

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

**DETERMINING COMPLIANCE WITH THE
MEDITERRANEAN DIET IN ADOLESCENTS AGED
14-18 AND EVALUATING ITS RELATIONSHIP WITH
OBESITY**

MASTER THESIS

SEREN PEKER

İstanbul-2023

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

**DETERMINING COMPLIANCE WITH THE
MEDITERRANEAN DIET IN ADOLESCENTS AGED
14-18 AND EVALUATING ITS RELATIONSHIP WITH
OBESITY**

MASTER THESIS

SEREN PEKER

SUPERVISOR

Asst.Prof.Dr. İrem Kaya Cebioğlu

İstanbul-2023

THESIS APPROVAL FORM

Institution : Yeditepe University Institute of Health Sciences

Programme : Nutrition and Dietetics

Thesis Title : Determining Compliance with the Mediterranean Diet in Adolescents
Aged 14-18 And Evaluating Its Relationship with Obesity

Owner of Thesis : SEREN PEKER

Exam date : 17.04.2023

This study was accepted as a Master's Thesis in terms of scope and quality by our jury.

	Title, Name-Surname (Institution)
Chair of the Jury:	Asst.Prof.Dr. Melike Şeyma Deniz(Fenerbahçe University, Faculty of Health Sciences Department Nutrition and Dietetics)
Supervisor:	Asst.Prof.Dr. İrem Kaya Cebioğlu (Yeditepe University, Faculty of Health Sciences Department Nutrition and Dietetics)
Member:	Asst.Prof.Dr.Gözde Dumlu Bilgin(Yeditepe University, Faculty of Health Sciences Department Nutrition and Dietetics)

APPROVAL

This thesis was approved by the above jury in accordance with the relevant articles of the Yeditepe University Graduate Education and Examination Regulations and it was approved by the Graduate School Administrative Board/...../..... It was approved by the decision dated .. and numbered

Prof. Dr. Bayram

YILMAZ Director of

Institute of HealthScience

DECLARATION

I have stated that this thesis is my own work, that I have not had any unethical behavior at any stage from its planning to writing, that I have obtained all the information in the thesis within academic and ethical rules, that I have cited all the information and comments that were not obtained through the thesis study, and that I have included these sources in the list of sources, during the thesis study and writing, and I declare that I have not acted in violation of copyrights.



Date

Signature

Seren Peker

ACKNOWLEDGEMENTS

First of all, I would like to thank my thesis advisor, Asst. Prof. Dr. İrem Kaya Cebioğlu, for her support and information. I would like to thank the guidance teachers in high schools in my survey collection process. I would like to thank the high school principal and vice principals for allowing me to administer the questionnaire to students.



TABLE OF CONTENTS

THESIS APPROVAL FORM	ii
DECLARATION	iii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES	vii
LIST OF FIGURES	ix
LIST OF SYMBOLS AND ABBREVIATIONS	x
ABSTRACT.....	xii
ABSTRACT (TURKISH).....	xiii
2. INTRODUCTION AND PURPOSE	1
3. GENERAL INFORMATION.....	3
2.1. Adolescent Period	3
2.2. Physiological Changes During Adolescents	3
2.3. Nutrition in Adolescence.....	5
2.3.1.Nutritional Requirements During Adolescence.....	6
2.3.2. Malnutrition, Eating Disorders and in Adolescence.....	8
2.3.3. Vitamin and Mineral Deficiencies in Adolescence	9
2.3.4. Eating Disorders in Adolescence.....	10
2.3.5. Obesity in Adolescence	11
2.4.Definition of obesity	11
2.4.1. Prevalence of Obesity.....	12
2.4.2. Evaluation of Obesity and Anthropometric Measurements in the Puberty Period.....	13
2.4.3. Treatment and Management of Obesity	16
2.4.4. Prevention and Treatment of Childhood Obesity and Adolescent Obesity..	16

2.5. Mediterranean Diet Definition and Updated Mediterranean Diet Pyramid	19
2.5.1. Food Components of the Mediterranean Diet	22
2.6. The Effect of the Mediterranean Diet on Diseases	28
2.6.1. MED and Obesity	28
2.6.2. MED and Diabetes Mellitus	30
2.6.3. Association between MED and Cardiovascular Disease.....	31
2.6.4. Mediterranean Diet and Cancer	32
2.6.5. Mediterranean Diet and Intestinal Diseases	36
2.7. Compliance with the Mediterranean Diet in Children and Adolescents.....	37
4. METHODS	39
3.1. Time, Universe and Place of Research	39
3.2. Inclusion and Exclusion Criterion of The Research	39
3.4. Data Collection.....	40
3.4.1. Mediterranean Diet Quality - KIDMED.....	41
3.4.2. Nutritional Habits and Food Consumption Record	41
3.5. Evaluation of Anthropometric Measurements of Adolescents	42
3.5.1. Body mass index (BMI), BMI Z-Score, and Percentile	42
3.6. Statistical Evaluation of Data.....	43
5. RESULT	44
6. DISCUSSION	65
CONCLUSION.....	69
7. REFERENCES	71
7. APPENDICES	84

LIST OF TABLES

Table 2.1 Dietary reference intakes (DRIs) and adequate intakes (AIs) for adolescents (14-18 years) in the United States.....	7
Table 2.2 Obesity among adults(15 years and over), 2015 or nearest year.....	12
Table 2.3 Comparison of the some nutrients in the Mediterranean diet with the daily recommended nutrient intakes	22
Table 2.4 Calcium, magnesium, sodium, and potassium content of some nuts, mg/100 g edible portion	26
Table 2.5 Summary table of the relationship between foods and pancreatic cancer risk	35
Table 4.1 Distribution of Descriptive Characteristics	44
Table 4.2 Distribution of Anthropometric Measurements.....	44
Table 4.3 Distributions of Eating Habits	45
Table 4.4 Distribution of Consumption Frequencies of Dairy Group Foods	46
Table 4.5 Distribution of Consumption Frequencies of Meat Group Products	50
Table 4.6 Distribution of Consumption Frequencies of Vegetables and Fruits.....	50
Table 4.7 Distribution of Consumption Frequencies of Cereal Group Products.....	50
Table 4.8 Distribution of Consumption Frequencies of Fats.....	52
Table 4.9 Distribution of Consumption Frequencies of Sugary foods	52
Table 4.10 Distribution of Consumption Frequencies of Drinks.....	54
Table 4.11. Mediterranean Diet Quality Index (KIDMED)	55
Table 4.12. Distribution of KIDMED Levels	57
Table 4.13. Evaluation of KIDMED Levels by Demographic Characteristics	57
Table 4.14. Evaluation of KIDMED Levels According to Anthropometric Measurements	57
Table 4.15. Evaluation of KIDMED Levels According to Eating Habits	59
Table 4.16. Evaluation of Eating Habits by BMI Levels.....	60
Table 4.17. Evaluation of Anthropometric Measurements by Gender	62

Table 4.18.The relationship of students' KIDMED scores with anthropometric measurements.....	62
Table 4.19. Average KIDMED scores and meal habits of students according to Z-score BMI-for-age classification.....	64
Table 4.20. Mean Z-score BMI-for-age, Percentile BKI-for-age and KIDMED scores according to where students eat	65



LIST OF FIGURES

Figure 2.1 2007 WHO References - Girls: 5 to 19 years (z-scores) - with labels	14
Figure 2.2 2007 WHO References-Boys: 5 to 19 years (z-scores) - with labels.....	14
Figure 2.3 2007 WHO Reference-Girls: 5 to 19 years (percentiles)	15
Figure 2.4 2007 WHO Reference-Boys: 5 to 19 years (percentiles)	15
Figure 2.5 Assessment diagram for childhood obesity in the UK	18
Figure 2.6 Updated Pyramid Image for Sustainable Mediterranean Diet.....	21
Figure 2.7 The effect of the MedDiet on the immune system and related disorders.....	24
Figure 2.8 Comparison of nutritional components of MED and Western diets & their effects on health.	28
Figure 2.9 Diagram describing the mechanism between Mediterranean diet components and their beneficial effects	32
Figure 2.10 Age-adjusted incidence rates map of worldwide breast cancer incidence in 2018.	33

LIST OF SYMBOLS AND ABBREVIATIONS

<i>AD</i>	<i>Alzheimer's Disease</i>
<i>ADHD</i>	Attention-Deficit/Hyperactivity Disorder
<i>AN</i>	Anorexia Nervosa
<i>BMD</i>	Bone Mineral Density
<i>BMI</i>	Body Mass Index
<i>BN</i>	Bulimia Nervosa
<i>CKD</i>	Chronic Kidney Disease
<i>COCO</i>	Childhood Obesity Care
<i>DASH</i>	Dietary Approach to Stop Hypertension
<i>DRI</i> s	Dietary Reference Intakes
<i>FAO</i>	United Nations Food And Agriculture Organization
<i>FDA</i>	Federal Drug Administration
<i>HNC</i>	Head And Neck Cancer
<i>KIDMED</i>	Mediterranean Diet Quality Index
<i>LEAF</i>	Lifestyles, Eating And Activity For Families
<i>MCI</i>	Mild Cognitive Impairment
<i>MED</i>	Mediterranean Diet
<i>MUFA</i>	Monounsaturated Fatty Acid
<i>PC</i>	Prostate Cancer



ABSTRACT

Peker, S. (2023). Determining compliance with the Mediterranean diet in adolescents aged 14-18 and evaluating its relationship with obesity. Yeditepe University, Institute of Health Science, Department of Nutrition and Dietetics, Master's Thesis, Istanbul.

This study was carried out to determine the adherence to the Mediterranean diet in adolescents aged 14-18 years and to evaluate the relationship between obesity and obesity. For this purpose, 380 adolescents between the ages of 14 and 18 who continue their high school education in Ataşehir province of Istanbul were included in the study. Questionnaires were administered face-to-face and online throughout the research. Questionnaire forms consist of general questions about nutrition, anthropometric information, food consumption frequency questionnaire and a 16-question Mediterranean Diet compliance questionnaire. When the data obtained were analyzed, it was determined that 50.5% of the participants were girls and 49.5% were boys. The mean age of the adolescents in this study was 15.87 ± 1.00 . The average height of the adolescents participating in the study was 170.73 ± 8.58 cm, their average weight was 62.34 ± 13.32 , and their body mass index was 21.27 ± 3.47 kg/m². While 60.5% (n=230) of the adolescents stated that they did sports, 39.5% (n=150) stated that they did not do sports. Of the adolescents, 2.6% (n=10) were underweight, 85.3% (n=324) had normal weight, 7.9% (n=30) were overweight, and 4.2% (n=16) was found to be obese. It was observed that 15.5% (n=59) of the adolescents had good adherence to the Mediterranean diet, 55% (n=209) had average adherence, and 29.5% (n=112) had poor adherence.

As a result, the adherence of the adolescents participating in the study to the Mediterranean diet was determined as mostly moderate and poor level. The prevalence of obesity in adolescents was found to be 4.2%.

Keywords: Mediterranean Diet, Adolescent, Obesity, KIDMED

ABSTRACT (TURKISH)

Peker, S. (2023). 14-18 yaş arası adölesanlarda Akdeniz Diyetine uyumun saptanması ve obezite ile arasındaki ilişkinin değerlendirilmesi. Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Anabilim Dalı, Yüksek Lisans Tezi, İstanbul.

Bu araştırma, 14-18 yaş arası adölesanlarda akdeniz diyetine uyumu belirleme ve obezite ile arasındaki ilişkiyi değerlendirme amacıyla yapıldı. Bu amaç doğrultusunda, İstanbul ilinin Ataşehir ilinde lise eğitimine devam eden 14- 18 yaş arası 380 adölesan çalışmaya dahil edildi. Araştırma boyunca anket soruları yüzyüze ve online olarak uygulandı. Anket formları, beslenme ile ilgili genel sorular, antropometrik bilgiler, besin tüketim sıklığı anketi ve 16 soruluk Akdeniz Diyetine uyum anketinden oluşmaktadır. Elde edilen verilerin analiz edildiğinde, katılımcıların %50,5' i kız ve %49,5' i erkek olarak saptandı. Bu çalışmadaki adölesanların yaşları ortalama $15.87 \pm 1.00'$ dir. Araştırmaya katılan adölesanların ortalama boyları $170,73 \pm 8,58$ cm, ortalama kiloları $62,34 \pm 13,32$ ve vücut kitle indeksleri ortalama $21,27 \pm 3,47$ kg/m² dir. Adölesanların %60,5' i (n=230) spor yaptığını belirtirken, %39,5'i (n=150) spor yapmadığını belirtmiştir. Adölesanların %2,6' sının (n=10) zayıf, %85,3' ünün (n=324) normal kilolu, %7,9' unun (n=30) fazla kilolu ve %4,2' sinin (n=16) obez olduğu tespit edildi. Adölesanların %15,5' inin (n=59) Akdeniz diyetine iyi uyum gösterdiği, %55' inin (n=209) ortalama uyum gösterdiği ve %29,5' inin (n=112) düşük uyum gösterdiği gözlemlendi. Sonuç olarak, çalışmaya katılan adölesanların Akdeniz diyetine uyumu çoğunlukla orta seviye ve düşük seviye olarak belirlendi. Adölesanların obezite prevalansı % 4.2 olarak bulundu.

Anahtar Kelimeler: Akdeniz Diyeti, Adölesan, Obezite, KIDMED

1. INTRODUCTION AND PURPOSE

The global population is constantly increasing. It is estimated that the population of 7.7 billion in 2019 may increase to around 8.5 billion by 2030 and 9.7 billion by 2050. The healthy diet of the growing global population will be a concern for governments in the future. Adequate nutrition is not just a problem of survival; it is related to the environment and environmental balance. Although the Mediterranean diet is healthy, it is sustainable with environmental, economic, and sociocultural benefits. For these reasons, it has come to the fore in recent years. As a traditional dietary pattern, the Mediterranean diet is rich in plant-based foods (grains, legumes, nuts, fruits, vegetables, and herbs). Red meat and processed meat content are low. Fish, seafood, eggs, white meat, and dairy products are moderately consumed. However, it includes moderate alcohol intake. The consumption of wine is mainly recommended. The main source of oil is olive oil.¹ The Mediterranean Diet (MED) has proven to be the most effective in preventing obesity-related diseases compared to other dietary patterns. The MED has been found to be associated with lower cardiovascular diseases, obesity, and diabetes in adults. In addition, its association with lower waist circumference at preschool age was determined². Research in recent years conducted research on the MED model and other healthy diet models³.

Obesity is defined as excessive body fat above normal values. Approximately 7% of the world's population (approximately 300 million people) is obese. The obesity rate in children is also increasing, and the factors that cause obesity are genetic, environmental, and cultural factors. Having obese individuals in the family increases the danger of obesity in children. It is known that sedentary life, an unhealthy diet, and fast food consumption cause obesity in children. Experts say that interventions to prevent obesity should start early in life. The rate of childhood obesity in breastfed babies is low, and therefore mothers are recommended to breastfeed for at least 6 months. Nutrition is very important in preventing obesity in childhood and adolescence⁴.

Adolescence is a period in which growth and development continue, and therefore, it is very important for the individual to eat healthily and have the right eating habits in adolescence period. Having the right eating habits for children and adolescents is one of the important elements of a healthy society, and for this reason, it is important to determine the nutritional habits and nutritional status of individuals. Nutrition plays an

important role in adolescent health. Sustainable healthy nutrition and healthy nutrition practices in adolescence have a great impact on health status in adulthood. In addition, the relationship between nutrition in this period and obesity, which is the biggest problem of our age, is very high. Overweight and obesity have increased rapidly over the years⁵. The global strategy also aims to make improvements in health between 2016 and 2030⁶.

The objective of this research is to find the nutritional condition of adolescents between the ages of 14-18 and their compliance with the MED with questionnaires and the KIDMED and to evaluate the correlation between obesity and adherence to the MED in adolescents according to the data obtained. Few studies have examined adherence to the MED during adolescence. It will provide new information on this subject by investigating the relationship between obesity in adolescents and adherence to MED. In addition, determining the obesity prevalence among adolescents aged 14-18 with the data obtained from the study; in the future, it will help to make the necessary interventions to prevent obesity in the early period.

2. GENERAL INFORMATION

2.1. Adolescent Period

The period of adolescence is known as the change period from childhood to maturity. During the adolescent period, the rate of growth and development increases⁷. The World Health Organization (WHO) establishes adolescence as the life stage between childhood and adulthood, between the ages of 10 and 19. According to WHO, adolescence is a unique stage of human development⁸.

Cognitive, physical, and psychosocial growth is experienced so fastly during adolescence, and this change affects their decisions and feelings. Although considered a healthy stage of life, there are significant deaths, illnesses, and injuries during the teenage years, but most of them are preventable or treatable. At this stage, the current and future behaviors of adolescents are formed. For example, they can acquire behaviors including substance use, dietary patterns, physical activity, and also sexual activity that can protect their health and the health of others. On the contrary, they can acquire behaviors and habits that will risk their future and present health⁸.

A school environment is important for children to acquire healthy eating habits. The school environment should be suitable for the acquisition of healthy eating habits at an early age⁹. However, nutritional requirements also change with the acceleration of growth and development in adolescence. During this period, there is an increase in calories and protein, and energy requirements increase. Vitamin and mineral requirements, which are effective in the development and growth of the body, are also increasing⁷.

2.2. Physiological Changes During Adolescents

Adolescence is a critical time of maturation and physical development and encompasses changes in body composition and the development of organ systems. Adolescence is also a critical period for the individual to establish a lifelong relationship with food. Nutrition is important and emotional changes are experienced during this period. Adolescents begin to make their own decisions independently of their families during this period. All behaviors and decisions of an adolescent, including eating, change. Adolescents doing sports positively supports psychological health for most adolescents. In addition, sports make an important contribution to adolescents' achieving a healthy self-image¹⁰.

The transition from pre-puberty to full reproductive capacity can take a minimum of 18 months or a maximum of five years. The earliest symptom in boys is the increase in testicular volume, which begins at 12 on average. The growth spurt of girls takes place at 11-12 on average in early adolescence, while it occurs at 14 on average in boys. Among the causes of early puberty are genetics, obesity, and central nervous system abnormalities. Causes of late puberty, malnutrition, chronic diseases, eating disorders, and severe psychosocial stress¹¹.

Rapid physical growth is experienced during adolescence, and adolescents reach adult body sizes in 3-5 years. Adolescents have an increase in bone and muscle mass. Lungs, heart, spleen, pancreas, kidneys, penis, and uterus increase in weight and size. The growth acceleration that starts between the ages of 11-16 and lasts for an average of 2-3 years is called the “growth spurt” (pubertal growth spurt). During adolescence, an average height increase of 23-28 cm in girls and 26-28 cm in boys is observed. Height growth occurs most rapidly in boys between the ages of 14-15. In girls, the fastest growth in height is between 12-13 years of age. Weight gain during adolescence is observed approximately six months after the period when the height grows the fastest, and the weight is 20 kg (7-30 kg) on average. While boys' sexual development starts at an average of 11.6 years (9.5 to 13.5), girls' sexual development begins at an average of 11.2 years (9.0-13.4 years)¹².

The biological changes that occur during adolescence are as follows:

- Early adolescence: The development of breast buds and pubic hair occurs in girls. A pubertal growth spurt occurs in girls. In boys, testicular enlargement and genital growth begin.
- Mid-adolescence: It is the middle-late adolescence period in girls and is the end of the pubertal growth spurt. With fat accumulation, the development of the female body shape begins. In boys, it is the middle of puberty and the beginning of the pubertal growth spurt.
- Late adolescence: In boys, a continuous increase in muscle volume and body hair is observed¹¹.

Adolescence is a critical time of physical, cognitive, and emotional maturation, characterized by openness to change and the drive to reshape the social environment. This is the most favorable period for adopting changes in diet and physical activity that can continue into later life. Among adolescents, nutritional problems, including

micronutrient deficiencies and low-quality diets, and an epidemic of obesity are observed¹³. Sleep is important during adolescence. Sleep plays an important role in human health, for example, in immune function, and mental health. Hormonal changes occur during adolescence¹⁴.

2.3. Nutrition in Adolescence

Adolescence is a period when physical, psychological, and social maturity is completed. Growth and development accelerate during adolescence. Growth and development in adolescents; physical growth, sexual development, psycho-social development. In general, with growth, there is an increase in the size of the glands and internal organs, muscle, and bone masses. The bodies of adolescents reach the body measurement value in the adult period in 3-5 years. During this period, sex-specific characters are formed with the increase in the secretion of sex hormones⁷. With the rapid physical development experienced during adolescence, the nutritional needs of the body also change. Vitamin, mineral, protein, and energy requirements and appetite increase during this period. Nutritional habits that will continue for life are gained during adolescence. Inadequate and unbalanced nutrition in childhood and adolescence causes serious diseases to occur at later ages¹⁵. Because adolescence is a period of rapid growth, adequate nutrition is crucial to reaching full growth potential. Malnutrition, including stunting and thinness, is decreasing in children below five years of age, while rates of overweight and obesity are increasing among children and adolescents. Being overweight and obese during childhood is associated with some severe risks, including high cholesterol, triglycerides, and glucose¹⁶.

The following should be considered when evaluating the nutritional conditions of adolescents:

- The count of main meals and snacks consumed daily should be questioned,
- Physical activity status should be questioned,
- A history of sexual development should be taken,
- Height and weight should be measured and compared with previous measurements¹⁵.

Nutritional status is critical in both childhood and adulthood. Both obesity and malnutrition are major health problems worldwide. Excess weight and obesity can lead to serious diseases in adolescents and children, including diabetes and heart disease.

There are studies and evidence on this subject. A meta-analysis was conducted by synthesizing published meta-analyses evaluating the role of nutrition. An online search was conducted on PubMed in this study. The results found that interventions, including physical activity and dietary changes, were effective in combating childhood obesity¹⁷.

Children aged 6-17 years admitted to Ankara Gülhane Training and Research Hospital Pediatric Endocrinology Outpatient Clinic were included in a study to evaluate insulin resistance, vitamin D level, and the KIDMED. The study was conducted with obese and overweight children. The results revealed that vitamin D deficiency is prevalent in children or adolescents. It also revealed that there is a significant relationship between children and adolescents regarding their HOMA-IR and KIDMED scores. At the same time, a significant relationship was found between serum vitamin D levels and insulin resistance¹⁸. Obesity in maturity is associated with malnutrition starting in childhood and excess weight gain in childhood. In order to prevent childhood and adolescence obesity, it is critical for children and adolescents to acquire healthy eating habits at an early age. At the same time, individuals in this period should head toward sports fields and stay away from a sedentary lifestyle¹⁹.

2.3.1.Nutritional Requirements During Adolescence

Special nutritional requirements arise to meet the growth spurt and bone growth in adolescence. Appetite increases during puberty. Adolescent boys have higher calorie needs than adolescent women due to the greater increase in height, weight, and lean body mass. Protein requirements are highest for girls ages 11 to 14, and boys age 15 to 18. Dietary reference intakes (DRIs) and adequate intakes (AIs) in the puberty period in the U.S. are available in the table (see Table 2.1.)¹⁶.

