzeler											
Kurutulmuş sebzeler											
Turunçgiller											
Diğer taze meyveler											
Kurutulmuş meyveler											
Ekmek -tahıllar											
Beyaz ekmek türleri											
Tam tahıllı ekmekler											
Pirinç,bulgur,makarna ,kuskus											
Erişte											
Simit											
İçecekler											
Hazır meyve suları											
Taze sıkılmış meyve suları											
Gazlı içecekler											
Maden suyu,soda											
Kahve,neskafe											
Siyah çay											
Yeşilçay											
Bitki çayları											
Alkollü içecekler											
Yağ,şeker,tatlı											

Zeytinyađı													
Fındık yađı													
Ayçiçek yađı													
Mısırözü yađı													
Soya yađı													
Kanola yađı													
Sert margarin													
Yumuşak margarin													
Tereyađı													
Kuyruk yađı,iç yađı													
Şeker,bal,reçel,pekmez													
Şekerleme,lokum													
Çikolata, gofret													
Bisküvi,kraker													
Kahvaltılık tahıllar													
Hazır çorbalar													
Hazır yemekler													
Pide,lahmacun,pizza vb													
Döner,kebap vb.													
Hamburger													
Cips													
Hamur işi tatlı													
Sütlü tatlı, dondurma													

7.2. Ethics Committee Approval



T.C. YEDİTEPE ÜNİVERSİTESİ

Sayı : 37068608-6100-15-1374
Konu: Klinik Araştırmalar
Etik kurul Başvurusu hk.

23/11/2017

İlgili Makama (Fatma Çetinel)

Yeditepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Bölümü Yrd. Doç. Dr. Binnur Okan Bakır'ın sorumlu olduğu "**Bir İlköğretim Okuluna Kayıtlı 1. Sınıf Öğrencilerinde Obezitenin Saptanması ve Veliye Verilen Eğitimin 3 Aylık Ağırlık Değişimine Etkisi**" isimli araştırma projesine ait Klinik Araştırmalar Etik Kurulu (KAEK) Başvuru Dosyası (1347 kayıt Numaralı KAEK Başvuru Dosyası), Yeditepe Üniversitesi Klinik Araştırmalar Etik Kurulu tarafından **22.11.2017** tarihli toplantıda incelenmiştir.

Kurul tarafından yapılan inceleme sonucu, yukarıdaki isimi belirtilen çalışmanın yapılmasının etik ve bilimsel açıdan uygun olduğuna karar verilmiştir (**KAEK Karar No: 744**).

Prof. Dr. Turgay ÇELİK

Yeditepe Üniversitesi
Klinik Araştırmalar Etik Kurulu Başkanı

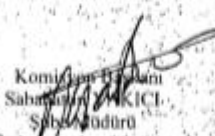
7.3. Permission From The National Education Directorate For Thesis Research

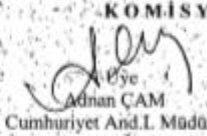
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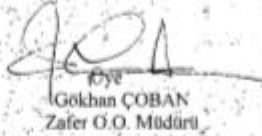
T.C.
MILLÎ EĞİTİM BAKANLIĞI
Eğitimi Araştırma ve Geliştirme Dairesi Başkanlığı
ARAŞTIRMA DEĞERLENDİRME FORMU

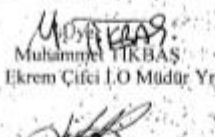
ARAŞTIRMA SAHİBİNİN	
Adı Soyadı:	Fatma ÇETİNEL
Kurumu / Üniversitesi:	T.C. YEDİTEPE ÜNİVERSİTESİ
Araştırma yapılacak iller:	AYDIN
Araştırma yapılacak eğitim kurumu ve kademesi:	İlköğretim Okuluna Kayıtlı 1. Sınıf Öğrencileri.
Araştırmanın konusu:	İlköğretim Okuluna Kayıtlı 1. Sınıf Öğrencilerinde Obezitenin Saptanması ve Veliye Verilen Eğitimin Üç Aylık Ağırlık Değişimine Etkisi.
Üniversite / Kurum onayı:	Var.
Araştırma/proje/ödev/tez önerisi:	Tez.
Veri toplama araçları:	Anket Formu.
KOMİSYON GÖRÜŞÜ	
Millî Eğitim Bakanlığı'nın 2017/25 sayılı genelgesi doğrultusunda incelenmiş, inceleme sonucunda; 2017-2018 Eğitim-Öğretim yılıni aşmamak şartı ile, Aydın Efeler Ekrem Çifci İlkokulu 1. Sınıf Öğrencileri ve velilerine okul müdürünün uygun gördüğü zaman ve sınıflarda yapılması uygun görülmüştür.	
Komisyon kararı:	Oybirliği ile alınmıştır.
Muhalef üyenin Adı ve Soyadı:	