11-18 years old boys need to take about 2500-2800 calories per day, and girls 2200 calories. The amount of calories they need to take increases significantly compared to childhood. Energy and nutritional deficiencies in this period cause a delay in growth and sexual development. The need for protein also increases. Proteins are important because they provide cell repair and muscle development. The daily protein requirement of adolescents is approximately 45-60 grams. The protein requirement is 0.8 g/kg/day for girls. In addition, the protein requirement is 1 g/kg/day for boys. Carbohydrate is an important source of energy. During adolescence, 50-60% of daily energy should be composed of carbohydrates. Also, fat and fatty acids are important for

growth and development in this period. 30% of total calories should be provided from fats, and saturated fatty acids should not exceed 10%¹⁵.

Table 2.1 DRIs & AIs in the puberty period (14-18 years) in the U.S.

**DRIs and AIs: recommended intakes in the puberty period		
	14-18 years girls	14-18 years boys
Energy (kcal/day)	2368	3152
Carbohydrates (g/day)	130	130
Total fiber (g/day)	28	38
Protein (g/day)	46	52
Vitamin A (g/day)	700	900
Vitamin C (mg/day)	65	75
Vitamin D (g/day)	5	5
Vitamin B12 (g/day)	2.4	2.4
Folate(g/day)	400	400
Calcium (mg/day)	1300	1300
Chromium (g/day)	24	35
Copper (g/day)	890	890
Iron (mg/day)	15	11

Source: Das JK, Salam RA, Thornburg KL, et al. Nutrition in adolescents: physiology, metabolism, and nutritional needs. *Ann N Y Acad Sci.* 2017;1393(1):21-33. doi:10.1111/nyas.13330

Vitamin and mineral requirements during adolescence also change. Calcium intake is very important, and 1200 mg of calcium should be taken daily. The daily iron requirement is 12 mg per day for boys and 15 mg for girls. Some foods are important sources of iron, such as chicken and green leafy vegetables and meat. These foods should be consumed in sufficient quantities. Zinc joins in protein creation and is found in the structure of many enzymes. For this reason, it is very important. It provides growth and sexual development. The zinc requirement for boys aged 14-18 is 11 mg daily, and for girls, 9 mg. The daily requirement of vitamin A, which has vital functions in reproduction, immunity, and growth, is 600 µg per day for girls and boys aged 9-13. It is 700 µg for girls aged 14-18 and 900 µg for boys. Cheese, milk, and carrots are important sources of vitamin A. Vitamin D deficiency has been reported in

approximately 14% of adolescents and has a daily requirement of 400 IU of vitamin D. The daily requirement of vitamin E is 11 mg for 9-13 years old and 15 mg for adolescents between 14-18 years old. Vitamin C has important tasks: connective tissue synthesis and collagen synthesis etc. The daily requirement is 45 mg for adolescents 9-13 years old, 75 mg for boys 14-18 years old, and 65 mg for adolescent girls 14-18 years old. Folate plays a role in protein synthesis and DNA, and RNA synthesis. The daily requirement for folate is 300 µg for adolescents aged 9-13 years and 400 µg for adolescents aged 14-18 years¹⁵.

The meat group consisting of meat, eggs, legumes, and oilseeds contains protein, iron, zinc, phosphorus, magnesium B6, B12, B1, and vitamin A and fiber. These components play a role in important tasks such as growth and development, cell regeneration, and tissue repair. Adolescents should take at least three portions of meat group foods per day. Foods made from milk, such as milk, yogurt, cheese, and kefir constitute the milk group. It contains protein, calcium, phosphorus, and vitamins B2 and B12 should be consumed daily. Adolescents are recommended to consume 3-4 servings of milk and milk substitutes daily. Cereals are the basic food group of Turkish society, and bread, rice, and pasta are in this group. However, products such as oats, barley, wheat, and bulgur are included in the grain group. Vegetables and fruits are rich in minerals and vitamins, and their consumption is important²⁰. According to the Turkish Dietary Guidelines (TUBER) 2015 guideline, the recommended total daily serving of bread and cereals is 7-8 servings for boys aged 15-18, and 4-5 servings for girls aged 15-18. According to TUBER 2015, the recommended daily amount of vegetables is 3.5-4 servings for boys aged 15-18 and 3.5 servings for girls. The recommended total daily serving of fruit is 2.5-3 standard servings for men aged 15-18 years. For girls aged 15-18, it is 2.5 standard servings²¹.

2.3.2. Malnutrition, Eating Disorders and in Adolescence

Malnutrition is defined as the deterioration of health caused by a lack, over-sufficiency, or imbalance of nutrients in the body. Malnutrition during the puberty period may delay growth and sexual development. The consequences of chronic malnutrition in infancy and childhood affect adolescence²². In short, malnutrition results from excessive intake, inadequate food consumption, and inadequate use of the nutrients provided by the food taken. Anemia, weight problems, and micronutrient deficiencies are important health problems. Countries face complex and interrelated

nutritional challenges, including stunting in children under five years of age, overweight and obesity in adults, and anemia in women. Protein-energy malnutrition (PEM) is a comprehensive medical term that includes marasmus, kwashiorkor, and marasmus-kwashiorkor²³.

Stunting, or in other words, growth retardation, is defined as short height for age. Malnutrition is the condition of not getting enough food for at least one year. Wasting usually results from acute weight loss due to a recent hunger/starvation or illness. The results of a study show that stunting and malnutrition can cause death in children younger than five years old²³.

2.3.3. Vitamin and Mineral Deficiencies in Adolescence

Iron deficiency is the most common nutritional deficiency in the world, even in developed countries. Anemia affects 1.62 billion people worldwide (about 24.8% of the world's population). The highest prevalence of anemia is seen in preschool-aged children, mostly affecting children and women of reproductive age. Anemia reduces the body's resistance to diseases. However, it reduces the learning power and physical strength of children. Anemia also increases the risk of maternal death during childbirth. Nutritional sources of iron are of animal origin, and red meat, fish, liver, and other meat products are sources of iron. Nuts, legumes, and dark green leafy vegetables are vegetable sources of iron²³.

Adequate vitamin D intake in puberty is critical during growth and into the post-adolescent stage because vitamin D plays a role in building the highest bone mass. Bone reserves are a determinant of osteoporosis danger in later adulthood. The main source of vitamin D is sun exposure, but adequate sun exposure is difficult to achieve in the European winter. However, dietary vitamin D intake is low in children and adolescents. In European countries, vitamin D deficiency is prevalent in puberty and childhood. Based on epidemiological data, some European countries recommend vitamin D supplementation after the second year of life. In Switzerland, vitamin D supplementation is recommended only for children, and puberty in girls and boys is at the hazard of deficiency. For example, overweight and dark-skinned children and adolescents are at higher risk of vitamin D deficiency, so supplementation is recommended for them²⁴.

Nicolas Parel et al. conducted a study to evaluate the dietary intake of vitamin D, vitamin D status, and the main dietary sources of vitamin D in healthy Swiss

adolescents. A cross-sectional study aimed to prepare the next Swiss national nutrition survey 11-18 children and adolescents living in the Lausanne region. Findings from the study revealed that the main dietary sources of vitamin D are fish and dairy products. While an adequate level of vitamin D is achievable for almost all adolescents during the summer, it turns out to be more difficult to achieve from autumn to spring²⁴.

Osteoporosis is a global health problem, and milk and dairy products are the most common sources of calcium and vitamin D²⁵. Osteoporosis is defined as low bone mineral density (BMD) with changes in bone structure, increased bone fragility, and higher fracture risk and osteoporosis is also increasing in younger patients. Although <-2 Z-scores are considered a serious warning, most bone specialists diagnose osteoporosis in children and adolescents with a low BMD. Regular physical activity and adequate calcium and vitamin D are the most important factors for optimal bone mineral mass formation and density formation. BMD measurement is a crucial evaluation for osteoporosis. In young people, known risk factors for low bone mass should be identified and reduced before certain medications are prescribed for the treatment of osteoporosis. Therapeutic interventions (vitamin D and calcium supplementation) should start with this method, which is the most reliable and simple. Physical activity is necessary and recommended to increase BMD. In the presence of growth retardation, puberty delay, or hypogonadism, necessary hormonal therapy should be applied²⁶.

2.3.4. Eating Disorders in Adolescence

Eating disorders in adolescents negatively affect growth and development. The Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) divides eating disorders into three categories: Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Atypical Eating Disorders (EID). The prevalence of eating disorders in adolescents varies. AN is characterized by the fear of being fat and the desire to have a weak body, as well as excessive exercise and the use of diuretics. It is more prevalent in women than in men. BN is an eating disorder in which the patient resorts to methods such as vomiting, diuretic use, excessive exercise, and enemas to prevent weight gain after binge eating attacks. Binge Eating Disorder (BED) is another type of eating disorder that is characterized by uncontrolled overeating²⁷.

The word meaning of AN is 'neural loss of appetite'; today, its incidence is 4% in adolescents and young adults. AN usually starts at 15-19 years old, but in some cases, it

can start after age 20. The incidence in adolescent girls is approximately 0.5-1%. The most prominent feature in Anorexia Neurosa is an extreme fear of obesity, and patients struggle to lose weight even when they are very thin. Weight loss becomes an obsession, and patients use diuretics and laxative drugs in addition to the diet. BN means 'ox hunger,' and individuals experience uncontrollable binge eating attacks in this disease. In these seizures, patients usually take between 3,000 and 20,000 calories. The prevalence of this disease is 1% in society, and bulimia is rare in men. Its incidence in women is 10 times higher than in men²⁸.

2.3.5. Obesity in Adolescence

Recently, obesity prevalence among children has increased significantly, and the WHO has declared obesity a global epidemic. Results of the National Health and Nutrition Examination Survey (NHANES) conducted in 2009 - 2010, showed that 16.9% of children aged 2-19 were obese, and 31.8% were overweight or obese.²⁹ According to WHO 2021 data, 39 million children < 5 years were overweight or obese in 2020. In 2016, the amount of adolescents aged 5-19 with overweight or obesity was more than 340 million³⁰. According to the 2016 data from the Turkish Statistical Institute (TUIK), 64.4% of the girls in the 15-19 age group had normal weight according to their body mass index. It was determined that 11.4% of the young girls were overweight, 2.2% were obese, and 22% were underweight. According to body mass indexes, 70% of young men in the 15-19 age group have normal weights; It was observed that 15.1% were overweight, 2.5% were obese, and 12.4% were underweight³¹.

2.4. Definition of obesity

Obesity is recognized as an important pandemic of the 21st century. Obesity is defined as excessive or abnormal fat or adiposity accumulation in the body that also can result in several dysregulations. The prevalence of obesity has increased rapidly in the last 50 years and has become an epidemic. Obesity may require lifelong treatment, and 5% to 10% weight loss significantly improves an individual's quality of life.³² Obesity is associated with an increased risk of cancer, stroke, and heart disease, and urgent interventions are required to reduce the prevalence³³. In short, weight gain occurs due to the imbalance between daily consumption and spending energy. A study has revealed that there are numerous genes defined by adiposity and weight gain. Low physical

activity, drug use, endocrine disorders, and insomnia are among the other causes of obesity³². Since obesity is seen in every part of society and causes diseases with high mortality, it is defined as the "Global Obesity Epidemic"³⁴.

2.4.1. Prevalence of Obesity

Obesity rates are increasing rapidly worldwide. Obesity affects more than 500 million adults worldwide. About 17% of adolescents and about 1/3 of adults in the United States are obese. Moreover, according to 2011-2012 data from the Centers for Disease Control and Prevention (CDC), one in five adolescents, one in six primary school children, and one in 12 preschool children are obese. The prevalence of obesity in the United States increased to 42.4% in 2017-2018. It is estimated that one in two adults will be obese by 2030. It is now known internationally that one in five adults is obese³⁵.

According to the Multinational Monitoring of Trends and Determinants in Cardiovascular Disease (MONICA) study conducted in Asian, African, and 6 European countries, during the last 10 years the obesity prevalence has increased by 10-30%. The country with the highest obesity rate is the USA, and according to the results of the USA national nutrition and health survey (NHANNES), the prevalence of obesity was found to be 33.3% in men and 35.3% in women in 2006. Albania, Bosnia-Herzegovina, and England are the countries with the highest rate of overweight in Europe. The least common countries are Turkmenistan and Uzbekistan.³⁴ According to the Organization for Economic Cooperation and Development (OECD) Health Statistics 2017 data, the obesity prevalences of the countries are given in the table (see Table 2.2.)³⁶.

One in two adults and about one in six children in OECD countries are overweight or obese. Obesity rates are predicted to increase further by 2030, and are expected to increase faster in Korea and Switzerland. In 2015, 19.5% of adults were obese across the OECD. This rate is below 6% in Korea and Japan, but over 30% in the United States, Mexico, and New Zealand (see Table 2.2.). In most countries, women have a higher obesity rate than men. However, male obesity is increasing more rapidly in most OECD countries³⁶.

Table 2.2 Obesity among adults (15 years and over), 2015 or nearest year.

COUNTRIES	% OF POPULATION AGED 15 YEARS AND OVER
OECD	19.5
Japan	3.7

Korea	5.3
Italy	9.8
France	15.3
Spain	16.7
Greece	17
Turkey	22.3
Germany	23.6
United Kingdom (UK)	26.9
United States	38.2
Norway	12.0
Ireland	23
Canada	25.8
Australia	27.9
Hungary	30
New Zealand	30.7
Mexico	32.4

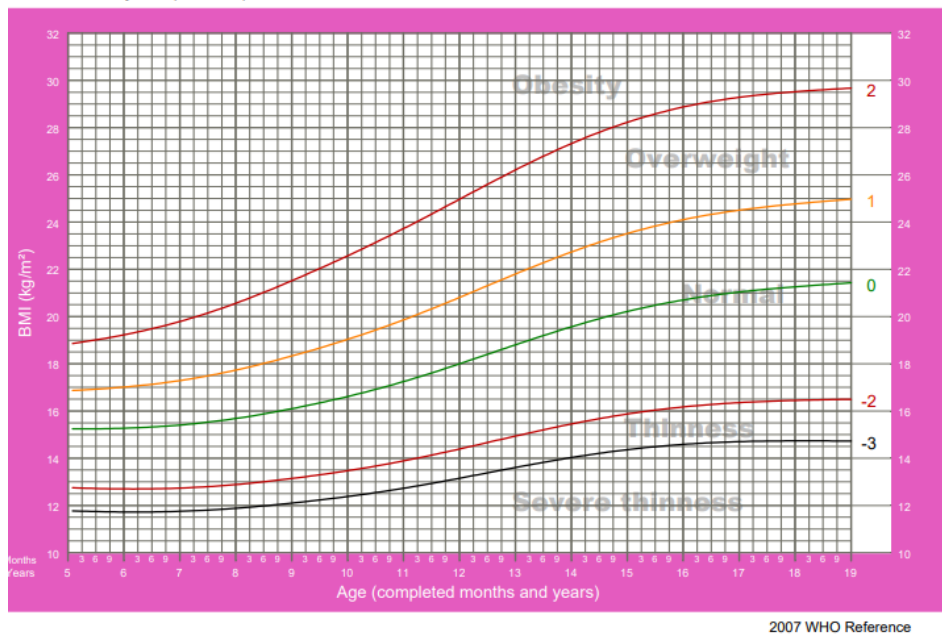
Source: OECD, *Obesity Update 2017*; 2017. <https://www.oecd.org/health/health-systems/Obesity-Update-2017.pdf>

2.4.2. Evaluation of Obesity and Anthropometric Measurements in the Puberty Period

Assessing a child's growth and nutritional status using anthropometry's percentile and Z-score relative to a reference or standard population is more accurate. The percentile, which is easier to understand by the public, shows the percentage of observations that fall below a certain value of the reference population. While the Z-score is defined as the distance and direction of an observation from the population mean. The Z-score, which is not perceptible intuitively, can be used to compare dimensionless quantities, indicators, and populations. Strengths of percentile: It is more intuitively understandable and indicates expected prevalence. Z-score strengths: It is a good statistical tool for making comparisons between ages and genders, measuring outliers, and assessing longitudinal changes in growth status³⁷. World Health Organization Z-score and Percentile charts for boys and girls are given below (see Figures 2.1., 2.2., 2.3. and 2.4.)³⁸.

BMI-for-age GIRLS

5 to 19 years (z-scores)

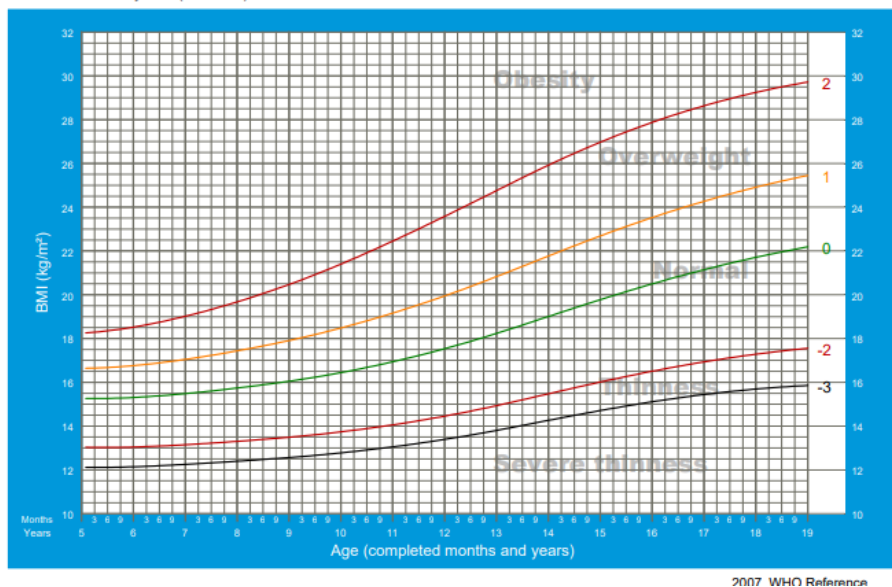


Source: WHO. BMI-for-age (5-19 years). 2007 WHO REFERENCES. Published 2007. <https://www.who.int/tools/growth-reference-data-for-5to19-years/indicators/bmi-for-age>

Figure 2.1 2007 WHO References - Girls: 5 to 19 years (z-scores) - with labels

BMI-for-age BOYS

5 to 19 years (z-scores)

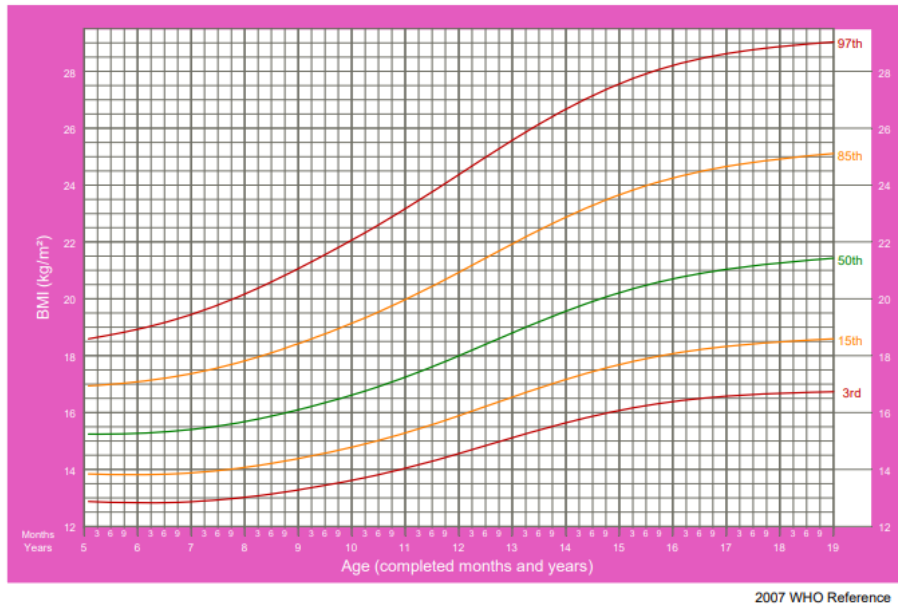


Source: WHO. BMI-for-age (5-19 years). 2007 WHO REFERENCES. Published 2007. <https://www.who.int/tools/growth-reference-data-for-5to19-years/indicators/bmi-for-age>

Figure 2.2 2007 WHO References-Boys: 5 to 19 years (z-scores) - with labels

BMI-for-age GIRLS

5 to 19 years (percentiles)



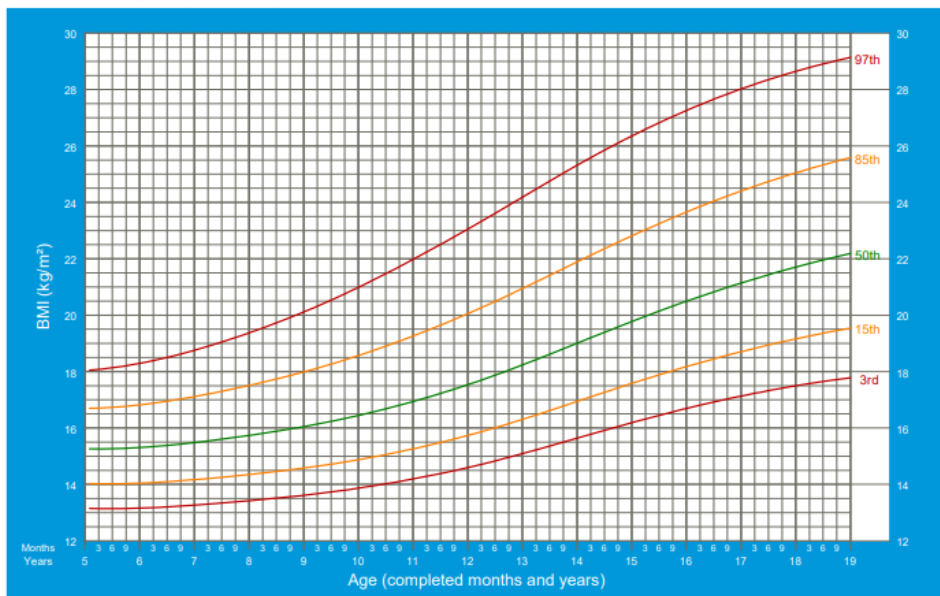
2007 WHO Reference

Source: WHO. BMI-for-age (5-19 years). 2007 WHO REFERENCES. Published 2007. <https://www.who.int/tools/growth-reference-data-for-5to19-years/indicators/bmi-for-age>

Figure 2.3 2007 WHO Reference-Girls: 5 to 19 years (percentiles)

BMI-for-age BOYS

5 to 19 years (percentiles)



2007 WHO Reference

Source: WHO. BMI-for-age (5-19 years). 2007 WHO REFERENCES. Published 2007. <https://www.who.int/tools/growth-reference-data-for-5to19-years/indicators/bmi-for-age>

Figure 2.4 2007 WHO Reference-Boys: 5 to 19 years (percentiles)

2.4.3. Treatment and Management of Obesity

Behavior Interventions, Diet, and Exercise: Interventions such as cognitive behavioral therapy, motivational interviewing, and psychotherapy are recommended for obese patients. It is recommended to combine these behavioral interventions with diet and exercise. Low-calorie diets are recommended in diet therapy. Dietary interventions with reduced fat and carbohydrate content are considered appropriate³². With physical activity, energy expenditure increases and effectively reduces excess adipose tissue. Exercise is beneficial not only for weight loss but also for health. Dietary interventions and regular physical activity have proven effective in the treatment of obesity. At least 150-180 minutes of aerobic exercise per week is recommended³³.

Medications: Obesity drugs have developed significantly, and today six anti-obesity drugs have received approval from the Federal Drug Administration (FDA).³⁵ Antiobesity drugs are used in individuals with high BMI. It is used in individuals without the disease with a BMI of 30 and above. In addition to obesity, it is used in patients with a BMI of 27 and above. Combining diet, exercise, and behavioral interventions with drug therapy is necessary. FDA-approved antiobesity drugs, including phentermine, phentermine/topiramate, phendimetrazine, lorcaserin, orlistat, diethylpropion, naltrexone/bupropion, liraglutide, and Orlistat is often the first choice. Patients usually lose over 5% of their weight in the first three months³². Various studies have revealed the effect of orlistat on weight loss and maintenance. It is also known that Orlistat affects improving insulin sensitivity and lowering serum glucose levels³⁵.

Surgery: Obesity surgeries are recommended for patients with a BMI of 40 and above. In addition to obesity, individuals with serious diseases should have a BMI of 35 and above. The sleeve gastrectomy and Roux-en-Y gastric bypass are the most commonly used techniques of bariatric surgery. Weight loss can be achieved in the fastest way with gastric bypass³².

2.4.4. Prevention and Treatment of Childhood Obesity and Adolescent Obesity

Obesity during childhood which may continue during the rest of their lives is one of the most serious public health problems of the 21st century and affects the whole world. The prevalence of childhood obesity has increased at an alarming rate³⁹. Failure to prevent obesity in children leads to the emergence of diabetes and cardiovascular diseases at a young age. However, childhood obesity is a preventable disease⁴⁰.

The reasons for obesity are both biological and environmental. From a biological point of view, genetics can cause obesity. Environmental factors also have a great effect on the development of obesity. In addition, if the energy taken in food is more than the energy required for growth and activity, it is stored as adipose tissue or fat in the human body, and thus body weight gains. Excessive fat accumulation leads to overweight and obesity³⁹. The increased energy-rich foods consumption, specifically those high in fat and sugar but low in nutritious contents, and the decrease in physical activity are considered the main causes of childhood obesity. WHO recognizes that the increasing prevalence of childhood obesity is due to global and societal changes. The problem is not only related to children's behavior but also to agriculture, transportation, urban planning, education, and environmental problems. Lifestyle intervention is one of them recommended by the NICE in the UK, and lifestyle intervention is the only method in children younger than six years. Treatment with pharmacological intervention is also possible in older children under expert medical supervision. Lifestyle interventions are an effective method of preventing and also treating childhood obesity³⁹.

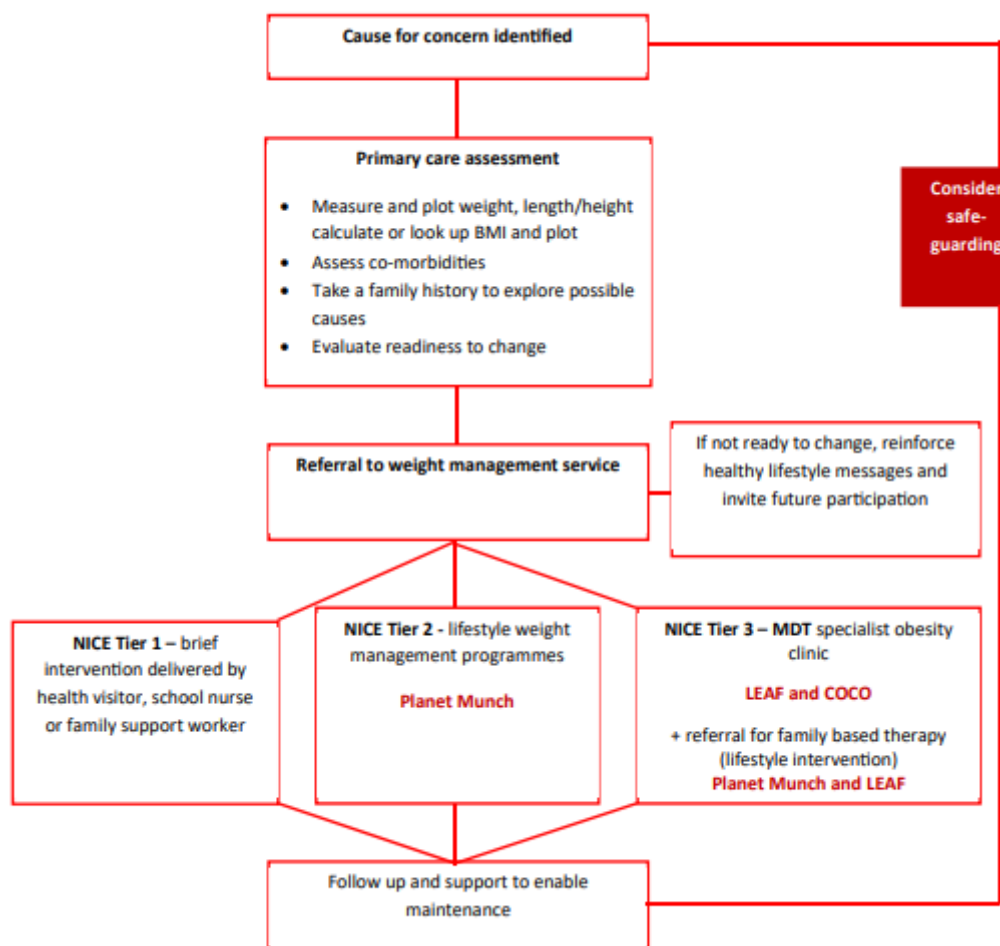
The World Health Organization recommendations to reduce and prevent childhood overweight and obesity are as follows:

- Increasing the consumption of fruits and vegetables, legumes, whole grains, and nuts in the daily diet of children
- Preferring unsaturated fats instead of saturated fats as fat consumption and limiting energy from total fat
- Restricting the consumption of sugar and sugary foods
- Ensuring that children are physically active in at least regular, moderate, to high-intensity activity for 60 minutes per day that is appropriate for their development⁴⁰.

Nutritional supplement therapy for overweight and obese children in childhood aims to support the child's attainment of normal body weight and composition and promotes optimal development both physically and mentally by improving the child's diet and lifestyle. Nutritional supplements are designed to ensure adequate intake of both macro and micronutrients for all people (except infants), and these supplements provide the body with complete nutritional support in appropriate amounts and proportions. These supplements can also be used to treat obesity. The main purpose of nutritional supplements in childhood obesity is to ensure that the child receives the necessary basic nutrients completely by restricting food energy intake to a small

amount. Thus, it is possible for children to lose weight in a healthy way without harming their physical and mental development⁴¹.

In the UK, almost 1 in 4 children under the age of 5 are overweight when starting school. Severe obesity in children aged 10-11 has reached the highest numbers. In the UK, NICE advises lifestyle interventions as the first line of weight management in children. These interventions should take in reducing energy intake, increasing physical activity, and involving other family members in behavior change. Behavior modification interventions are essential for successful weight management. In children aged 12 years and older, pharmacotherapy treatment can be applied in addition to lifestyle interventions. Surgery to treat severe morbid obesity in adolescents is only recommended when other treatments have failed. Below is an image illustrating the assessment of childhood obesity in the UK (see Figure 2.5.)³⁹.



Source: Lanigan J, Sauven N. Treatment of childhood obesity: a multidisciplinary approach. *Clin Integr Care*. 2020;3. doi:10.1016/j.intcar.2020.100026

Figure 2.5 Assessment diagram for childhood obesity in the UK

The Planet Munch, pictured above, is a program for preschoolers and learning through art and play. This program is a 24-week healthy lifestyle intervention aimed at reducing obesity and obesity-related risk factors in preschool children. Children referred to the Lifestyle, Eating, and Activity for Families (LEAF) program are first evaluated by a doctor, dietitian, and physical activity specialist. Regular clinical examinations are then carried out. A geneticist is consulted when necessary to investigate hereditary causes. Childhood Obesity Care (COCO) is for children aged 5-18 years with severe obesity. The COCO program is for children with a higher than 40 kg/m² BMI or above the 99.6th percentile³⁹.

2.5. Mediterranean Diet Definition and Updated Mediterranean Diet Pyramid

The MED is a general term used to describe the diet of people living in the Mediterranean region, especially in Spain, southern France, and Greece⁴². The Latin word “Mediterranean” means “the sea in the middle of the earth.” Various cultures grown in the Mediterranean lands were transported to various regions by seafarers. The Greeks, Phoenicians, and Romans enabled different societies to communicate with each other. Despite ethnic, political, and religious differences, the Mediterranean region had a common diet, and the basis of this diet was cereals, fruits, vegetables, olive oil, and other products. Grain is the most consumed food group in Mediterranean countries⁴³.

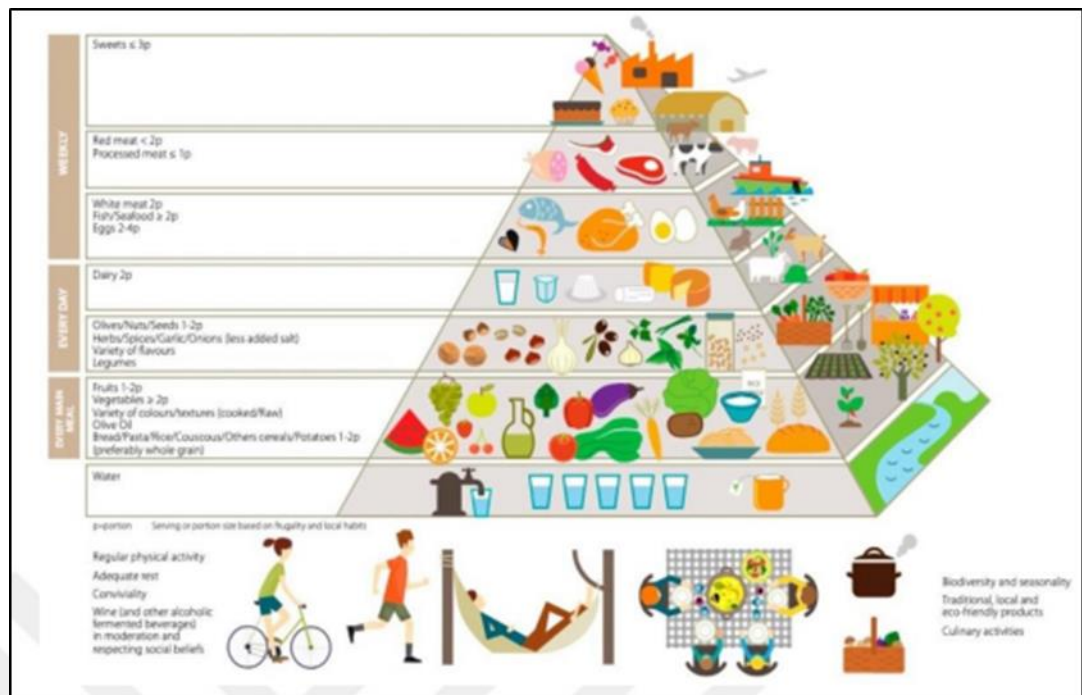
Various foods are grown in the Mediterranean climate. Mediterranean populations traditionally eat fresh, seasonal fruits. At the end of summer, figs, pomegranates, and grapes are eaten. Pears, oranges, and apples are consumed during the winter months. Nuts are collected in certain months and eaten in their natural form in other months⁴³. Legumes, lentils, chickpeas, and beans are among the most characteristic features of the Mediterranean diet. According to historical data, legumes have been cultivated since ancient times, and prehistoric people consumed legumes almost every day in the form of porridge or puree. Legumes can be stored for a long time. They are also nutritious. Thanks to these features, legumes are widely consumed in many countries⁴⁴. Legumes contain monounsaturated fatty acids and polyunsaturated fatty acids.⁴⁵ The people of the Mediterranean region have consumed nuts (peanuts, almonds, hazelnuts, etc.) for years. Nuts are the components of the MED. The most consumed cereals in Mediterranean countries are rice and wheat. These foods are the main source of carbohydrates in the MED.⁴⁴ The MED is also rich in fruits and

vegetables. Therefore, the amount of carotenoids taken by individuals fed this diet is sufficient. The MED has abundant fruit and vegetable consumption, and fruits and vegetables contain flavonoids and polyphenols. Thanks to these components, they have both cardioprotective and neuroprotective properties⁴⁵. Red wine is also a food component of the Mediterranean Diet. Moderate consumption of wine with main courses is common in European Mediterranean countries⁴⁴.

A large-scale literature review on the MED was conducted by Davis et al., and it was determined that approximately 2200 calories or 9300 kJ per day and 33 grams of fiber per day should be taken, and other results are as follows:

1. Consumption of 3-9 portions of vegetables
2. ½-2 servings of fruit consumption
3. 1-13 servings of grain consumption
4. Olive oil consumption of up to 8 servings per day
5. Daily consumption of red wine in moderation⁴².

The updated MED pyramid is designed according to the geographical and socio-cultural characteristics, nutritional needs, and food traditions and cultures of different countries in the Mediterranean region. The recommendations in the pyramid are appropriate for the healthy adult population aged 18-65. It should be changed according to the needs of pregnant women, children, and individuals with cardiovascular diseases. The updated Mediterranean Diet pyramid image is as follows (Figure 2.6.)¹.



Source: Serra-Majem L, Tomaino L, Dernini S, et al. Updating the mediterranean diet pyramid towards sustainability: Focus on environmental concerns. *Int J Environ Res Public Health*. 2020;17(23):1-20. doi:10.3390/ijerph17238758

Figure 2.6 Updated Pyramid Image for Sustainable Mediterranean Diet.

According to the MED pyramid, the main meals should consist of a combination of 3 food groups, including cereals, fruits and vegetables, and a small amount of legumes. The cereal group should be consumed as 1-2 servings per meal. Cereal group: bread, bulgur, couscous, pasta, and rice. Fruits should be consumed in 1-2 portions per meal. Fruits and vegetables should be consumed fresh and in season. Milk and dairy products should be consumed daily in moderation, and a maximum of 2 servings per day is recommended. Poultry and eggs are also included in the pyramid. There are important recommendations regarding red meat and processed meats. Red meat should be consumed less frequently, 2 servings or less per week. Red meat should preferably be eaten lean. Processed meat consumption should also be limited, with 1 serving per week or less. High-fat and high-sugar desserts, pastries, and beverages appear to be at the top of the Mediterranean Diet Pyramid. Sweets, high-fat foods, and beverages should be consumed in small quantities. In the diet, a small amount of dried fruits and honey should be preferred along with fresh fruits as dessert. In the pyramid, in addition to the water taken from food, it is recommended to consume 1.5-2 L of water and sugar-free beverages per day. Physical activity is beneficial to health and balances energy

intake, so physical activity is necessary. It emphasizes the importance of regular exercise for 150 minutes or at least 30 minutes a day, 5 days a week¹.

2.5.1. Food Components of the Mediterranean Diet

The MED is a traditional diet model that has beneficial effects on human health. This diet model, rich in vitamins and minerals, basically includes vegetables and fruits, fish, whole grains, nuts, and seeds⁴⁶. The MED model recommends excessive consumption of fresh fruits, vegetables, legumes, fish, nuts, and grains and low to moderate consumption of dairy products and poultry. The main source of fat is olive oil. Consumption of red meat is low. Wine is consumed moderately with meals⁴⁵. The MED has beneficial effects on health. The Mediterranean region has a lower incidence of heart disease and, as a result, longer-lived individuals⁴⁷.

While there are some differing opinions, in general, the MED is characterized as follows:⁴³

- Plant-based foods: unprocessed grains, especially whole grains, bread, pasta, couscous and rice, fruits, raw and cooked vegetables, beans, chickpeas, nuts, almonds, pistachios, herbs, and spices.
- Olive oil: Olive oil is an important oil source in salads & dishes.
- Moderate consumption of fish and seafood, yogurt, kefir, eggs
- Red meat is consumed in small amounts. Poultry or rabbit are preferred.
- Restricting the consumption of butter, processed meat, cream, and sugary drinks
- Red wine can be consumed in moderation at meal times. It should not be banned because of their religion and culture⁴³.

The table showing the comparison of the nutritional content of the MED with the daily intake is as follows (Table 2.3.)⁴⁸.

Table 2.3 Comparison of some nutrients in the Mediterranean diet with the daily recommended nutrient intakes

<i>Nutrients</i>	<i>in MED</i>	<i>Recommendations for 19–50-Years Americans</i>
<i>Total fat (% of total calories)</i>	25–35	20–35
<i>Saturated fat (% of total calories)</i>	≤8	≤10

Carbohydrates (% of total calories)	45-65	45-65
Protein (% of total calories)	10-35	10-35
Vitamin A (μg)	≥ 900	women: 700; men: 900
Vitamin C (μg)	≥ 90	women: 75; men: 90
Calcium (mg)	≥ 1200	≥ 1000

Source: Matter OO, Mazzocchi A, Leone L, Agostoni C, Pali-schöll I. The Secrets of the Mediterranean Diet . Does [Only]Olive Oil Matter? *Nutrients*. 2019;11:1-14. doi:10.3390/nu11122941

2.5.1.1. Whole Grains

In Italy, there is high consumption of fish, as well as pasta from grain products. Conversely, in Greece, salads and meals rich in olive oil prepared with whole grain bread, legumes, and vegetables are consumed. The most basic products obtained from wheat in the Mediterranean nutrition pyramid are bread, pasta, and pizza. The most consumed grain product in Mediterranean countries is bread made from wheat. Traditional bread types in Turkey are bazlama, yufka, French and European bread. It is Trablisi and French bread in Tunisia. Pasta is the second most consumed grain product after bread⁴⁹.

Grains are an important component of the MED and are at the bottom of the pyramid. Daily consumption of cereal products is recommended. Whole grains are generally recommended. High consumption of grain products such as oats, barley, wheat, and rye is part of the MED. A study by Tighe et al. in 2010 determined that whole grains reduce the risk of cardiovascular disease by balancing blood pressure⁵⁰.

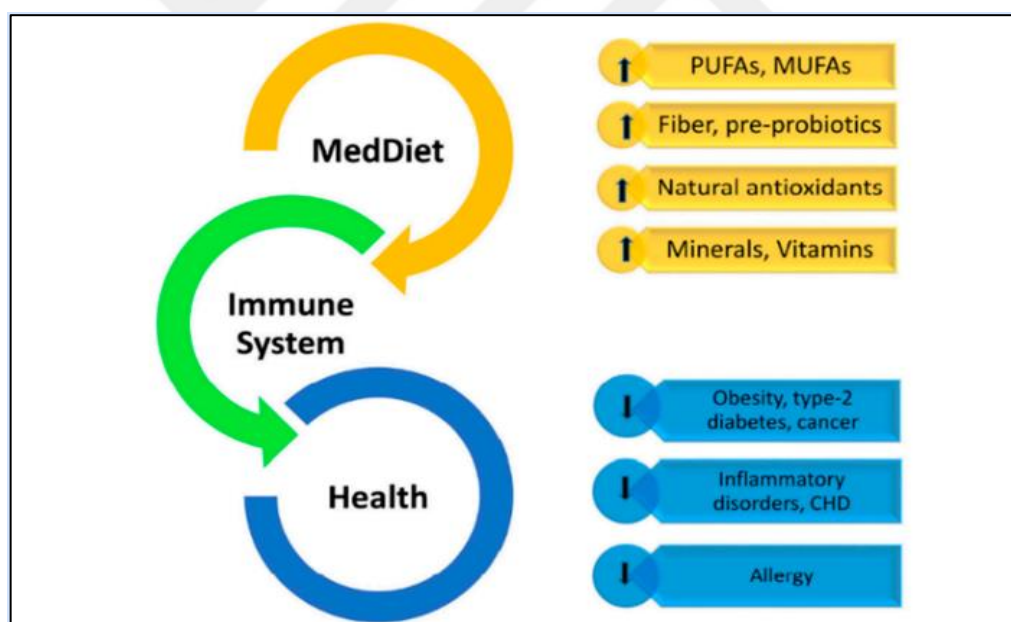
2.5.1.2. Olive Oil

The olive is one of the most common types of fruit trees in the world⁵¹. Olive oil is derived from olive fruit, the olive, and is a functional food due to its nutritional value and health benefits. It contains high amounts of oleic acid, phenolic compounds, and vitamin E. The consumption of olive oil reduces the risk of developing cardiovascular diseases. Extra virgin olive oil (EVOO) is the highest quality category of olive oil⁵². Olive oil is a significant nutrient of the MED. It is rich in monounsaturated fatty acids and polyphenols and is known to have cardiovascular benefits⁴⁵. A clinical study with

447 volunteers in Spain found that a MedDiet supplemented with olive oil or hazelnuts was associated with improved cognitive function⁵³.

The MED's health benefits are related to EVOO's nutraceutical properties, such as its nutraceutical properties⁵⁴. Monounsaturated fatty acids, phytosterols, carotenoids, tocopherols, and many phenolic compounds are the main nutraceutical ingredients of extra virgin olive oil. Olives and olive products are important in Mediterranean countries for their health benefits and are an important part of the Mediterranean Diet. Olive oil also has an antimicrobial effect⁵⁵.

Vitamins and minerals affect the functions of the immune system. It is known that the MED has an effect on protecting individuals from diseases. The MED is thought to be beneficial for preventing or treating diabetes, obesity, and inflammatory disorders. EVOO, as part of the MED, affects immune-mediated inflammatory diseases (IMID) and cardiovascular diseases (CVD). Figure 2.7. illustrates the multistage effect of MED on the immune system and related disorders⁴⁸.



Source: Matter OO, Mazzocchi A, Leone L, Agostoni C, Pali-schöll I. The Secrets of the Mediterranean Diet. Does [Only]Olive Oil Matter? *Nutrients*. 2019;11:1-14. doi:10.3390/nu11122941

Figure 2.7 The effect of the MedDiet on the immune system and related disorders

2.5.1.3. Fish

n-3 Fatty acids contain ω -3 fatty acids, long-chain α -linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). ALA is considered an

essential fatty acid because the body cannot synthesize it. It must be taken into the body by consuming food or nutritional supplements. The results of multiple animal studies and in vitro studies have shown that fish consumption high in ω -3 fatty acids is associated with a reduced risk of cancer⁵⁶. There are many studies on the beneficial effects of the consumption of fish and fish oil supplements. Studies have revealed that omega-3 supplements and their intake of food may be beneficial at the onset of Alzheimer's disease⁵³.

In a meta-analysis study investigating the relationship between fish or omega-3 fatty acid consumption and depression, articles were reviewed in PubMed and Web of Science databases. A total of 10 prospective cohort studies with 6672 depression cases were included in a meta-analysis with 109,764 participants. The results of this study revealed a relationship between fish or omega-3 fatty acid consumption and the risk of depression, especially in women⁵⁷. In addition, fish consumption has significant health benefits, including reduced risk of stroke and inflammation. There is evidence that fish consumption is crucial in the neurological development of the fetus⁵⁸.