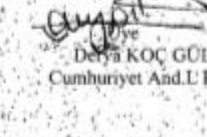
KOMİSYON



Komisyon Başkanı
Saban KILIÇ
Şube Müdürü

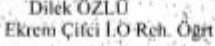

Üye
Adnan ÇAM
Cumhuriyet And.L. Müdürü


Üye
Gökhan ÇOBAN
Zafer O.O. Müdürü


Üye
Muhammet TIKBAŞ
Ekrem Çifci İ.O Müdür Yrd.


Üye
Derya KOÇ GÜL
Cumhuriyet And.L. Reh. Öğrt.


Üye
Sevgi AKKURT TÜRKAY
Zafer O.O. Reh. Öğrt.


Üye
Dilek ÖZLÜ
Ekrem Çifci İ.O Reh. Öğrt.

7.4. Informed Consent

BİLGİLENDİRİLMİŞ GÖNÜLLÜ OLUR FORMU

Lütfen dikkatlice okuyunuz!

Değerli katılımcı veli;

Sağlıksız beslenme alışkanlıkları ve bunun sonucu ortaya çıkan obezite çocukluk çağının en önemli sorunlarından biridir. Obezite ilerleyen yaşlarda da birçok soruna yol açar.

Çocukluk çağı obezitesinde ailenin rolü çok önemlidir. Bu nedenle bu çalışmada öğrencilerin obezite sıklığını ve aileye verilen eğitimin ağırlık değişimine etkisini ölçeceğiz. Bunun için bir anket düzenledik ve buna ek olarak öğrencilerin boy ve kilolarını ölçeceğiz.

Bize vereceğiniz bilgiler çok değerli olup başka kimseyle paylaşılmayacak ve bilimsel amaç dışında hiçbir yerde kullanılmayacaktır.

Bu çalışmaya katılıp katılmamakta serbestsiniz. Çalışmaya katılım tamamen gönüllülük esasına dayalıdır. Eğer bu çalışmaya katılmayı kabul ediyorsanız lütfen bu formu imzalayınız.

Sorumlu araştırmacı

Dyt. Fatma Çetinel

Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü

Beslenme ve Diyetetik

05057911941

Velinin adı soyadı

İmza

7.5. Cirruculum Vitae

Kişisel Bilgiler

Adı	FATMA	Soyadı	ÇETİNEL AVLAYICI
Doğum Yeri	SÖKE	Doğum Tarihi	08.02.1992
Uyruğu	TC	TC Kimlik No	26848228482
E-mail	fatoscetinel@hotmail.com	Tel	05057911941

Öğrenim Durumu

Derece	Alan	Mezun Olduğu Kurumun Adı	Mezuniyet Yılı
Doktora	-	-	-
Yüksek Lisans	Beslenme ve Diyetetik	Yeditepe Üniversitesi	2019
Lisans	Beslenme ve Diyetetik	Yeditepe Üniversitesi	2015
Lise	-	Izmir Kız Lisesi	2010

Bildiği Yabancı Dilleri	Seviye
İngilizce	Çok iyi

İş Deneyimi (Sondan geçmişe doğru sıralayın)

Görevi	Kurum	Süre (Yıl - Yıl)
Diyetisyen	Dyt. Fatoş Çetinel Beslenme Danışmanlığı Merkezi	2016-halen

Bilgisayar Bilgisi

Program	Kullanma becerisi
Microsoft Office Word, Excell, Powerpoint Outlook	İyi
Bebis	Orta