2.5.1.4. Nuts

Nuts are an important component of the MED. Common tree nuts are hazelnuts, almonds, cashews, walnuts, pistachios, and Brazil nuts. Nuts are included in the MED in a variety of ways. Nuts can be included in the diet as a snack or as a sauce. Pastes such as almond paste are also consumed by spreading. Studies on nut consumption suggest that it is inversely proportional to the risk of hypertension. Due to the high-calorie content of nuts, the relationship between long-term consumption and weight gain is being investigated. However, epidemiological evidence suggests that nuts do not have a detrimental effect on adiposity. It is thought that long-term consumption of nuts does not cause obesity and is even associated with less weight gain. Nuts contain quality vegetable protein, fiber, minerals, tocopherols, phytosterols, and phenolic compounds. Thanks to these components, nuts have health benefits. A study has revealed that nut consumption is associated with reduced coronary heart disease and gallstones in both women and men. The table below lists some nuts' calcium, magnesium, sodium, and potassium content (see Table 2.4.)⁵⁹.

Table 2.4 Calcium, magnesium, sodium, and potassium content of some nuts, mg/100 g edible portion

Nuts	Calcium	Magnesium	Sodium	Potassium
Almonds	248	275	1	728
Brazil Nuts	160	376	3	659
Peanuts	92	168	18	705
Pistachios	107	121	1	1025
Walnuts	98	158	2	441

Source: Ros E. Health benefits of nut consumption. *Nutrients*. 2010;2(7):652-682. doi:10.3390/nu2070652

2.5.1.5. Fruits and Vegetables

Fruits and vegetables are universally recognized as healthy. The Dietary Guidelines for Americans 2010 recommends making half your plate fruit and vegetables⁶⁰. Fruits and vegetables are an important part of MED. Fruits and vegetables are rich in polyphenols. Fruits such as blueberries and blackberries have high polyphenol content. Polyphenols are known to have positive effects on cognitive function⁵³. Polyphenols in grapes can reduce atherosclerosis by lowering blood pressure and reducing inflammation. Potato is a well-known vegetable with high starch content in many parts of the world. Potatoes are rich in vitamin C and potassium. Some studies have shown that potatoes and french fries are associated with the risk of type 2 diabetes in women. Dried fruits and cooked vegetables have high fiber content. Epidemiological studies have revealed that fiber consumption is associated with lower cardiovascular disease risk and obesity prevention⁶⁰.

Components obtained from fruit and vegetables include water, fiber, proteins, fats (olives, avocados, and nuts), minerals, and carbohydrates. Fruits and vegetables are vitamin C, provitamin A, and vitamin B6 sources. Fruits and vegetables are low in calories and do not contain cholesterol. Fruits and vegetables contain phytochemicals that prevent diseases⁶¹. Dietary models aimed at improving cardiovascular health recommend consuming adequate amounts of fruits and vegetables daily. A meta-analysis of more than 200,000 patients revealed that consuming 3-5 servings of fruit and vegetables per day resulted in a 17% reduction in cardiovascular disease⁶².

2.5.1.6. Meat and Meat Products

Meat is among the best protein sources, and meat contains vitamin B12, iron, and zinc. Vitamin B12 deficiency is common in vegetarians who do not consume or cut back on meat⁶³. However, offal, such as the liver, is a source of vitamin A and folic acid⁶⁴.

Red meat is a rich protein source. The leanest part of beef is the waist, while the breast is usually the leanest in poultry. Chicken and turkey breast have similar fat content. Whole turkey legs have a higher fat content than chicken legs. At the same time, the consumption of 100 grams of red meat meets about two-thirds of the daily vitamin B12 requirement. Meat is also one of the best sources of zinc, selenium, phosphorus, and iron sources. Lean pieces of beef are a good source of selenium, zinc, and potassium. However, offal and especially the liver are an important source of vitamin A. Liver is a good source of retinol, providing over 338% of the recommended dietary value of 100 g⁶⁴.

2.5.1.7. Milk and Dairy Products

Milk and dairy products are foods consumed around the world and are rich in nutrients. Dairy products contain metabolites, including essential nutrients derived from dairy animals and milk processing and fermentation methods⁶⁵. Milk is a unique biological fluid that promotes development and provides optimal nutrition from the early stages of life. Milk is a good source of fat and protein⁶⁶.

The recommended adequate amount of protein for adult men is 52-56 g/day. For women, it is approximately 46 g/day. Protein requirements may increase in old age and pregnancy. Raw or processed milk is highly nutritious and an excellent source of protein, minerals, and fats for developing babies⁶⁶.

2.5.1.8. Red Wines

Red wine is known to have health-promoting properties. Recently, white wine is also known for its antioxidant effect. The high potassium content of grape juice, which is an important component of heart health, is also found in grape juice when the wine is made. By metabolizing, wine contains phytochemicals that may help reduce the risk of heart disease and colon or rectum cancers. Some studies have shown that moderate alcohol consumption will effectively reduce age-related loss of mental function compared to non-drinkers or those who drink too much alcohol⁶⁷.

The MED recommends consuming red wine with meals regularly. It is known that regular and moderate consumption of red wine is effective in reducing diseases such as CVD, hypertension, and type 2 diabetes. However, red wine contains antioxidant components. Red wine also has a protective effect on cardiovascular diseases. Red wine contains polyphenols, quercetin and resveratrol. Thanks to these components, it shows beneficial effects on health. Resveratrol protects heart cells from damage. At the same time, it prevents platelet aggregation and lowers plasma triglyceride and cholesterol levels. For these reasons, it is possible to say that resveratrol has a protective and beneficial effect on cardiovascular diseases. Quercetin is associated with blood pressure. According to studies, quercetin inhibits platelet aggregation and reduces the risk of hypertension by showing a vasodilator effect. It is known that red wine components also prevent cancer cell formation. In summary, the beneficial components of red wine show a protective and preventive effect on diseases such as heart disease, cancer, and blood pressure⁶⁸.

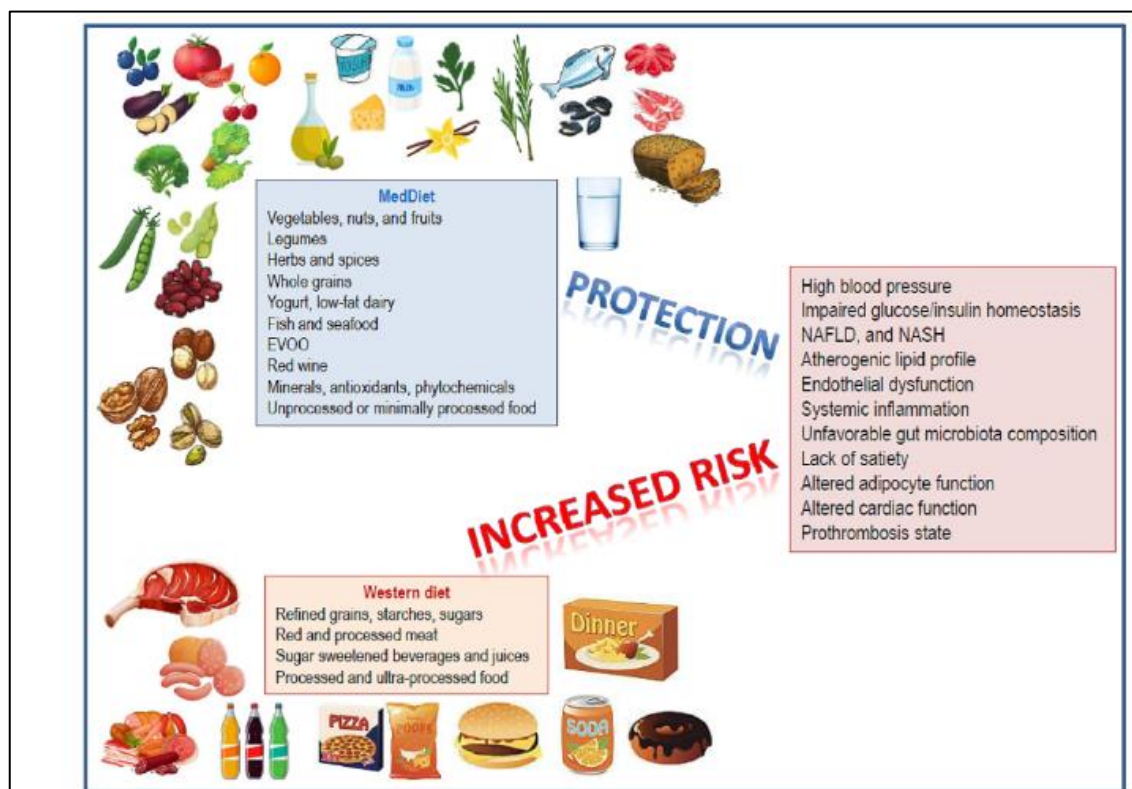
2.6. The Effect of the Mediterranean Diet on Diseases

2.6.1. MED and Obesity

The prevalence of obesity has increased rapidly in both men and women, regardless of factors such as continent, country, socioeconomic status, and active origin. Obesity is associated with mortality and is an important public health problem. The latest evidence for the safest BMI value indicates that it should be below 23 kg/m²⁶⁹. The MED has proven to be the most effective diet in preventing obesity and obesity-related diseases. Obese children and adolescents are at risk for many diseases, including insulin resistance, hypertension, sleep apnea, and fatty liver disease. For these reasons, it is important to prevent obesity in children⁷⁰.

There is evidence for the effects of the MED on weight loss and reduction of central adiposity. The SUN (Seguimiento Universidad de Navarra – Follow-up from the University of Navarra) project results with a mean follow-up of 5.7 ± 2.2 years and 10,376 participants are one of this evidence. The results of this study showed that individuals with the highest adherence to the MED were in the group with the lowest average weight gain. The fat content of MED is around 35-45%. Unlike the Western Diet model, the MED consists of unprocessed or minimally processed natural foods.

Below is the visual that compares the nutritional contents of the Western Diet and MED and explains the effects of these two diet models on diseases (see Figure 2.8.)⁷¹.



**(EVOO: extra virgin olive oil; NAFLD: non-alcoholic fatty liver disease; NASH: nonalcoholic steatohepatitis.)

Source: Dominguez LJ, Veronese N, Di Bella G, et al. Mediterranean diet in the management and prevention of obesity. *Exp Gerontol.* 2023;174(January). doi:10.1016/j.exger.2023.112121

Figure 2.8 Comparison of nutritional components of MED and Western diets & their effects on health.

Remarkably, the results of the entire PREDIMED (Prevención con Dieta Mediterránea) trial cohort, consumption of ultra-processed foods, refined carbohydrates, potatoes, red meats, and alcohol, have been significantly associated with greater weight gain. Some of the beneficial mechanisms of the MED on obesity and related diseases are weight loss, improving insulin resistance, improving lipid profiles, and reducing oxidative stress⁷¹.

An Italian study of obese pediatric patients examined the interaction between adherence to MED, which is assessed by KIDMED, and non-alcoholic fatty liver disease (NAFLD) of 243 children and adolescents with obesity. When the results were analyzed, higher fasting insulin, HOMA-IR values were observed in those with low adherence to MD. The results showed that the MED might be a good option for children who are obese and have fatty liver disease⁷².

Current research data from Italy supports the MED as a healthy eating model. It reveals that this diet model has a significant contribution to reducing the risk of obesity. Although southern Italy has traditionally been one of the regions where the MED is most prevalent, adherence to the MED has decreased in this region in recent years, and obesity rates have also increased in this region⁷³. In a study conducted in Spain examining the relationship between obesity and BMI in Mediterranean countries, an inverse relationship was determined between BMI and the MED⁷⁴.

2.6.2. MED and Diabetes Mellitus

Diabetes mellitus (DM) is a metabolic disease characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. In 2010, approximately 285 million people worldwide were diagnosed with DM; most cases were type 2 diabetes mellitus⁷⁵. Unlike the MED, the Western diet increases the risk of developing type 2 diabetes. In the Large Prospective European Study on Cancer and Nutrition study, adherence to a MED was associated with a reduced risk of type 2 diabetes.⁷⁶ Studies have shown that the Dietary Approach to Stop Hypertension (DASH) and similar diet models are protective against diabetes. These dietary patterns are known to be similar to the MED. In one study, the relationship between adherence to the MED and the risk of diabetes was investigated. Participants with high adherence to MED were found to have a 12% lower risk of Type 2 diabetes than those with poor adherence to MED⁷⁵.

A study was conducted in Iran to evaluate the effectiveness of the MED model on the incidence of cardiovascular disease, diabetic foot disorders, diabetic retinopathy, nephropathy, and neuropathy. A total of 22,187 participants with type 1 diabetes (mean age 50.7) or type 2 diabetes (mean age 59.9) were included in the analysis. 30.22% of the participants were male, and 69.78% were female. The results showed that the MED pattern was associated with a lower incidence of CVD and microvascular complications (diabetic retinopathy, nephropathy, and neuropathy)⁷⁷.

A study was conducted in Greece investigating the association of the MED with NAFLD and the 10-year onset of diabetes. In a study in Athens in which 1,514 men and 1,528 women over 18 years of age without cardiovascular disease at baseline participated, the MED was assessed by MedDietScore. The results determined that there was an inverse relationship between NAFLD and MED. However, the MED was found

to have a protective effect against prospective diabetes and cardiovascular diseases in individuals diagnosed with NAFLD⁷⁸.

2.6.3. Association between MED and Cardiovascular Disease

Cardiovascular diseases are the leading cause of death worldwide. In a study, it was revealed that the MED reduced cardiovascular morbidity and mortality⁶². In the MED model, consumption of meat and meat products is limited, and beef, pork, and lamb are only eaten on special occasions. Consumption of processed meat and butter products is very low or zero. Fermented products such as yogurt and cheese are consumed in moderate amounts⁷⁹. The effect of dairy products on cardiovascular diseases is discussed. The main source of fat in the MED is extra virgin olive oil. Primarily red wine is consumed as alcohol. EVOO and red wine include bioactive polyphenols. Extra virgin olive oil is obtained from pressing many olive fruits and has a high antioxidant content⁸⁰. However, olive oil contains oleic acid. Oleic acid is a monounsaturated fatty acid. Monounsaturated fatty acids are known to reduce hypercholesterolemia, hypertension, and cardiovascular mortality. Red wine contains polyphenols, quercetin and resveratrol. These ingredients are known to have a protective effect on cardiovascular diseases. Another important flavonoid found in red wine is quercetin. Quercetin acts as a vasodilator by inhibiting platelet aggregation, thus reducing the risk of hypertension⁶⁸.

One study in Spain examining the relationship between cardiovascular disease and the MED included 7,447 people (57% women) aged 55-80 years. The study's findings showed that a MED supplemented with EVOO reduced the incidence of major cardiovascular diseases among people at high cardiovascular risk. In summary, the results support the benefits of MED for primary prevention of cardiovascular disease⁸¹. According to the results of a clinical study, adherence to the MED improves the plasma lipid profile, reduces insulin resistance, and lowers blood pressure. However, it has been determined that MED has a beneficial effect on inflammation and oxidation biomarkers. The results of the PREDIMED study showed that the MED had a significant protective effect on the incidence of stroke⁸².

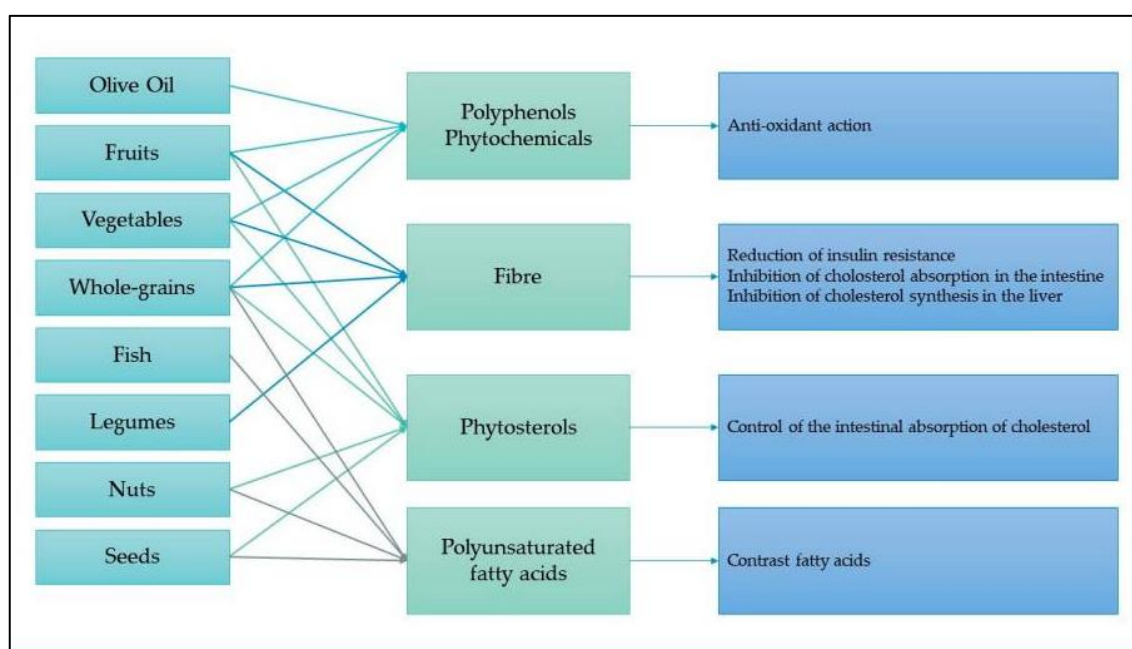
Some foods of the MED, such as nuts, vegetables, fruits, olive oil, and wine, are rich in antioxidant and anti-inflammatory components. Consumption of these foods is associated with improvement in various inflammatory and oxidant biomarkers. The

MED has a high vitamin E and C content, magnesium, and potassium. The results of many meta-analysis studies have found that MED has beneficial effects in the prevention of cardiovascular diseases⁸³.

2.6.4. Mediterranean Diet and Cancer

Cancer is the second leading reason of death worldwide. In 2018 alone, approximately 9.6 million deaths were due to cancer. In cancer cases, it was determined that there were 9.5 million new diagnoses in men and 8.5 million new diagnoses in women in 2018. However, while lung cancer, prostate cancer, and colorectal cancer affected more men in 2018, breast cancer and colorectal cancer were the most common in women. and lung cancer. Risk factors in cancer incidence are mainly heredity, exposure to harmful substances, or hormone imbalance. However, the incidence of cancer is also associated with people's lifestyle. Smoking is the leading reason for cancer deaths. Smoking, diet, obesity, and physical inactivity are important risk factors for cancer⁸⁴.

It is known that some nutritional components that form the basis of the MED contribute to reducing the danger of cancer. Below is the figure describing the mechanism of beneficial effects of the components of the MED (see Figure 2.9.)⁸⁴.

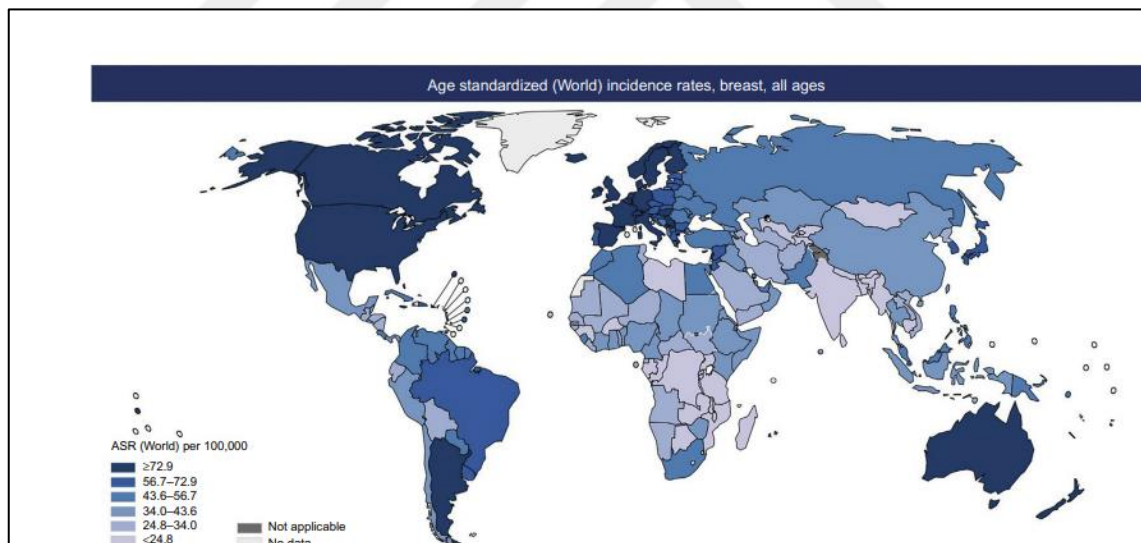


Source: Mentella MC, Scaldaferrì F, Ricci C, Gasbarrini A, Miggiano GAD. Cancer and mediterranean diet: A review. *Nutrients*. 2019;11(9):1-25. doi:10.3390/nu11092059

Figure 2.9 Diagram describing the mechanism between Mediterranean diet components and their beneficial effects

Polyphenols are abundant in foods such as grapes, blueberries, strawberries, onions, wine, olive oil, and tea. Polyphenols reduce the risk of cancer thanks to their antioxidant, antimutagenic and antiproliferative properties. Carotenoids, lycopene, and vitamin C found in vegetables and fruits have antioxidant properties and anticarcinogenic effects. However, omega-3 found in fish and nuts, which are the nutrients of the MED, is an important component that prevents cancer formation. Omega-3 regulates the transcription of oncogenes, cell proliferation, and metastasis. Thus, it has a slowing effect on cancer cell formation⁸⁵.

The incidence of breast cancer is increasing globally. There has been a significant increase in the incidence of breast cancer in recent years. Various reproductive factors and environmental risks are associated with the risk of breast cancer. Nutrition is thought to affect the risk of breast cancer, and studies are ongoing. The figure showing global breast cancer incidence spread is below (see Figure 2.10.)⁸⁶.



On the map, darker colors indicate a higher incidence of breast cancer.

Source: Demetriou CA, Maria G. Kakkoura, Andreas Hadjisavvas MAL, Sacerdote C, Vineis P, Kyriacou K. Chapter 35 - The Mediterranean diet and breast cancer risk. In: *The Mediterranean Diet (Second Edition)*. ; 2020:381-391.

Figure 2.10 Age-adjusted incidence rates map of worldwide breast cancer incidence in 2018.

A randomized controlled trial was recently conducted that investigated the relationship between adherence to a MED and invasive breast cancer among women at high cardiovascular risk. Those included in the study were divided into 3 groups. Group

one was administered a MED supplemented with EVOO, while group two administered a MED supplemented with mixed nuts. The third group, the control group, applied a diet by reducing dietary fat. This study showed that women in the MED group containing EVOO had a 68% lower risk of invasive breast cancer than control women. Women in the nut-containing MED group had a reduced risk of invasive breast cancer compared to women in the control group, but it was not statistically significant⁸⁶. A case-control study investigating the relationship between adherence to a MED and the risk of breast cancer was conducted in Italy and Switzerland. 3 034 breast cancer cases and 3,392 control cases admitted to the same hospital network for acute, non-neoplastic, and non-gynecological diseases were analyzed. Compliance with the MED was quantified through the Mediterranean Diet Score (MDS). As a result of the study, the results were similar in pre-and post-menopausal women. At the same time, adherence to the MED was determined to be associated with a reduced risk of breast cancer⁸⁷.

Studies in the U.S. report an inverse association of the MED pattern with breast cancer risk. Several studies in Mediterranean countries show that olive oil intake is inversely related to the danger of breast cancer. A study of traditional MED compliance and breast cancer risk was conducted by Antonia Trichopoulos et al. in the Greek EPIC (European Prospective Investigation into Cancer and Nutrition) cohort. 14 807 women were followed for an average of 9.8 years, and 240 cases of breast cancer were identified. The study concluded that adherence to a traditional MED might be associated with a lower risk of breast cancer among postmenopausal women⁸⁸.

Prostate cancer is the most common type of cancer in men in the world. In China, approximately 60,300 newly diagnosed cases were identified in 2015, and there were 26,600 patient deaths from prostate cancer⁸⁹. Animal fats, dairy products, and calcium are associated with an increased risk of prostate cancer. Fiber, fruit and vegetables, and tomato products are thought to be inversely related to prostate cancer. Based on available evidence, the MED and DASH diet patterns, high fiber, fruit, and vegetable consumption characteristics, and low consumption of meat, saturated fat, and whole milk are effective for reducing prostate cancer risk. However, the nutritional properties mentioned in these dietary patterns may protect against aggressive forms of prostate cancer⁹⁰.

Pancreatic cancer is among the leading reasons of cancer death in the world. The incidence of pancreatic cancer is highest in Europe, North America, and Australia/New Zealand. In pancreatic cancer, the five-year survival rate is 12%, despite improvements

in treatments. Risk factors that cause pancreatic cancer include advanced age, male gender, ethnicity, smoking, alcohol use, and diet factors. In terms of ethnicity, African Americans are more at risk than European Americans⁹¹. Between 90% and 95% of cases are due to environmental risk factors. These environmental risk factors are alcohol, smoking, physical inactivity, and obesity. Nutrition is also known to be effective in the risk of pancreatic cancer, and it is estimated that approximately 50% of pancreatic cancer cases are related to nutrition. Many macro and micronutrients are associated with the risk of pancreatic cancer. The results of the meta-analyses found that the risk of pancreatic cancer was significantly reduced in individuals who received high amounts of vitamin C in the diet compared to those who received low amounts of vitamin C. The correlation between food groups and pancreatic cancer danger is summarized in the table below (see Table 2.5.)⁹².

Table 2.5 Summary table of the correlation between foods and pancreatic cancer risk

Food groups	Relationship with Pancreatic cancer risk
Dairy Products	No Known Relationship
Fruits And Vegetables	There is an inverse relationship (in cohort studies)
Whole Grains	There is inverse association (but only significant in case-control studies)
Red & Processed Meat	There is a positive relationship
High Glycemic Foods	No correlation with glycemic load, glycemic index, total carbohydrate intake and sucrose. Only the highest fructose consumption levels were positively correlated.
Drinks Containing Alcohol	There is a positive correlation with excessive alcohol consumption.

Source: Salem AA, Mackenzie GG. Pancreatic cancer: A critical review of dietary risk. *Nutr Res*. 2018;52:1-13. doi:10.1016/j.nutres.2017.12.001

Over half a million cases of head and neck cancer (HNC) were detected worldwide in 2012. Approximately 70% of all HNC cases are caused by tobacco and alcohol consumption⁹³. Patients diagnosed with HNC are at risk of developing second primary cancers in the head and neck region and lungs. There are studies emphasizing the benefits of MED in reducing the death rate in cancer patients. In the treatment of patients with HCN, it is important to have a clinical team consisting of oncologists, dietitians, surgeons, speech and language pathologists, dentists, physiotherapists, nurses, and psychologists⁹⁴. Nutrition is of great importance in serious diseases or after major surgical operations, and it is necessary to pay attention to the diet of HCN cases with poor eating habits, alcohol, and smoking habits⁹⁵.

A study was conducted by Adriana Salvatore Benito et al. to compare adherence to MD in patients diagnosed with HNC and the healthy population. Cases diagnosed with HNC at a hospital in Madrid were compared with healthy individuals and included 168 people. As a result of this study, it was determined that moderate to high adherence to MD may reduce the risk of developing HNC⁹⁶.

2.6.5. Mediterranean Diet and Intestinal Diseases

There are approximately 1014 bacteria in the human body, and these bacteria live on the outer and inner surfaces of the human body. Of these bacterial species, Bacteroidetes, Firmicutes, Actinobacteria, Proteobacteria, and Verrucomicrobia are mostly found in the intestinal microbiota⁹⁷. Microbiota; It is defined as a community of microorganisms living in a host. The use of antibiotics, lifestyle, and dietary habits are the factors that affect the microbiota. The MED and similar healthy diet models have positive effects on the health of the intestinal microbiota. In many studies conducted in recent years, it has been found that intestinal microbiota is associated with many diseases, such as obesity, diabetes, cardiovascular disease, hypertension, inflammatory bowel diseases, allergies, and asthma. At the same time, the intestinal microbiota has an important regulatory role in the immune system and human health.⁹⁸ Nutrition is one of the most important factors affecting intestinal microbiota.⁹⁹ A healthy gut is defined as the absence of any gastrointestinal system (GIS) diseases and good physical and mental status. When the homeostatic balance of the intestines is disturbed, symptoms such as loss of appetite, diarrhea, constipation, involuntary weight loss, gas, cramps, vomiting, bloating, and nausea occur. Beneficial bacteria in the gastrointestinal tract have health effects. These beneficial bacteria protect the body against germs and harmful bacteria and provide protection against allergic diseases and inflammation⁹⁷.

There is an interaction between nutrient intake and intestinal microbiota. It is known that microorganisms in the intestine affect the synthesis of some vitamins. The first dietary factor affecting the microbiota is breast milk. It is known that one of the most important factors affecting the formation of intestinal microbiota in infants is breast milk. Breast milk is a food that contains both prebiotics and probiotics. The gut microbiota reaches the adult microbiota composition at an average of 2-3 years of age. In a study by De Filippo et al., the microbiota of children living in urban areas of Italy and children living in rural areas in Africa were compared. African children are fed a diet high in fiber and plant content, while Italian children are fed a diet high in animal

protein and fat. As a result, the abundance and variety of bacteria in the intestines of African children were higher compared to the bacteria in the intestines of Italian children¹⁰⁰.

The MED is rich in polyphenols that are beneficial for cardiovascular health. As a result of a study examining the relationship between microbiota polyphenols and the MED, it was determined that the metabolites of the MED could affect the gut microbiota, which is associated with cardiovascular health¹⁰¹.

In our country, a study was conducted to find the compliance of adolescents aged 14-16 years with the MED and to evaluate the relationship between compliance with the MED and intestinal health. In this study, 200 people between the ages of 14 and 16, registered in Antakya Anatolian High School in the academic year of 2019-2020, were included. In the research, the nutritional habits of individuals, 24-hour retrospective food consumption record and food consumption frequency, physical activity levels international Physical Activity Form (IPAQ) questionnaire, intestinal health were questioned with the Bristol Stool Scale, and compliance with the MED using the KIDMED form. As a result of this study, it has been determined that compliance with the MED has a positive effect on intestinal health⁹⁷.

2.7. Compliance with the Mediterranean Diet in Children and Adolescents

Eating habits are formed during childhood. Children use gender diagrams to make food choices. Children aged 3-6 may prefer pink and blue packaging according to packaging. In addition, it has been observed that children's food choices and eating behaviors are affected by cartoon characters. The food choices and eating behaviors of children older than 8 years are also affected by the choice of their friends. The school environment should encourage healthy eating for children⁹.

One study was conducted in Portugal to find the correlation between diet cost and adherence to MED in children. 464 children aged 6-12 years were studied. The KIDMED was used. The results revealed that greater compliance with the MED was associated with higher dietary costs in children¹⁰².

Children and adolescents in Mediterranean countries have a low degree of adaptation to the MED. This is because, with urbanization, children and adolescents turn to unhealthy and processed foods. The prevalence and adoption of the Western-style diet model cause the prevalence of obesity to be high in countries that should

adopt the MED. One study reported a higher level of adherence to the MED in Italian children compared to other studies conducted in Italy and other countries. According to the literature, women are generally thought to have better dietary habits in modern Western societies. However, on the contrary, recent studies on adherence to MED in children and adolescents have reported most studies that there is no difference between the sexes in terms of nutrition⁹.

MED has an effect on attention-deficit/hyperactivity disorder (ADHD). The research was conducted to find the correlation between compliance with the MED and the likelihood of ADHD. It was conducted on 360 children aged 7-13. As a result, children with the highest adherence to the MED were found to have a lower rate of ADHD compared to children with the lowest adherence¹⁰³.

A research was conducted to find the correlation between MED compliance and academic performance. After adjusting for potential confounders, the results showed a positive association between MED compliance, and academic indicators. In summary, the findings revealed that compliance with the MED is positively correlation with academic performance in adolescents¹⁰⁴.

3. METHODS

3.1. Time, Universe and Place of Research

This study was carried out with adolescent individuals who continue their high school education in Ataşehir district of Istanbul province. In the Spring Semester of 2022, a questionnaire was applied to the students who continued their high school education between January and May. The consent form was obtained from the adolescents and their parents, stating that they voluntarily participated in the research. 380 students aged between 14-18 agreed to join the research voluntarily and who filled out the questionnaire completely were included in the research.

In order to calculate the population size of the research, the sum count of students studying in public high schools in Ataşehir was learned. The sum count of students was calculated as 18897. Afterward, the sample size was calculated in the society whose universe is known. The universe of this research is 18897. The minimum sample number was calculated as 377 in a population with a known universe, according to the 95% confidence interval.

Written and verbal information was given to the volunteers who agreed to participate in this study with the "Informed Consent Form," and their consent forms were obtained (Appendix 7.3.). In order to carry out the study in high schools in Istanbul, necessary institutional permission was gained from the Istanbul Provincial Directorate of National Education (Appendix 7.5.). Ethics committee approval was obtained from Yeditepe University in order to carry out the study (Appendix 7.1.).

3.2. Inclusion and Exclusion Criterion of The Research

Inclusion criteria

- Between the ages of 14 and 18
- Volunteering
- Sign the consent form
- Answering the questions in the questionnaire completely

Exclusion criteria

- Not be between the ages of 14 and 18
- Not volunteer
- Not signing the consent form

- Answering questions in survey forms incompletely

3.3. Objective, Hypotheses, and Method of the Research

This research aims to determine the nutritional status and compliance with the MED of adolescents between the ages of 14-18 with questionnaires and the KIDMED. The second objective of this study is to evaluate the correlation between compliance with the MED, BMI values, and obesity in adolescents according to the data obtained. Since few studies examine the relationship between MED adherence and obesity in adolescence, this research will provide new information on this subject by investigating the relationship between MED adherence and obesity in adolescents. In addition, determining the prevalence of obesity in adolescents aged 14-18 with the data obtained from the study will help to make the necessary interventions to prevent obesity in the early period in the future.

Hypotheses;

- Adolescents with high adherence to the MED have a low prevalence of obesity.
- The Ho hypothesis of this study is that there is no difference between the obesity prevalence of boys with high adherence to the MED and girls with high adherence to the MED.
- The H1 hypothesis of this research is; There is a difference between the obesity prevalences of boys with high adherence to the MED and girls with high adherence to the MED.

3.4. Data Collection

In the research, the questionnaire forms were applied to the adolescents in two ways: a face-to-face written questionnaire and an online one. Questionnaire forms were administered to the students in high schools face-to-face and by distributing written questionnaires. The e-mail addresses of the students who wanted to participate in the research with the online survey method in high schools were obtained. The Google forms survey form was sent to the students' e-mails. Most of the adolescents preferred to fill out the questionnaires in written form. A small number of students (only 15 student responses) answered the online questionnaire sent to their e-mail. Questionnaire forms; It consists of a section consisting of general questions about nutrition, a section

consisting of questions containing anthropometric information, the food consumption frequency questionnaire, and the KIDMED section with 16 questions.

In this research, a questionnaire prepared by the researcher using the literature and similar studies, the KIDMED, and a food consumption frequency form were used as data collection tools. The KIDMED consists of 16 questions. However, voluntary adolescents participating in the research were asked to fill in the 'Frequency of Food Consumption Form' in the questionnaire form. In the questionnaire form, anthropometric data were obtained with the questions of body weight (kg), height (cm), and BMI.

3.4.1. Mediteranean Diet Quality - KIDMED

In this research, KIDMED, which is widely used in the world, will be used. This scale will be used to determine adherence to the MED. KIDMED was developed in 2004 by Serra Majem et al. A study aiming to determine the validity and reliability of the KIDMED scale by making the Turkish adaptation was carried out with 440 students attending the 6th, 7th, and 8th grades. As a result of the evaluation of the data, the reliability value (KR-20) was determined as 0.72. The findings obtained from the study showed that the scale has an acceptable level of reliability and that the scale is applicable in Turkey¹⁰⁵.

The KIDMED questionnaire is the scoring system used to assess adherence to the MED. The KIDMED range is between 0-12, and the scale consists of 16 questions. 12 of the questions are positive questions. 4 of them are negative questions. Those who answer yes to positive questions get +1 point. Those who answer yes to negative questions get -1 point. These points are accumulated. At the end of the evaluation, scores in the range of 0-12 points are obtained, and compliance with the MED is determined. These scores are then interpreted as follows:

- Collect ≥ 8 Points = Good Adherence
- Collect 4-7 Points =Average Adherence
- Collect ≤ 3 Points =Poor Adherence¹⁰⁶.

3.4.2. Nutritional Habits and Food Consumption Record

The food consumption frequency questionnaire determined the basic nutritional habits questions in the demographic questionnaire (Appendix 7.4.). The food

consumption frequency registration form questioned which foods, how often, and what quantity the adolescents consumed.

3.5. Evaluation of Anthropometric Measurements of Adolescents

3.5.1. Body mass index (BMI), BMI Z-Score, and Percentile

Body Mass Index (BMI) is the calculation of a person's weight in kilograms divided by the height in meters (kg/m^2) squared¹⁰⁷. BMI is a common method used to determine weight status. However, crude BMI remains inconclusive when considering changes in BMI due to age-related growth. BMI percentiles and Z-scores allow for intergroup comparisons and averaging by comparing an individual with age- and sex-specific references. The BMI-Z-Score is a good method for determining weight status in severely obese adolescents¹⁰⁸.

The classification of age- and sex-specific percentiles for children is as follows¹⁰⁹:

- Underweight.....<5th percentile
- Healthy weight.....5th to <85th percentile
- Overweight 85th to <95th percentile
- Obesity..... $\geq$ 95th percentile.

In anthropometric measures, sex- and age-specific percentiles, z-scores, and growth standards are commonly used statistical tools to assess growth and nutritional status and obesity in children and adolescents¹⁰⁹. In this study, BMI-Percentile and Z-score values were calculated to evaluate the nutritional status and obesity status/weight status of adolescents aged 14-18 years.

According to WHO 2007, BMI classification for children and adolescents aged 5-19 years should be calculated according to the reference median with z-scores by age and gender as follows:

- ($\leq +1$ SD) – (≥ -2 SD) normal weight
- ($> +1$ SD) overweight
- ($> +2$ SD)obesity¹¹⁰.

3.6. Statistical Evaluation of Data

Statistical Package for the Social Sciences (SPSS 26, IBM corporate, Chicago; USA) software was used for all the statistical analysis. Descriptive statistics including mean, standard deviation, median, frequency, percentage, minimum, maximum were used to reveal the nature of the data. The Shapiro-Wilk test was used to conform the quantitative data to fit the normal distribution. One-way analysis of variance (ANOVA) and binary evaluations with Bonferroni correction were used to compare groups of more than two normally distributed quantitative variables. Kruskal-Wallis and Dunn-Bonferroni tests were used to compare differences between groups of more than two quantitative variables that did not fit a normal distribution. The two qualitative data comparisons were performed using the Pearson chi-square test and Fisher-Freeman-Halton tests. Statistical significance was accepted as $p < 0.05$ with 95% confidence interval.

4. .RESULT

This research was conducted with a sum of 380 students, 50.5% (n=192) girls, and 49.5% (n=188) boys, in 3 high schools in Ataşehir between January 2022 and May 2022.

The ages of the people joining in the study ranged from 14 to 18, with a mean of 15.87 ± 1.00 years. 10.3% of the cases (n=39) were 14 years old, 25% (n=95) were 15 years old, 33.4% (n=127) were 16 years old, 29.7% (n=113) were 17 years old, and 1.6% (n=6) were 18 years old (see below Table 4.1.).

Table 4.1 Distribution of Descriptive Characteristics

		Mean $\pm$ SD
		Median (Min-Max)
Age		15.87 $\pm$ 1.00
		16 (14-18)
		n (%)
	14 Years	39 (10.3)
	15 Years	95 (25.0)
	16 Years	127 (33.4)
Gender	17 Years	113 (29.7)
	18 Years	6 (1.6)
	Girl	192 (50.5)
Exercise	Boy	188 (49.5)
	Yes	230 (60.5)
	No	150 (39.5)

While 60.5% (n=230) of the adolescents stated that they exercised, 39.5% (n=150) stated that they did not exercise.

The average height of the adolescents participating in the study was 170.73 ± 8.58 cm, their average weight was 62.34 ± 13.32 , and their body mass index was 21.27 ± 3.47 kg/m² on average (see Table 4.2.).

Table 4.2 Distribution of Anthropometric Measurements

	Mean $\pm$ SD	Median (Min-Max)
Height (cm)	170.73 $\pm$ 8.58	170 (150-203)
Weight (kg)	62.34 $\pm$ 13.32	60 (40-160)
BMI (kg/m ²)	21.27 $\pm$ 3.47	20.70 (15.24-38.83)
		n (%)

BMI Percentile	<5 percentile (Thin)	10 (2.6)
	5-85 percentile (Normal)	324 (85.3)
	85-95 percentile (Overweight)	30 (7.9)
	>95 percentile (Obese)	16 (4.2)

Of the adolescents, 2.6% (n=10) were underweight, 85.3% (n=324) had normal weight, 7.9% (n=30) were overweight, and 4.2% (n=16) were observed to be obese (see Table 4.2.).

Table 4.3 Distributions of Eating Habits

		Mean ± SD	Median (Min-Max)
Number of main meals		2.66±0.91	3 (1-6)
Number of snacks		2.48±1.74	2 (0-10)
Amount of Water Consumed (Glass of water)		8.90±5.18	8 (1-30)
		n (%)	
Preferring Healthy Meals at Meals	Yes		198 (52.1)
	No		182 (47.9)
Appetite status	Poor appetite		37 (9.7)
	Normal		216 (56.9)
	high appetite		127 (33.3)
Breakfast Place	home		210 (55.3)
	bring from home and eat at school		83 (21.8)
	School canteen		52 (13.7)
	Bakery		35 (9.2)
Lunch place	home		134 (35.3)
	school cafeteria/canteen		195 (51.3)
	restaurants		32 (8.4)
	other		19 (5.0)
Dinner Place	home		355 (93.4)
	Restaurant		20 (5.3)
	other		5 (1.3)
frequency of eating out	1-2 times a week		105 (27.6)
	3-4 times a week		61 (16.1)
	everyday		26 (6.8)
	sometimes		188 (49.5)

The number of main meals of the participants varied between 1 and 6 meals, with an average of 2.66 ± 0.91 , and the number of snacks between 0 and 10, with an average of 2.48 ± 1.74 . The amount of water consumed by the participants varied between 1 and 30 glasses, with an average of 8.90 ± 5.18 glasses. 52.1% (n=198) of adolescents prefer healthy meals (see Table 4.3.).

It was determined that 9.7% (n=37) of the adolescents had poor appetite, 56.9% (n=216) had a normal appetite, and 33.3% (n=127) had a high appetite. It was determined that 55.3% (n=210) of the study's adolescents had breakfast at home. However, it was determined that 21.8% (n=83) brought it from home and ate it at school, 13.7% (n=52) in the school canteen, and 9.2% (n=35) in the patisserie. 35.3% (n=134) of adolescents eat lunch at home. However, 51.3% (n=195) eat in the school cafeteria/canteen, 8.4% (n=32) eat at a restaurant, and 5% (n=19), at other places. 93.4% (n=355) of the adolescents have their dinner at home, 5.3% (n=20) at a restaurant, and 1.3% (n=5) at other places. 27.6% (n=105) of adolescents eat out 1-2 times a week. 16.1% (n=61) eat out 3-4 times a week, 6.8% (n=26) eat out every day, and 49.5% (n=188) occasionally eat out (see Table 4.3.).

Table 4.4 Distribution of Consumption Frequencies of Dairy Group Foods

	daily	5-6 times/w eek	3 or 4 times /week	1 or 2 times /week	1 time in 15 days	Once a month	Any/zero
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Full fat milk	63 (16.6)	40 (10.5)	69 (18.2)	59 (15.5)	26 (6.8)	27 (7.1)	96 (25.3)
Semi-skimmed milk	59 (15.5)	33 (8.7)	82 (21.6)	50 (13.2)	31 (8.2)	22 (5.8)	103 (27.1)
Light milk	19 (5)	16 (4.2)	41 (10.8)	39 (10.3)	27 (7.1)	27 (7.1)	211 (55.5)
Kefir	5 (1.3)	19 (5)	16 (4.2)	32 (8.4)	37 (9.7)	40 (10.5)	231 (60.8)
Yogurt	74 (19.5)	75 (19.7)	89 (23.4)	64 (16.8)	21 (5.5)	19 (5)	38 (10)
Feta cheese	113 (29.7)	61 (16.1)	61 (16.1)	71 (18.7)	14 (3.7)	13 (3.4)	47 (12.4)
Kaşar	77 (20.3)	65 (17.1)	94 (24.7)	60 (15.8)	27 (7.1)	12 (3.2)	45 (11.8)
Tulum	7 (1.8)	20 (5.3)	28 (7.4)	54 (14.2)	35 (9.2)	29 (7.6)	207 (54.5)
Çökelek	10 (2.6)	7 (1.8)	22 (5.8)	25 (6.6)	28 (7.4)	41 (10.8)	247 (65)
Cream cheese	33 (8.7)	31 (8.2)	53 (13.9)	60 (15.8)	34 (8.9)	40 (10.5)	129 (33.9)

milk desserts (rice pudding, pudding, etc.)	24 (6.3)	27 (7.1)	58 (15.3)	96 (25.3)	80 (21.1)	52 (13.7)	43 (11.3)
Others	17 (4.5)	11 (2.9)	20 (5.3)	24 (6.3)	15 (3.9)	8 (2.1)	285 (75)

16.6% of adolescents consume whole milk every day. 10.5% five or six times a week, 18.2% three or four times a week, 15.5% 1 or 2 times/week, 6.8% 1 time in 15 days, and 7.1% consumes one time per month. 25.3% do not consume. 15.5% of adolescents consume semi-skimmed milk daily. 8.7% consume it five or six times /week, 21.6% consume it three of four times a week, 13.2% consume it 1-2 times /week, and 8.2% consume it one time in 15 days. 5.8% consume it once a month. 27.1% do not consume. 5% of adolescents consume light milk daily. 4.2% consume it five or six times a week, 10.8% consume it three or four times a week, and 10.3% consume it one or two times a week. 7.1% consume it once in 15 days. 7.1% consume it once a month. 55.5% do not consume. 1.3% of adolescents consume kefir daily. 5% consume it 5-6 times a week, 4.2% consume it 3-4 times/week, 8.4% consume it one or two times a week, and 9.7% consume 1 time in 15 days. 10.5% is consumed once a month. 60.8% do not consume. 19.5% of adolescents consume yogurt daily. 19.7% consume five or six times a week, 23.4% consume three or four times a week, 16.8% consume one or two times a week, 5.5% consume it once in 15 days. 5% consume once a month. 10% do not consume. 29.7% of adolescents consume feta cheese daily. 16.1% five or six times a week, 16.1% three or four times a week, 18.7% one or two times a week, % and 3.7 of them consume it one times in fifteen days. 3.4% of them consume it once a month. 12.4% do not consume. 20.3% of adolescents consume kaşar cheese daily. 17.1% consume it five or six times a week, 24.7% consume it three or four times a week, 15.8% consume it one or two times a week, 7.1% consume it once in fifteen days. 3.2% consume it once a month. 11.8% do not consume. 1.8% of adolescents consume Tulum cheese every day. 5.3% of them five or six times a week, 7.4% of them three or four times a week, 14.2% of them one or two times a week, % 9.2% consume one time in fifteen days, and 7.6% consume it once a month. 54.5% do not consume. 2.6% of adolescents consume Çökelek cheese every day. 1.8% of them five or six times a week, 5.8% of them three or four times a week, 6.6% of them one or two times a week, % 7.4 of them consume it once in fifteen days, and 10.8% of it once a month but 65% do not consume. 8.7% of adolescents consume cream cheese every day. 8.2% consume it 5-6 times a week, 13.9% consume it three or four times a week, 15.8% consume it one or

two times a week, 8.9% consume it once in fifteen days, and 10.5% consume it once a month while 33.9% do not consume. 6.3% of adolescents consume milk desserts daily. 7.1% consume it five or six times a week, 15.3% consume it three or four times a week, 25.3% consume it one or two times a week, and 21.1% consume it once in fifteen days. 13.7% of them consume it once a month. 11.3% do not consume. 4.5% of adolescents consume other dairy products every day. 2.9% consume it five or six times/week, 5.3% consume it three or four times a week, 6.3% consume it one or two times a week, and 3.9% consume it once in fifteen days. 2.1% consume it once a month. 75% do not consume (see Table 4.4.).

3.9% of adolescents consume red meat daily. 10% consume five or six times a week, 24.5% consume three or four times a week, and 32.9% consume one or two times a week. 12.9% consume it once in fifteen days. 9.2% consume it once a month. 6.6% do not consume. 9.2% of adolescents consume meat products (salami, pastrami, etc.) every day. 15.3% consume five or six times a week, 27.4% consume three or four times a week, 26.3% consume one or two times/week, and 9.5% consume it once a day. 4.7 of them consume it one times in month. 7.6% do not consume. 6.6% of the cases consume white meat daily. 16.3% consume it five or six times a week, 32.1% consume it three or four times/week, and 26.1% consume it one or two times a week. 12.6% consume it once in fifteen days, and 3.7% consume it once a month. 2.6% do not consume. 1.1% of cases consume offal daily. 1.3% consume five or six times a week, 5.3% consume three or four times a week, and 8.2% consume one or two times a week. 9.2% consume it once in fifteen days, and 13.2% consume it one time a month. 61.8% do not consume it. 0.8% of adolescents consume fish daily. 1.1% consume it five or six times a week, 9.7% consume it three or four times a week, 18.7% consume it one or two times a week. 26.3% consume it once in fifteen days. 28.9% consume it once a month. 14.5% do not consume. 6.1% of adolescents consume legumes daily. 9.2% consume five or six times a week, 27.6% consume three or four times a week, and 29.2% consume one or two times a week. 10.3% consume it once in fifteen days, and 6.1% once a month. 11.6% do not consume at all. 12.1% of adolescents consume oil seeds daily. 9.5% consume it five or six times a week, 23.7% consume it three or four times a week, 30.8% consume it one or two times a week, 13.9% consume it once in fifteen days. 5% consume it once a month. 5% do not consume at all. 26.6% of adolescents consume eggs daily. 13.9% consume five or six times a week, 20.3% consume three or four times

a week, and 17.1% consume one or two times a week. 7.6% consume it once in fifteen days, and 4.7% consume it one time in a month. 9.7% do not consume (see Table 4.5.).

Table 4.5. Distribution of Consumption Frequencies of Meat Group Products

	daily	Five or six times /week	Three or four times /week	One or two times /week	Once in fifteen days	Once in month	Any or zero
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Red meats	15 (3.9)	38 (10)	93 (24.5)	125 (32.9)	49 (12.9)	35 (9.2)	25 (6.6)
Meat products (salami, bacon, etc.)	35 (9.2)	58 (15.3)	104 (27.4)	100 (26.3)	36 (9.5)	18 (4.7)	29 (7.6)
White meats (chicken, turkey)	25 (6.6)	62 (16.3)	122 (32.1)	99 (26.1)	48 (12.6)	14 (3.7)	10 (2.6)
Offal	4 (1.1)	5 (1.3)	20 (5.3)	31 (8.2)	35 (9.2)	50 (13.2)	235 (61.8)
Fish	3 (0.8)	4 (1.1)	37 (9.7)	71 (18.7)	100 (26.3)	110 (28.9)	55 (14.5)
dry beans	23 (6.1)	35 (9.2)	105 (27.6)	111 (29.2)	39 (10.3)	23 (6.1)	44 (11.6)
Oilseeds (walnuts, hazelnuts, etc.)	46 (12.1)	36 (9.5)	90 (23.7)	117 (30.8)	53 (13.9)	19 (5)	19 (5)
Egg	101 (26.6)	53 (13.9)	77 (20.3)	65 (17.1)	29 (7.6)	18 (4.7)	37 (9.7)

Table 4.6. Distribution of Consumption Frequencies of Vegetables and Fruits

	daily	Five or six times a week	Three or four times a week	One or two times a week	Once in fifteen days	Once a month	Any
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Green leafy vegetables	66 (17.4)	51 (13.4)	94 (24.7)	87 (22.9)	37 (9.7)	17 (4.5)	28 (7.4)
Other vegetables	48 (12.6)	51 (13.4)	74 (19.5)	92 (24.2)	44 (11.6)	19 (5)	52 (13.7)
Potatoes	40 (10.5)	62 (16.3)	125 (32.9)	96 (25.3)	39 (10.3)	5 (1.3)	13 (3.4)
Citrus	29 (7.6)	46 (12.1)	92 (24.2)	95 (25)	51 (13.4)	27 (7.1)	40 (10.5)
Other Fruits	74 (19.5)	65 (17.1)	66 (17.4)	66 (17.4)	29 (7.6)	15 (3.9)	65 (17.1)
Dried Fruits	25 (6.6)	32 (8.4)	52 (13.7)	69 (18.2)	52 (13.7)	36 (9.5)	114 (30)

17.4% of adolescents consume green leafy vegetables daily. 13.4% consume five or six times a week, and 24.7% consume three or four times a week, and 22.9% consume one or two times a week. 9.7% consume it once in fifteen days, and 4.5% consume it once a month. 7.4% do not consume. 12.6% of adolescents consume other vegetables daily. 13.4% consume five or six times a week, 19.5% consume three or four times a week, and 24.2% consume one or two times a week. 11.6% consume it once in fifteen days, and 5% consume it once a month. 13.7% do not consume. 10.5% of adolescents consume potatoes daily. 16.3% consume five or six times a week, 32.9% consume three or four times a week, and 25.3% consume one or two times a week. 10.3% consume it once in fifteen days, and 1.3% consume it once a month. 3.4% do not consume. 17.4% of adolescents consume citrus fruits daily. 13.4% consume five or six times a week, 24.7% consume three or four times a week, and 22.9% consume one or two times a week. 9.7% consume it once in fifteen days, and 4.5% consume it once a month. 7.4% do not consume. 19.5% of adolescents consume other fruits daily. 17.1% consume five or six times a week, 17.4% consume three or four times a week, and 17.4% consume one or two times a week. 7.6% consume it once in fifteen days, and 3.9% consume it once a month. 17.1% do not consume at all. 6.6% of adolescents consume dried fruits daily. 8.4% consume five or six times a week, 13.7% consume three or four times a week, and 18.2% consume one or two times a week. 13.7% consume it once in fifteen days, and 9.5% consume it once a month, but 30% do not consume it (see Table 4.6.).

Table 4.7 Distribution of Consumption Frequencies of Cereal Group Products

	daily	5-6 times a week	3-4 times a week	1-2 times a week	Once in fifteen days	Once a month	Any
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
White bread	166 (43.7)	51 (13.4)	53 (13.9)	37 (9.7)	16 (4.2)	15 (3.9)	42 (11.1)
Wholemeal bread	46 (12.1)	32 (8.4)	52 (13.7)	51 (13.4)	35 (9.2)	32 (8.4)	132 (34.7)
Flatbread/Yufka	12 (3.2)	16 (4.2)	36 (9.5)	59 (15.5)	81 (21.3)	70 (18.4)	106 (27.9)
Bagel	21 (5.5)	29 (7.6)	51 (13.4)	92 (24.2)	87 (22.9)	44 (11.6)	56 (14.7)
Rice	35 (9.2)	77 (20.3)	102 (26.8)	95 (25)	40 (10.5)	17 (4.5)	14 (3.7)
Bulgur	18 (4.7)	48 (12.6)	83 (21.8)	110 (28.9)	65 (17.1)	28 (7.4)	28 (7.4)
Pasta-noodles	44 (11.6)	64 (16.8)	115 (30.3)	81 (21.3)	31 (8.2)	13 (3.4)	32 (8.4)

Breakfast cereals	45 (11.8)	36 (9.5)	74 (19.5)	76 (20)	41 (10.8)	40 (10.5)	68 (17.9)
--------------------------	-----------	----------	-----------	---------	-----------	-----------	-----------

43.7% of adolescents consume white bread daily. 13.4% consume five or six times a week, 13.9% consume three or four times a week, and 9.7% consume one or two times a week. 4.2% consume it once in fifteen days, and 3.9% consume it once a month. 11.1% do not consume. 12.1% of adolescents consume wholemeal bread daily. 8.4% consume five or six times a week, 13.7% consume three or four times a week, and 13.4% consume one or two times a week. 9.2% consume it once in fifteen days, and 8.4% consume it once a month. 34.7% of them do not consume it. 3.2% of adolescents consume flatbread/yufka daily. 4.2% consume five or six times a week, 9.5% consume three or four times a week, and 15.5% consume one or two times a week. 21.3% consume it once in fifteen days, and 18.4% consume it once a month. 27.9% do not consume. 5.5% of adolescents consume bagels daily. 7.6% consume five or six times a week, 13.4% consume three or four times a week, and 24.2% consume one or two times a week. 22.9% consume it once in fifteen days, and 11.6% consume it once a month. 14.7% do not consume. 9.2% of adolescents consume rice daily. 20.3% consume five or six times a week, 26.8% consume three or four times a week, and 25% consume one or two times a week. 10.5% consume it once in fifteen days, and 4.5% consume it once a month. 3.7% do not consume. 4.7% of adolescents consume bulgur daily. 12.6% consume it five or six times a week, 21.8% consume it three or four times a week, and 28.9% consume it one or two times a week. 17.1% consume it once in fifteen days, and 7.4% consume it once a month. 7.4% do not consume. 11.6% of adolescents consume pasta-noodles every day. 16.8% consume it five or six times a week, 30.3% consume it three or four times a week, and 21.3% consume it one or two times a week. 8.2% consume it once in fifteen days, and 3.4% consume it once a month. 8.4% do not consume. 11.8% of adolescents consume white bread daily. 9.5% consume five or six times a week, 19.5% consume three or four times a week, and 20% consume one or two times a week. 10.8% consume it once in fifteen days, and 10.5% consume it once a month. 17.9% do not consume it (see Table 4.7.)

Table 4.8 Distribution of Consumption Frequencies of Fats

	daily	Five or six /week	Three or four times/wee k	One or two times/wee k	Once in fifteen days	once in month	Any
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Olive oil	52 (1.7)	64 (16.8)	91 (23.9)	62 (16.3)	39 (10.3)	18 (4.7)	54 (14.2)
Other oils	30 (7.9)	46 (12.1)	70 (18.4)	53 (13.9)	29 (7.6)	12 (3.2)	140 (36.8)
Margarine	14 (3.7)	39 (10.3)	56 (14.7)	82 (21.6)	41 (10.8)	35 (9.2)	113 (29.7)
Butter	38 (10)	65 (17.1)	77 (20.3)	75 (19.7)	39 (10.3)	28 (7.4)	58 (15.3)

13.7% of adolescents consume olive oil daily.16.8% consume five or six times a week, 23.9% consume three or four times a week, and 16.3% consume one or two times a week.10.3% consume it once in fifteen days and 4.7% once a month, but 14.2% do not consume it. 7.9% of adolescents consume other oils daily. 12.1% consume five or six times a week, 18.4% consume three or four times a week, 13.9% consume one or two times a week, 7.6% consume it once in fifteen days, and 3.2% consume it once a month. 36.8% do not consume. 3.7% of adolescents consume margarine daily. 10.3% consume it five or six times a week, 14.7% consume it three or four times a week, and 21.6% consume it one or two times a week.10.8% consume it once in fifteen days, and 9.2% consume it once a month. 29.7% do not consume. 10% of adolescents consume butter daily. 17.1% consume five or six times a week, 20.3% consume three or four times a week, and 19.7% consume one or two times a week. 10.3% consume it once in fifteen days, and 7.4% consume it once a month.15.3% do not consume at all (see Table 4.8.).

27.9% of adolescents consume chocolate daily. 22.4% consume five or six times a week, 20% consume three or four times a week, and 18.2% consume one or two times a week.5.8% consume it once in fifteen days, and 3.2% consume it once a month, but 2.6% do not consume it. 19.7% of adolescents consume sugar daily. 15.3% consume five or six times a week, 16.6% consume three or four times a week, and 20% consume one or two times a week.8.2% consume it once in fifteen days, and 6.1% consume it once a month. 14.2% do not consume. 12.4% of adolescents consume honey daily. 10.8% consume five or six times a week, 18.9% consume three or four times a week, and 20.5% consume one or two times a week.10.8% consume it once in fifteen days,

and 8.4% consume it once a month. 18.2% do not consume. 7.6% of adolescents consume jam every day. 10.5% consume five or six times a week, 17.1% consume three or four times a week, and 17.1% consume one or two times a week. 13.9% consume it once in fifteen days, and 8.2% consume it once a month, but 25.5% do not consume it. 7.1% of adolescents consume molasses daily. 7.9% consume five or six times /week, 11.1% consume three or four times a week, and 13.9% consume one or two times a week. 14.7% consume it once in fifteen days, and 11.1% consume it once a month, but 34.2% do not consume it. 5% of adolescents consume confectionery-Turkish delight every day. 5.5% consume five or six times a week, 10.5% consume three or four times a week, and 17.9% consume one or two times a week. 15% consume it once in fifteen days, and 15.3% consume it once a month 30.8% do not consume it (see table 4.9.).

Table 4.9 Distribution of Consumption Frequencies of Sugary foods

	daily	Five or six times/week	Three or four times/week	One or two times/week	once in fifteen days	once in month	Any
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Chocolate	106 (27.9)	85 (22.4)	76 (20)	69 (18.2)	22 (5.8)	12 (3.2)	10 (2.6)
Sugar	75 (19.7)	58 (15.3)	63 (16.6)	76 (20)	31 (8.2)	23 (6.1)	54 (14.2)
Honey	47 (12.4)	41 (10.8)	72 (18.9)	78 (20.5)	41 (10.8)	32 (8.4)	69 (18.2)
Jam	29 (7.6)	40 (10.5)	65 (17.1)	65 (17.1)	53 (13.9)	31 (8.2)	97 (25.5)
Molasses	27 (7.1)	30 (7.9)	42 (11.1)	53 (13.9)	56 (14.7)	42 (11.1)	130 (34.2)
Candies - Turkish delight	19 (5)	21 (5.5)	40 (10.5)	68 (17.9)	57 (15)	58 (15.3)	117 (30.8)

Table 4.10 Distribution of Consumption Frequencies of Drinks

	daily	Five or six a week	Three four times week or a	One or two times a week	once in fifteen days	Once a month	Any
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Tea	177 (46.6)	55 (14.5)	45 (11.8)	42 (11.1)	11 (2.9)	13 (3.4)	37 (9.7)
Coffee	121 (31.8)	56 (14.7)	51 (13.4)	61 (16.1)	27 (7.1)	18 (4.7)	46 (12.1)
Coke-Normal	52 (13.7)	36 (9.5)	56 (14.7)	67 (17.6)	26 (6.8)	31 (8.2)	112 (29.5)
Coke-Light	27 (7.1)	26 (6.8)	40 (10.5)	52 (13.7)	28 (7.4)	34 (8.9)	173 (45.5)
Herbal teas	45 (11.8)	31 (8.2)	45 (11.8)	48 (12.6)	40 (10.5)	42 (11.1)	129 (33.9)
Juices	50 (13.2)	54 (14.2)	70 (18.4)	78 (20.5)	38 (10)	31 (8.2)	59 (15.5)
Mineral waters	59 (15.5)	61 (16.1)	64 (16.8)	47 (12.4)	36 (9.5)	48 (12.6)	65 (17.1)
Alcohol	19 (5)	5 (1.3)	12 (3.2)	10 (2.6)	17 (4.5)	43 (11.3)	274 (72.1)

46.6% of adolescents drink tea daily. 14.5% drink five or six times a week, 11.8% drink three or four times a week, and 11.1% drink one or two times a week. 2.9% drink it once in fifteen days, and 3.4% drink it once a month. 9.7% do not drink. 31.8% of adolescents drink coffee daily. 14.7% drink five or six times a week, 13.4% drink three or four times a week, and 16.1% drink one or two times a week. 7.1% drink it once in fifteen days, and 4.7% drink it once a month. 12.1% do not drink at all. 13.7% of adolescents drink normal cola daily. 9.5% drink five or six times a week, 14.7% drink three or four times a week, and 17.6% drink one or two times a week. 6.8% drink it once in fifteen days, and 8.2% drink it once a month. 29.5% do not drink at all. 7.1% of adolescents drink light cola daily. 6.8% drink five or six times a week, 10.5% drink three or four times a week, and 13.7% drink one or two times a week. 7.4% drink it once in fifteen days, and 8.9% drink it once a month. 45.5% do not drink. 11.8% of adolescents drink herbal teas every day. 8.2% drink five or six times a week, 11.8% drink three or four times a week, and 12.6% drink one or two times a week. 10.5% consume it once in fifteen days, 11.1% consume it once a month, and 33.9% do not drink. 13.2% of adolescents drink fruit juices every day. 14.2% consume five or six times a week, 18.4% consume three or four times a week, and 20.5% consume one or two times a week. 10% drink once in fifteen days, and 8.2% drink once a month. 15.5%

do not drink. 15.5% of adolescents drink mineral water every day. 16.1% drink five or six times a week, 16.8% drink three or four times a week, and 12.4% drink one or two times a week. 9.5% drink it once in fifteen days, 12.6% drink it once a month, but 17.1% do not. 5% of adolescents drink alcohol daily. 1.3% consume five or six times a week, 3.2% consume three or four times a week, and 2.6% consume one or two times a week. 4.5% consume it once in fifteen days, and 11.3% consume it once a month, but 72.1% do not consume it (see Table 4.10.).

Table 4.11. Mediterranean Diet Quality Index (KIDMED)

	YES	NO
	n (%)	n (%)
Do you eat a fruit or drink juice every day?	296 (78.1)	83 (21.9)
Do you eat a second fruit every day?	203 (53.4)	177 (46.6)
Do you regularly consume fresh or cooked vegetables once a day?	197 (52.0)	182 (48.0)
Do you consume more than one fresh or cooked vegetable a day?	126 (33.2)	254 (66.8)
Do you regularly eat fish at least 2-3 times a week?	79 (20.9)	299 (79.1)
Do you go to fast food restaurants more than once a week?	154 (40.8)	223 (59.2)
Do you like legumes and eat more than once a week?	238 (63.0)	140 (37.0)
Do you consume pasta and rice almost every day (5 or more per week)?	202 (53.6)	175 (46.4)
Do you consume cereals (corn-flakes, etc.) or cereal products (bread) for breakfast?	255 (67.3)	124 (32.7)
Do you consume nuts regularly (at least 2-3 times a week)?	244 (64.9)	132 (35.1)
Do you consume olive oil?	278 (73.7)	99 (26.3)
Do you skip breakfast?	171 (45.2)	207 (54.8)
Do you consume milk and dairy products (milk, yogurt, etc.) for breakfast?	276 (73.2)	101 (26.8)
Do you eat ready-made bakery products (bread, etc.) or cake for breakfast?	249 (65.9)	129 (34.1)
Do you consume milk/yogurt and/or cheese (40 g) twice a day?	252 (67.7)	120 (32.3)
Do you eat dessert and sweets/confectionery several times a day?	220 (58.4)	157 (41.6)

The distribution of the answers given by the participants to the KIDMED is shown in Table 4.11.

Table 4.12. Distribution of KIDMED Levels

		n (%)
KIDMED	Good Adherence	59 (15.5)
	Average Adherence	209 (55.0)
	Poor Adherence	112 (29.5)
	Mean $\pm$ SD	Median (Min-Max)
KIDMED Score	4.87 $\pm$ 2.61	5 (-2-12)

According to the scores of the participants from the KIDMED questions, it was observed that 15.5% (n=59) of the participants had good adherence to the MED, 55% of them (n=209) were average adherence and 29.5% (n=112) were at poor adherence. (see Table 4.12.).

Table 4.13. Evaluation of KIDMED Levels by Demographic Characteristics

		KIDMED			
		Good Adherence (n=59)	Average Adherence (n=209)	Poor Adherence (n=112)	
		Mean $\pm$ SD Median (Min-Max)	Mean $\pm$ SD Median (Min-Max)	Mean $\pm$ SD Median (Min-Max)	p
Age		15.80 $\pm$ 0.98	15.90 $\pm$ 0.99	15.86 $\pm$ 1.05	F:0.285
		16 (14-18)	16 (14-18)	16 (14-18)	^A 0.752
		n (%)	n (%)	n (%)	
Gender	Girl	24 (40.7)	103 (49.3)	65 (58.0)	χ^2 :4.945
	Boy	35 (59.3)	106 (50.7)	47 (42.0)	^B 0.084
Exercise	Yes	46 (78.0)	125 (59.8)	59 (52.7)	χ^2 :10.443
	No	13 (22.0)	84 (40.2)	53 (47.3)	^B 0.005**

^aOneway ANOVA

^bPearson Chi-Square Test

**p<0,01

Table 4.14. Evaluation of KIDMED Levels According to Anthropometric Measurements

KIDMED					
		Good adherence (n=59)	Average Adherence (n=209)	Poor Adherence (n=112)	<i>p</i>
		Mean ± SD	Mean ± SD	Mean ± SD	
		Median (Min-Max)	Median (Min-Max)	Median (Min-Max)	
BMI (kg/m ²)		21.50±2.60	21.34±3.85	21.02±3.11	F:0.457
		21.3 (16.8-28.7)	20.5 (15.2-38.8)	20.6 (15.6-31.3)	^A 0.634
		Median ± SD	Median ± SD	Median ± SD	
		Min-Max	Min-Max	Min-Max	
BMI Z-Score		0.20 ± 1.10	0.10 ± 1.00	0.10 ± 1.10	
		-2.6-2.8	-2.3-2.9	-2.4-3.1	^A 0.602
BMI Percentile		55.50±29.6	52.10±29.10	50.9±28.5	
		0.5-99.8	1.2-99.8	0.9-99.9	^D 0.599
		n (%)	n (%)	n (%)	
BMI Percentile	<5 percentile (Thin)	0 (0.0)	7 (3.3)	3 (2.7)	
	5-85 percentile (Normal)	53 (89.8)	176 (84.2)	96 (85.7)	χ^2 :2.721
	85-95 percentile (Overweight)	5 (8.5)	16 (7.7)	8 (7.1)	^C 0.855
	>95 percentile (Obese)	1 (1.7)	10 (4.8)	5 (4.5)	
BMI Percentile in Girls	<5 percentile(thin)	0 (0.0)	1 (1.0)	2 (3.1)	χ^2 :3.051
	5-85 percentile (Normal)	23 (95.8)	97 (94.2)	59 (90.8)	^C 0.806
	85-95 percentile (Overweight)	1 (4.2)	4 (3.9)	2 (3.1)	
	>95 percentile (Obese)	0 (0.0)	1 (1.0)	2 (3.1)	
BMI Percentile in boys	<5 percentile(thin)	0 (0.0)	6 (5.7)	1 (2.1)	χ^2 :3.405
	5-85 percentile(Normal)	30 (85.7)	79 (74.5)	37 (78.7)	^C 0.776
	85-95 percentile (Overweight)	4 (11.4)	12 (11.3)	6 (12.8)	
	>95 percentile(Obese)	1 (2.9)	9 (8.5)	3 (6.4)	

^aOneway ANOVA

^CFisher Freeman Halton Test

Table 4.15. Evaluation of KIDMED Levels According to Eating Habits

		KIDMED			<i>p</i>
		Good adherence (n=59)	Average Adherence (n=209)	Poor Adherence(n=112)	
		Mean ± SD Median (Min- Max)	Mean ± SD Median (Min-Max)	Mean ± SD Median (Min-Max)	
Number of mean meal		2.78±0.87 3 (1-6)	2.73±0.88 3 (1-6)	2.45±0.95 2 (1-5)	χ^2 :10.665 ^d 0.005**
Number of snacks		2.90±2.32 2 (0-10)	2.47±1.50 2 (0-10)	2.27±1.79 2 (0-10)	χ^2 :6.739 ^d 0.034*
Amount of water consumed (glasses)		12.17±5.47 10 (1-27)	8.44±4.74 8 (2-30)	7.98±5.19 7 (1-30)	χ^2 :33.227 ^d 0.001**
		n (%)	n (%)	n (%)	
Preferring Healthy Meals	Yes	46 (78.0)	116 (55.5)	36 (32.1)	χ^2 :34.662 ^b 0.001**
	No	13 (22.0)	93 (44.5)	76 (67.9)	
Appetite status	Poor appetite	4 (6.8)	20 (9.6)	13 (11.6)	χ^2 :2.744 ^b 0.601
	Normal	31 (52.5)	124 (59.3)	61 (54.5)	
	High Appetite	24 (40.7)	65 (31.1)	38 (33.9)	
Breakfast place	Home	37 (62.7)	124 (59.3)	49 (43.8)	χ^2 :18.359 ^b 0.005**
	Bring it from home	16 (27.1)	42 (20.1)	25 (22.3)	
	School canteen	2 (3.4)	24 (11.5)	26 (23.2)	
	bakery	4 (6.8)	19 (9.1)	12 (10.7)	
Luch place	Home	28 (47.5)	71 (34.0)	35 (31.3)	χ^2 :8.450 ^c 0.195
	School canteen/cafeteria	28 (47.5)	109 (52.2)	58 (51.8)	
	Restaurants	3 (5.1)	18 (8.6)	11 (9.8)	
	Others	0 (0.0)	11 (5.3)	8 (7.1)	
Dinner place	Home	58 (98.3)	194 (92.8)	103 (92.0)	χ^2 :7.542 ^b 0.076
	Restaurants	0 (0.0)	14 (6.7)	6 (5.4)	
	Others	1 (1.7)	1 (0.5)	3 (2.7)	
Freq. of Eating Out	One or two times/week	19 (32.2)	61 (29.2)	25 (22.3)	χ^2 :6.578 ^b 0.362
	Three or four times/week	7 (11.9)	30 (14.4)	24 (21.4)	
	daily	2 (3.4)	17 (8.1)	7 (6.3)	
	Sometimes	31 (52.5)	101 (48.3)	56 (50.0)	

^bPearson Chi-Square Test^cFisher Freeman Halton Test^dKruskal Wallis Test **p*<0,05***p*<0,01

There was no statistically important gap between the ages of puberty according to the KIDMED levels ($p>0.05$). No statistically significant gap was found between the gender distribution of puberty according to the KIDMED levels ($p>0.05$). A statistically important gap was found between the exercise rates of puberty according to the KIDMED levels ($p=0.005$; $p<0.01$). The exercise rate in patients who were good adapted to the MED was found to be higher than those with average adapted and poorly adapted (see table 4.13.).

There was no statistically important gap between the body mass index measurements of the cases according to the KIDMED levels ($p>0.05$). According to the KIDMED levels, the cases' BMI Z score and BMI percentile measurements do not show a statistically significant difference ($p>0.05$). There was no statistically significant difference between the BMI percentile levels of the cases according to the KIDMED levels ($p>0.05$) (see Table 4.14.).

There was no statistically important gap between the BMI percentile levels of the adolescents according to the KIDMED levels in girls ($p>0.05$). In addition, there was no statistically important gap between the BMI percentile levels of the adolescents according to the KIDMED levels in boys ($p>0.05$) (see Table 4.14.).

A statistically important gap was found between the number of main meals eaten according to the KIDMED levels ($p=0.005$; $p<0.01$). According to the results of the pairwise comparison made to determine the difference, The number of main meals in patients with poor diet quality was found to be lower than in those with good and moderate diet compliance ($p=0.020$; $p=0.011$; $p<0.05$). A statistically significant difference was found between the number of snacks and meals according to the KIDMED levels ($p=0.034$; $p<0.05$). According to the results of the pairwise comparison made to determine the difference, The number of snacks in patients with poor diet quality was found to be lower than in those with moderate dietary compliance ($p=0.019$; $p<0.05$). A statistically significant difference was found between the cases' water drinking amounts according to the KIDMED levels ($p=0.001$; $p<0.01$). According to the results of the pairwise comparison made to determine the difference, The amount of water drinking in subjects with good diet quality was higher than in those with moderate or poor dietary compliance ($p=0.001$; $p=0.001$; $p<0.01$). A statistically important gap was found between the rates of preferring healthy meals at meals according to the

KIDMED levels ($p=0.001$; $p<0.01$). As the diet quality deteriorates, the rate of choosing healthy meals at meals decreases significantly. There was no statistically important gap between the patients' appetite status distributions according to the KIDMED levels ($p>0.05$). A statistically important gap was found between the distribution of the places where the subjects consumed breakfast according to the KIDMED levels ($p=0.005$; $p<0.01$). The rate of having breakfast in the patisserie of the cases with poor diet quality was found to be significantly higher than the cases with good adherence to the MED and average adherence. According to the KIDMED levels, the distribution of the places where the subjects ate lunch and dinner did not show a statistically significant difference ($p>0.05$). No statistically significant gap was found between the distribution of the frequency of eating out among the cases according to the KIDMED levels ($p>0.05$) (see Table 4.15.).

The sum of eating meals and snacks according to BMI levels did not show a statistically significant gap ($p>0.05$). A statistically significant gap was discovered between the adolescents' water consumption according to BMI levels ($p=0.001$; $p<0.01$). According to the results of the pairwise comparison made to determine the difference, The amount of water consumption in obese subjects was discovered to be importantly higher than in underweight and normal-weight subjects ($p=0.001$; $p=0.012$; $p<0.05$). There was no statistically significant gap between the rates of choosing healthy meals at meals according to BMI levels ($p>0.05$) (see Table 4.16.).

Table 4.16. Evaluation of Eating Habits by BMI Levels

		BMI level				<i>p</i>
		Thin (n=10)	Normal (n=325)	Overweigh t (n=29)	Obese (n=16)	
		Mean ± SD Median (Min-Max)	Mean ± SD Median (Min-Max)	Mean ± SD Median (Min-Max)	Mean ± SD Median (Min-Max)	
Number of mean meals		2.70±0.82 3 (1-4)	2.64±0.90 3 (1-6)	2.62±0.68 3 (2-4)	2.66±0.91 3 (1-6)	χ^2 :2.727 ^D 0.436
Number of snacks		1.90±0.99 2 (1-4)	2.48±1.79 2 (0-10)	2.36±1.25 2 (0-5)	2.88±1.86 2.5 (0-6)	χ^2 :2.203 ^D 0.531
Amount of Water Consumed (Glass)		5.50±2.17 5.5 (3-8)	8.66±4.90 8 (1-30)	9.41±4.88 10 (2-25)	14.75±8.00 13.5 (3-30)	χ^2 :16.252 ^D 0.001**
		n (%)	n (%)	n (%)	n (%)	
Preferring Healthy Meals	yes	4 (40.0)	177 (54.5)	11 (37.9)	6 (37.5)	χ^2 :5.013
	no	6 (60.0)	148 (45.5)	18 (62.1)	10 (62.5)	^B 0.171
Appetite status	Poor appetite	4 (40.0)	31 (9.5)	2 (6.9)	0 (0.0)	χ^2 :15.914 ^C 0.007**
	Normal	6 (60.0)	189 (58.2)	14 (48.3)	7 (43.8)	
	High appetite	0 (0.0)	105 (32.3)	13 (44.8)	9 (56.3)	
Breakfast place	home	6 (60.0)	180 (55.4)	16 (55.2)	8 (50.0)	χ^2 :4.457 ^B 0.876
	Bringing from home to school	2 (20.0)	70 (21.5)	8 (27.6)	3 (18.8)	
	School canteen	2 (20.0)	46 (14.2)	2 (6.9)	2 (12.5)	
	bakery	0 (0.0)	29 (8.9)	3 (10.3)	3 (18.8)	
Lunch place	home	5 (50.0)	111 (34.2)	12 (41.4)	6 (37.5)	χ^2 :4.668 ^C 0.822
	School canteen or cafeteria	5 (50.0)	170 (52.3)	13 (44.8)	7 (43.8)	
	Restaurants	0 (0.0)	26 (8.0)	3 (10.3)	3 (18.8)	
	others	0 (0.0)	18 (5.5)	1 (3.4)	0 (0.0)	
Dinner place	home	9 (90.0)	305 (93.8)	27 (93.1)	14 (87.5)	χ^2 :4.599 ^C 0.496
	restaurants	1 (10.0)	15 (4.6)	2 (6.9)	2 (12.5)	
	others	0 (0.0)	5 (1.5)	0 (0.0)	0 (0.0)	
Frequency of Eating Out	1-2 times a week	2 (20.0)	88 (27.1)	13 (44.8)	2 (12.5)	χ^2 :11.285 ^C 0.195
	3-4 times a week	1 (10.0)	51 (15.7)	6 (20.7)	3 (18.8)	
	everyday	0 (0.0)	22 (6.8)	1 (3.4)	3 (18.8)	
	sometimes	7 (70.0)	164 (50.5)	9 (31.0)	8 (50.0)	

^BPearson Chi-Square Test

^CFisher Freeman Halton Test

^DKruskal Wallis Test ***p*<0,01

Table 4.17. Evaluation of Anthropometric Measurements by Gender

		Gender			<i>p</i>
		Total	Girls (n=192)	Boys (n=188)	
		Mean ± SD	Mean ± SD	Mean ± SD	
		Median (Min-Max)	Median (Min-Max)	Median (Min-Max)	
BMI (kg/m²)		21.27±3.47	20.66±2.88	21.90±3.89	t:-3.525
		20.7 (15.2-38.8)	20.2 (15.2-33.4)	21.3 (15.7-38.8)	^E 0.001**
BMI Z -Score		0.11±1.1	-0.08±0.91	0.30±1.1	^F 0.001**
		-2.6-3.1	-2.4-2.8	-2.6-3.1	
BMI Percentile		52.3±29.0	47.3±27.3	57.5±29.8	t:-3.480
		0.5-99.9	0.9-99.7	0.5-99.9	^E 0.001**
		n (%)	n (%)	n (%)	
BMI percentile	<5 percentile (thin)	10 (2.6)	3 (1.6)	7 (3.7)	
	5-85 percentile (Normal)	325 (85.5)	179 (93.2)	146 (77.7)	
	85-95 percentile (overweight)	29 (7.6)	7 (3.6)	22 (11.7)	
	>95 percentile (Obese)	16 (4.2)	3 (1.6)	13 (6.9)	
BMI Z score Classification	Thinnes (<-2 SD)	5 (1.3)	3 (1.6)	2 (1.1)	
	Normal	303 (79.7)	167 (87)	136 (72.3)	
	Overweight (> 1 SD)	55 (13.9)	17 (8.9)	36 (19.1)	
	Obesity (> 2 SD)	19 (5.0)	5 (2.6)	14 (7.4)	

^eStudent-t Test^fMann Whitney U Test***p*<0,01

A statistically significant gap was detected between the appetite status of the adolescents according to BMI levels (*p*=0.007; *p*<0.01). The rate of high appetite in the obese group was found to be significantly higher than in the underweight and normal-weight cases. The distribution of the places where the subjects ate breakfast, lunch, and dinner according to BMI levels did not show a statistically significant diversity (*p*>0.05). There was no statistically important gap between the distribution of the frequency of eating out according to BMI levels (*p*>0.05) (see Table 4.16.).

BMI values of girls were detected to be statistically significantly lower than boys ($p=0.001$; $p<0.01$). The BMI z scores of girls were statistically significantly lower than boys ($p=0.001$; $p<0.01$). BMI percentile values of girls were detected to be statistically importantly lower than boys ($p=0.001$; $p<0.01$) (see Table 4.17.).

Table 4.18. The relationship of students' KIDMED scores with anthropometric measurements

		BMI-for-age	Z-score BMI-for-age	Percentile BMI-for-age
KIDMED score	r	0.030	0.037	0.039
	p	0.560	0.477	0.451

r=Coefficient of Correlation

No statistically important correlation was found between BMI, BMI z score, and BMI percentile measurements of the cases, and KIDMED scores ($p>0.05$) (see table 4.18.).

Table 4.19. Average KIDMED scores and meal habits of students according to Z-score BMI-for-age classification

	Thinnes (<-2 SD) (n = 5)	Normal (n = 303)	Overweight (> 1 SD) (n = 55)	Obesity (> 2 SD) (n = 18)	
	Mean $\pm$ SD (Min-Max)	Mean $\pm$ SD (Min-Max)	Mean $\pm$ SD (Min-Max)	Mean $\pm$ SD (Min-Max)	^dp
KIDMED score	5.6 $\pm$ 2.8 1-8	4.9 $\pm$ 2.6 -2-12	5.2 $\pm$ 2.4 0-11	4.4 $\pm$ 2.7 0-10	0.234
Number of mean meal	2.4 $\pm$ 0.9 1-3	2.7 $\pm$ 0.9 1-6	2.6 $\pm$ 0.9 1-5	3.1 $\pm$ 1.3 1-5	0.186
Number of snacks	2 $\pm$ 1.4 1-4	2.5 $\pm$ 1.8 0-10	2.2 $\pm$ 1.2 0-5	2.5 $\pm$ 1.9 0-6	0.834
Water consumption	5.2 $\pm$ 2.3 3-8	8.4 $\pm$ 4.9 0-30	10.2 $\pm$ 5.2 2-25	13.2 $\pm$ 7.5 3-30	0.014*

^dKruskal Wallis test

* $p<0,05$

No statistically important gap was detected between the KIDMED scores of the adolescents according to BMI Z score levels ($p>0.05$). The count of main meals and

snacks according to BMI Z score levels of the cases did not show a statistically significant gap ($p>0.05$). A statistically significant gap was found between the cases' water consumption according to the BMI Z score levels ($p=0.014$; $p<0.05$). As the BMI Z score level of the adolescents increases, the amount of water consumption also increases (see Table 4.19.).

The cases' BMI z-scores, BMI percentile values, and KIDMED scores did not show a statistically important gap according to the place where they had breakfast ($p>0.05$). The cases' BMI z scores, BMI percentile values, and KIDMED scores did not show a statistically important gap in where they ate lunch ($p>0.05$). BMI z scores, BMI percentile values, and KIDMED scores of the cases did not show a statistically significant difference according to the place of eating dinner ($p>0.05$) (see Table 4.20.).

Table 4.20. Mean Z-score BMI-for-age, Percentile BKI-for-age and KIDMED scores according to where students eat

		Z-score BKI-for- age		Percentile BKI-for- age		KIDMED total score	
		Mean $\pm$ SD Min.-Max.	^d p	Mean $\pm$ SD Min.-Max.	^d p	Mean $\pm$ SD Min.-Max.	^d p
Breakfast	At home (n=210)	0.1 $\pm$ 1.1 -2.6 – 3.1	0.736	51.4 $\pm$ 29.5 0.5 – 99.9	0.760	4.8 $\pm$ 27 -2 – 12	0.415
	Brown-bag food (n=83)	0.8 $\pm$ 1 -1.9 – 2.8		51.4 $\pm$ 28.5 2.7 – 99.8		5.1 $\pm$ 2.6 -1 – 10	
	School canteen (n=52)	0.2 $\pm$ 1 -2.4 – 2.6		55.5 $\pm$ 28.5 0.9 – 99.6		4.6 $\pm$ 2.6 0 – 9	
	Bakery (n=35)	0.3 $\pm$ 1.1 -1.4 – 2.9		55.1 $\pm$ 28.7 7.9 – 99.8		5.3 $\pm$ 2.3 0 – 10	
Lunch	At home (n=136)	0.2 $\pm$ 1 -2.6 – 3.1	0.248	55.1 $\pm$ 28.8 0.5 – 99.9	0.269	5.2 $\pm$ 2.6 -1 – 12	0.109
	Hot lunch at school (n=198)	0.02 $\pm$ 1 -2.4 – 29		49.7 $\pm$ 29.4 0.9 – 99.8		4.8 $\pm$ 2.6 -2 – 11	
	School canteen/ restarurant (n=32)	0.4 $\pm$ 1.1 -1.4 – 2.9		57 $\pm$ 29.3 8 – 99.8		4.9 $\pm$ 2.8 -2 – 10	
	Skip (n=14)	0.1 $\pm$ 0.7 -0.9 – 1.8		50.8 $\pm$ 21.4 19.7 – 96.4		3.6 $\pm$ 2.3 1 – 8	
Dinner	At home (n=359)	0.1 $\pm$ 1 -2.4 – 3.1	0.291	52 $\pm$ 28.7 0.9 – 99.9	0.294	4.8 $\pm$ 2.6 -2 – 12	0.069
	Restaurant (n=20)	0.2 $\pm$ 1.4 -2.6 – 2.7		59.1 $\pm$ 34.6 0.5 – 99.6		6 $\pm$ 2.9 0 – 10	
	Other (n=1)	-0.8		20.2		8	

^dKruskal Wallis test

5. DISCUSSION

This study determined compliance with the MED of 380 adolescents aged 14-18, and the KIDMED examined its relationship with obesity. The students' mean KIDMED score was detected as 4.87 ± 2.61 .

The ages of the students in this study were between 14 to 18 years, with a mean of 15.87 ± 1.00 years. 10.3% (n=39) of the students were 14 years old, 25% (n=95) were 15 years old, 33.4% (n=127) were 16 years old, 29.7% (n= 113) were 17 years old, and 1.6% (n=6) were 18 years old. Of the adolescents joining the study, 50.5% were girls, and 49.5% were boys. In a study examining the MED and intestinal health in adolescents, the ages ranged from 14 to 16, with a mean age of 14.65 ± 0.66 years. 54.0% (n=108) of the adolescents are boys, and 46.0% (n=92) are girls⁹⁷.

In the thesis study conducted by Yıldız VL, when the Mediterranean Diet Quality of the adolescents between the ages of 14-16 was examined according to the KIDMED score, 67.5% of the adolescents found the most good diet quality, 29% of average diet quality, and 7% very was found to be compatible with poor diet quality⁹⁷. In our study, according to the KIDMED, 15.5% of the adolescents were good adapted to the MED, and 55% were average adherence. It was observed that 29.5% of the adolescents had poor diet quality.

Regarding the KIDMED questions used in this study, 78.1% of the adolescents answered yes, and 21.9% answered no to the question, 'Do you eat a fruit or drink fruit juice every day?'. To the question "Do you regularly eat fish at least 2-3 times a week?", 20.9% (n=79) answered yes, and 79.1% (n=299) answered no. To the question "Do you go to fast-food restaurants more than once a week?", 40.8% (n=154) people answered yes, and 59.2% (n=223) answered no. In a study in which 14-16-year-old adolescents were asked KIDMED questions, 'Do you eat a fruit or drink fruit juice every day? 59.5% (n=119) answered yes to the question, and 40.5% (n=81) answered no. To the question "Do you regularly eat fish at least 2-3 times a week?", 28% (n=56) answered yes, and 72% (n=144) answered no. To the question "Do you go to fast-food restaurants more than once a week?", 31.5% (n=63) answered yes, 68.5% (n=137) answered no⁹⁷.

In a similar study examining the compliance with the MED and overweight and obesity in children and puberty in girls and boys in Northern Cyprus, when the BMI of children and adolescents in the 9-18 age group was examined, It was determined that 18.6% of them were between the 85th and 95th percentiles. It was determined that

16.2% of them were above the 95th percentile. In addition, the mean KIDMED score of children and adolescents was found to be 5.72 ± 2.33 ¹¹¹. Our study determined that 7.9% of adolescents aged 14-18 were between the 85th and 95th percentiles, and 4.2% were above the 95th percentile. The KIDMED score was found to be 4.87 ± 2.61 .

In a study conducted by Kaplan C. with puberty basketball players aged 14-18, when the participating boys were classified according to the KIDMED, 14 percent were found to have poor nutrition levels, 74 percent to have average nutrition levels, and 12 percent to have good nutrition levels¹¹². Our research, KIDMED classification of 188 boys in the same age boys, determined that 56.3 percent had average diet quality. It was determined that 18.62 percent had good diet quality. It was determined that 25 percent (n=47) had poor diet quality.

In a study aiming to determine the nutritional status of 10-14 year-old boys using KIDMED, the mean BMI of 229 boys was found to be 18.56 ± 2.04 ¹¹³. In our study, the mean BMI of boys was found to be 21.90 ± 3.89 .

A research conducted in Italy included 1643 adolescents aged 11-16 years. The mean KIDMED score was found to be 4.3 ± 2.1 . Only 9.1% of adolescents were found to be well-adjusted to the MED. More overweight and obese individuals were found in boys than in girls¹¹⁴. In our study, the KIDMED Score was found to be close to the study in Italy and was determined as 4.87 ± 2.61 . In our study, it was determined that 15.5% of them were well-compatible with the MED. Similarly, in our study, more obese and overweight individuals were found in boys compared to girls. In addition, girls' BMI percentile values were statistically significantly lower than boys. 52.1% of the adolescents stated that they prefer healthy meals at meals.

In 2007, compliance with the MED model was investigated with 1305 participants in Greece in children and adolescents aged 3-18 years. In the Greek population, only 11.3% of children (3-12 years) and 8.3% of adolescents (13-18 years) achieved an optimal KIDMED score. The KIDMED score of the adolescents was determined as 4.8 ± 2.1 . As a result, it was determined that adherence to the MED was low in children and adolescents in the Greek population¹¹⁵. A KIDMED score (mean+SD= 4.87 ± 2.61) was found close to the adolescents in the Greek population in our study. In addition, in our study, the number of adolescents with high adherence to the MED was found to be low. Most adolescents were found to be moderately compliant with the MED.

A research was conducted to discover the prevalence of obesity among primary and high school students in Ankara. 1510 children and adolescents in the 6-17 age group were included in the study. The prevalence of obesity was 4.4% in children aged 6-12 and 5.4% in adolescents aged 12-17¹¹⁶. In our study, the obesity rate in adolescents aged 14-18 was found to be 4.2%. A study was conducted to find the prevalence of obesity and hypertension in high school students aged 14-18 in Kütahya. 4529 students participated in the study. While 50.1% are girls, 49.9% are boys. The students' average BMI was $22.1 \pm 4.24 \text{ kg/m}^2$. In addition, the general obesity prevalence of the students was found to be 8.5%.¹¹⁰ In this study, general obesity prevalence was found to be 4.2% lower in adolescents in the same age group (14-18 years). Weight measurements were found to be 62.34 ± 13.32 on average, and body mass indexes were found to be $21.27 \pm 3.47 \text{ kg/m}^2$ on average.

A similar study was conducted with adolescents aged 13-18 in a high school in the Üsküdar district of Istanbul. 233 adolescent students were included in the research. In this research, the mean of the main meals consumed by the students was 2.57 ± 0.61 ; the average of snacks was 1.86 ± 1.14 ; It was determined that he consumed an average of 1416.74 ± 753.62 ml of water per day. It was determined that 53.6% of the students had a moderate KIDMED level and needed intervention in their diet. The average score of the students from the KIDMED scale was detected as 4.31 ± 2.48 . A statistically important gap was discovered between the students' food selection factor and their KIDMED score. According to the results of Mann Whitney U tests with Bonferroni correction, The KIDMED score of students who preferred healthy foods was detected to be higher. When the place where the students had breakfast was compared with the KIDMED score, a statistically significant difference was found between them. When the place where the students ate lunch and their KIDMED scores were compared, a statistically important diversity was discovered between them. A statistically important difference was found between the students' main meal amount and their KIDMED score.¹¹⁷ There are similarities and differences between the results of this study, which was similar to ours and our study. In this study, the mean of adolescents was 2.66 ± 0.91 , and the mean of snacking was 2.48 ± 1.74 . Their daily consumption was 8.90 ± 5.18 glasses (1790 ± 1036 ml) on average. In our study, similar to the other study, it was found that 55% of the adolescents had a moderate KIDMED level and required intervention in their diet. The mean score of the KIDMED scale was also similar, and it was found to be 4.87 ± 2.61 in

our study. Similarly, our study detected a statistically important gap between the rates of choosing healthy meals at meals and KIDMED. As the diet quality deteriorates, the rate of choosing healthy meals at meals decreases significantly. A statistically significant difference was found between the distribution of the places where the subjects consumed breakfast according to the KIDMED levels. The rate of having breakfast in the patisserie/bakery of the cases with poor diet quality was found to be significantly higher than the cases with good adherence to the MED and in need of medium-improvement. According to the KIDMED levels, the distribution of the places where the cases eat lunch and dinner does not show a statistically significant difference. In our research, a statistically important gap was detected between the sum of adolescents eating the main meal, according to KIDMED.

A research was conducted with 160 adolescent students aged 11-16 in Eskişehir. The study gave MED education, and the changes before and after were determined. It was determined that 25.0% of the students had low KIDMED scores before the education, 56.6% were medium, and 18.4% were good, and it was determined that all of the students' KIDMED scores improved after the education¹¹⁸. In this study, no pre-survey training was provided. It was determined that 15.5% of the adolescents had a high KIDMED score, 55% had a medium, and 29.5% had a low score.

A research was conducted to discover the adaptation of Italian high school students to the Mediterranean diet. 1127 students aged 14-20 were included in the study. Considering the anthropometric data of the adolescents, 9.3% were underweight, while the prevalence of overweight and obesity was 10%. Adherence to the Mediterranean diet was good in 16.5% of cases, average in 60.5%, and low in 23%¹¹⁹. In our study, while 2.6% were underweight, the prevalence of overweight and obesity was 12.12%. Adherence to the Mediterranean diet was found to be good in 15.5%, moderate in 55%, and low in 29.5%. A study was conducted with Sicilian students aged 9-13. The reported data showed that adherence to the Mediterranean diet was inversely related to increasing weight in the student population studied¹²⁰. In our study, adolescents' BMI z score and BMI percentile measurements do not show a statistically significant gap, according to the KIDMED.

CONCLUSION

The ages of 380 adolescents participating in the study ranged from 14 to 18, with a mean age of 15.87 ± 1.00 years. The average height of the adolescents was 170.73 ± 8.58 cm, mean weight was 62.34 ± 13.32 , and body mass index was found to be 21.27 ± 3.47 kg/m² on average. 2.6% of the adolescents were underweight, 85.3% were found to be normal weight, and 7.9% were overweight. It was observed that only 4.2% of them were obese. There was no statistically important gap between the ages of the adolescents according to the KIDMED levels. There was no statistically critical gap between the gender distributions of the adolescents according to the KIDMED levels. In addition, there was no statistically important gap between the BMI percentile levels of the adolescents according to the KIDMED levels.

According to the results of the research, the adaptation of most of the adolescents to the MED was determined as average. The number of students with high adherence to the MED has been identified as very few. Therefore, the level of knowledge of students on healthy nutrition should be increased. However, education on basic nutrition and health should be given to children and adolescents in schools. The effectiveness of dietitians in schools should be increased. In addition, healthy and nutritious meals should be sold in school canteens and cafeterias. For the health of future generations and the prevention of nutrition-related diseases such as obesity and diabetes, it is important to provide students and parents with the necessary education and information in schools. In order to provide adolescents with healthy eating habits and to make these habits sustainable, nutrition education should be planned in schools, including families. In order for a healthy diet to be sustainable, healthy nutrition education should be given to family members, and necessary lifestyle interventions should be made.

According to the results of the research, while 60.5% of adolescents exercise, 39.5% do not. A statistically significant difference was found between the exercise rates of adolescents according to the KIDMED levels. Adolescents who were well adapted to the MED had a higher rate of exercise than those with moderate-to-improvement and poor diet quality. Therefore, all adolescents should be encouraged to do sports. The number of lessons that will increase physical activity and direct students to their favorite sports should be increased in schools. It will benefit public health and future

generations' health for dietitians and sports instructors to evaluate the students' weight status and physical activity status and make the necessary interventions.

The Mediterranean diet is one of the healthiest diet models. In children and adolescents, compliance with Western-style diet models has increased, and obesity has increased. It is a good option for adolescents to follow the Mediterranean diet pyramid recommendations tailored to their specific needs. For this reason, it may be a good option to have a diet that meets the protein, energy, vitamin, and mineral requirements recommended for the growth and development of adolescents and is suitable for the Mediterranean-type diet.

Limitations

Although the students participating in the study studied at a public high school, the socio-economic status of the students and the educational status of their families were not questioned. Collecting these data through a survey and including them in the study could have provided better data. In addition, the adolescents could be educated about the MED for 1-2 weeks, and their KIDMED scores could be compared before and after the education. The effect of nutrition education on students could be questioned.

6. REFERENCES

1. Serra-Majem L, Tomaino L, Dernini S, et al. Updating the mediterranean diet pyramid towards sustainability: Focus on environmental concerns. *Int J Environ Res Public Health*. 2020;17(23):1-20. doi:10.3390/ijerph17238758
2. D'Innocenzo S., Biagi C., Lanari M. Obesity and the Mediterranean Diet: A Review of Evidence of the Role and Sustainability of the Mediterranean Diet. *Nutrients*. 2019. Jun 9;11(6):1306. doi: 10.3390/nu11061306.
3. Ntanasi E., Charisis S.,Yannakoulia M., Kosmidis M-H, et al. Adherence to Mediterranean Diet and Frailty. *Maturitas*. 2022 Aug;162:44-51. doi: 10.1016/j.maturitas.2022.05.001.
4. Önal Z, Adal E. Çocukluk Çağında Obezite. *Okmeydanı Tıp Derg*. 2014;30:39-44. doi:10.5222/otd.suppl.2014.039
5. Khan SS, Ning H, Wilkins JT, et al. Association of body mass index with lifetime risk of cardiovascular disease and compression of morbidity. *JAMA Cardiol*. 2018;3(4):280-287. doi:10.1001/jamacardio.2018.0022
6. WHO. *Guideline: Implementing Effective Actions for Improving Adolescent Nutrition*.;2018.Available at: <https://www.who.int/publications/i/item/9789241513708>
7. Köseoğlu SZA, Tayfur AÇ. Adölesan Dönemi Beslenme ve Sorunları. *Güncel Pediatr*.2017;15(2):50-62.Available at: <https://dergipark.org.tr/en/download/article-file/333405>
8. WHO. Adolescent health. World Health Organization. Published 2022. https://www.who.int/health-topics/adolescent-health#tab=tab_1
9. Ricotti R, Caputo M, Prodam F. Mediterranean diet, nutrition transition, and cardiovascular risk factor in children and adolescents. In: *The Mediterranean Diet*. Second Edi. Elsevier Inc.; 2020:89-95. doi:10.1016/b978-0-12-818649-7.00009-6
10. Desbrow B. Youth Athlete Development and Nutrition. *Sport Med*. 2021;51:3-12. doi:10.1007/s40279-021-01534-6

11. Christie D, Viner R. Adolescent Development Psychosocial Development. *Bmj*. 2005;330:301-305. doi:<https://doi.org/10.1136/bmj.330.7486.301>
12. Akçan Parlaz E, Tekgöl N, Karademirci E, Öngel K. Ergenlik Dönemi: Fiziksel Büyüme, Psikolojik ve Sosyal Gelişim Süreci. *Turkish Fam Physician*. 2012;3(4):10-16. Available at: <http://turkishfamilyphysician.com/wp-content/uploads/2016/08/C3-S4-ergenlik-donemi.pdf>
13. Hargreaves D, Mates E, Menon P, et al. Strategies and interventions for healthy adolescent growth, nutrition, and development. *Lancet*. 2022;399(Issue 10320):198-210. doi: 10.1016/S0140-6736(21)01593-2
14. Agostini A, Centofanti S. Normal Sleep in Children and Adolescence. In: *Child and Adolescent Psychiatric Clinics of North America*. Vol 30. ; 2021:1-14. <https://doi.org/10.1016/j.chc.2020.08.008>
15. Erkan T. Ergenlerde Beslenme. *Turk Pediatr Ars*. 2011;46(SUPPL.1):49-53. doi:10.4274/tpa.46.34
16. Das JK, Salam RA, Thornburg KL, et al. Nutrition in adolescents: physiology, metabolism, and nutritional needs. *Ann N Y Acad Sci*. 2017;1393(1):21-33. doi:10.1111/nyas.13330
17. Psaltopoulou T, Tzanninis S, Ntanas-Stathopoulos I, et al. Prevention and treatment of childhood and adolescent obesity: a systematic review of meta-analyses. *World J Pediatr*. 2019;15(4):350-381. doi:10.1007/s12519-019-00266-y
18. Tunçer E. Fazla Kilolu ve Obez Çocuklarda İnsülin Direnci ile D vitamini Düzeyi ve Akdeniz Diyeti Kalite İndeksi Arasındaki İlişki. Published online 2020. Available at: <https://acikbilim.yok.gov.tr/handle/20.500.12812/72506>
19. Coşkun S. Özel Bir Koleje Devam Eden Adölesanlarda Anne Beslenme Bilgi Düzeyinin, Adölesanların Beslenme Bilgi Düzeyi ve Diyet Kaliteleri ile İlişkisinin Belirlenmesi. Published online 2022.
20. Köseoğlu SZA, Tayfur AÇ. Adölesan Dönemi Beslenme ve Sorunları. *JCP* 2017. Published online 2017. Available at : <https://dergipark.org.tr/en/download/article->

21. TÜBER. *Türkiye Beslenme Rehberi (TÜBER) 2015.*; 2015.Available at: [2015-beslenme-rehberi.pdf \(saglik.gov.tr\)](https://www.saglik.gov.tr/urun/beslenme-rehberi.pdf)
22. Dasgupta A, Butt A, Saha T, Basu G, Chattopadhyay A, Mukherjee A. Assessment of malnutrition among adolescents: Can BMI be replaced by MUAC. *Indian J Community Med.* 2010;35(2):276-279. doi:10.4103/0970-0218.66892
23. Ngo J, Ortiz-Andrellucchi A, Serra-Majem L. Malnutrition: Concept, Classification and Magnitude. In: *Encyclopedia of Food and Health*. 1st ed. Elsevier Ltd.; 2016:610-630. doi:10.1016/B978-0-12-384947-2.00439-6
24. Parel N, Bochud M, Rezzi S, Chatelan A, Jotterand Chaparro C. Vitamin D dietary intake and status in a sample of adolescents. *Clin Nutr Open Sci.* 2022;43:56-66. doi:10.1016/j.nutos.2022.05.002
25. Nguyen VH. School-based nutrition interventions can improve bone health in children and adolescents. *Osteoporos Sarcopenia.* 2021;7(1):1-5. doi:10.1016/j.afos.2021.03.004
26. Bianchi ML. Osteoporosis in children and adolescents. *Bone.* 2007;41(4):486-495. doi:10.1016/j.bone.2007.07.008
27. Erbaba H, Şahin S. Adolesan Kızlarda Obezite ve Obezitenin Neden Olduğu Sorunlar. *Arch Pediatr.* 2017;2(1):16-21. doi:10.5799/ahinjs.04.2017.02.009
28. Çaka S., Çınar N. Adolesanda Yeme Bozuklukları. *Gümüşhane Üniversitesi Sağlık Bilim Derg.* 2018;7(1):203-209.Available at: <https://dergipark.org.tr/tr/download/article-file/398332>
29. Hanlon EC, Dumin M, Pannain S. *Sleep and Obesity in Children and Adolescents.*; 2019. doi:10.1016/b978-0-12-812840-4.00013-x
30. World Health Organization. Obesity and overweight. WHO. Published 2021. <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight#:~:text=lived in Asia.,Over 340 million children and adolescents aged 5-19 were,just over 18%25 in 2016.>

31. TÜİK. *Dünya Nüfus Günlüğü*, 2016.; 2016.
<https://data.tuik.gov.tr/Bulten/Index?p=Dunya-Nufus-Gunu-2016-21508>
32. Panuganti KK, Nguyen M, Kshirsagar RK. Obesity. In: *StatPearls [Internet]*. ; 2022;1-13.Available at : <https://www.ncbi.nlm.nih.gov/books/NBK459357/>
33. Niemi GM, Rewane A, Algotar AM. *Exercise and Fitness Effect On Obesity*.; 2022. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2023 Jan.2022 Jun 5.Available at : <https://www.ncbi.nlm.nih.gov/books/NBK539893/>
34. Turan R. Obez Adölesanlarda B12 Vitamin Eksikliğinin Serum Metilmalonik Asit ve Homosistein Düzeyleri ile İncelenmesi ve Normal Kilolu Adölesanlarla Karşılaştırması. Published online 2019.Available at: [file:///C:/Users/HP/Downloads/549296%20\(2\).pdf](file:///C:/Users/HP/Downloads/549296%20(2).pdf)
35. Tchang BG, Aras M, Kumar RB, et al. Pharmacologic Treatment of Overweight and Obesity in Adults. *Endotext [Internet]*. Published online 2021. <https://www.ncbi.nlm.nih.gov/books/NBK279038/?report=reader>
36. OECD. *Obesity Update 2017*.; 2017. <https://www.oecd.org/health/health-systems/Obesity-Update-2017.pdf>
37. Wang Y, Chen HJ. Use of Percentiles and Z -Scores in Anthropometry. In: *Handbook of Anthropometry: Physical Measures of Human Form in Health and Disease*. Springer New York; 2012:29-48. doi:10.1007/978-1-4419-1788-1_2
38. WHO. BMI-for-age (5-19 years). 2007 WHO REFERENCES. Published 2007. <https://www.who.int/tools/growth-reference-data-for-5to19-years/indicators/bmi-for-age>
39. Lanigan J, Sauven N. Treatment of childhood obesity: a multidisciplinary approach. *Clin Integr Care*. 2020;3. doi:10.1016/j.intcar.2020.100026
40. (WHO) WHO. Noncommunicable diseases: Childhood overweight and obesity. WHO Website. Published 2020. <https://www.who.int/news-room/questions-and-answers/item/noncommunicable-diseases-childhood-overweight-and-obesity>
41. Lin RIS. Dietary Supplements in the Prevention and Treatment of Childhood Obesity. In: *Global Perspectives on Childhood Obesity: Current Status*,

- Consequences and Prevention*. First Edit. Elsevier Inc.; 2011:419-432. doi:10.1016/B978-0-12-374995-6.10039-8
42. Hinson CRR-OMR. *Mediterranean Diet*; 2022. <https://www.ncbi.nlm.nih.gov/books/NBK557733/>
 43. Salas-Salvadó J, Papandreou C. The Mediterranean diet: History, concepts and elements. In: *The Mediterranean Diet*. ; 2020:3-11. doi:10.1016/b978-0-12-818649-7.00001-1
 44. Serra-Majem L, Román-Viñas B, Sanchez-Villegas A, Guasch-Ferré M, Corella D, La Vecchia C. Benefits of the Mediterranean diet: Epidemiological and molecular aspects. *Mol Aspects Med*. 2019;67(April):1-55. doi:10.1016/j.mam.2019.06.001
 45. Gauci S, Young LM, Macpherson H, et al. Mediterranean diet and its components: potential to optimize cognition across the lifespan. In: *Nutraceuticals in Brain Health and Beyond*. Elsevier; 2021:293-306. doi:10.1016/b978-0-12-820593-8.00020-3
 46. Mesías M, Seiquer I, Delgado-Andrade C. The Mediterranean diet and mineral composition. In: *The Mediterranean Diet*. Second Edi. Elsevier Inc.; 2020:151-163. doi:10.1016/b978-0-12-818649-7.00016-3
 47. Aiello A, Accardi G, Caruso C, Candore G. Effects of nutraceuticals of Mediterranean diet on aging and longevity. In: *The Mediterranean Diet*. Second Edi. Elsevier Inc.; 2020:547-553. doi:10.1016/b978-0-12-818649-7.00047-3
 48. Matter OO, Mazzocchi A, Leone L, Agostoni C, Pali-schöll I. The Secrets of the Mediterranean Diet . Does [Only]Olive Oil Matter? *Nutrients*. 2019;11:1-14. doi:10.3390/nu11122941
 49. Yeyinli N, Köse E. Akdeniz Diyetinde Tahılların Rolü. *Türkiye 10 Gıda Kongresi; 21-23 Mayıs*. Published online 2008.Available at : <https://www.gidadernegi.org/TR/Genel/24093463484f5.pdf?DIL=1&BELGEANAH=1612&DOSYASIM=240934634.pdf>
 50. Özer E-R, Tekinşen K. Akdeniz Diyeti ve Sağlık. *Akad ve Süt Kurumu Derg*.

2021;(2):13-23.Available at : <https://dergipark.org.tr/tr/download/article-file/1947956>

51. Lombardo L, Grasso F, Lanciano F, Loria S, Monetti E. Broad-Spectrum Health Protection of Extra Virgin Olive Oil Compounds. In: *Studies in Natural Products Chemistry*. Vol 57. 1st ed. Elsevier B.V.; 2018:41-77. doi:10.1016/B978-0-444-64057-4.00002-8
52. Alves E, Domingues M do R, Domingues P. Olive oil. In: *Functional Foods and Their Implications for Health Promotion*. Academic Press; 2023:97-129. doi:10.1016/B978-0-12-823811-0.00012-2
53. Panickar KS, Tavener SK, Jewell DE. Molecular and intracellular signaling mechanisms of herbs, spices, and food components in the mediterranean diet in improving cognitive function. In: *Role of the Mediterranean Diet in the Brain and Neurodegenerative Diseases*. Elsevier Inc.; 2017:35-51. doi:10.1016/B978-0-12-811959-4.00003-1
54. Sabatini N, Perri E, Rongai D. Olive Oil Antioxidants and Aging. In: *Food Quality: Balancing Health and Disease: Volume 13*. Elsevier Inc.; 2018:145-157. doi:10.1016/B978-0-12-811442-1.00004-3
55. Brenes M, Medina E, García P, Romero C, de Castro A. Olives and olive oil compounds active against pathogenic microorganisms. In: *Olives and Olive Oil in Health and Disease Prevention*. Academic Press; 2021:329-336. doi:10.1016/B978-0-12-819528-4.00027-4
56. Lee KH, Seong HJ, Kim G, et al. Consumption of Fish and ω -3 Fatty Acids and Cancer Risk: An Umbrella Review of Meta-Analyses of Observational Studies. *Adv Nutr*. 2020;11(5):1134-1149. doi:10.1093/advances/nmaa055
57. Yang Y, Kim Y, Je Y. Fish consumption and risk of depression: Epidemiological evidence from prospective studies. *Asia-Pacific Psychiatry*. Published online 2018. <https://doi.org/10.1111/appy.12335>
58. Parian AM, Mullin GE. Fish Consumption and Health. *Nutr Clin Pract*. 2016;31(4):562-565. doi:10.1177/0884533616651069

59. Ros E. Health benefits of nut consumption. *Nutrients*. 2010;2(7):652-682. doi:10.3390/nu2070652
60. Slavin J, Lloyd Beate. Health Benefits Of of Fruits and Vegetables. *Adv Nutr*. 2012;3(4):506-516. doi:10.3945/an.112.002154.506
61. R.Vicente A, A.Manganaris G, MagaliDarre, M.Ortiz C, O.Sozzi G. Chapter 19 - Compositional determinants of fruit and vegetable quality and nutritional value. In: *Postharvest Handling (Fourth Edition)*. ; 2022:565-619.
62. Widmer RJ, Flammer AJ, Lerman LO, Lerman A. The Mediterranean diet, its components, and cardiovascular disease. *Am J Med*. 2015;128(3):229-238. doi:10.1016/j.amjmed.2014.10.014
63. Gille D, Schmid A. Vitamin B12 in meat and dairy products. *Nutr Rev*. 2015;73(2):106-115. doi:10.1093/nutrit/nuu011
64. Pereira PM de CC, Vicente AF dos RB. Meat nutritional composition and nutritive role in the human diet. *Meat Sci*. 2013;93(3):586-592. doi:10.1016/j.meatsci.2012.09.018
65. Suh J-H. Critical review: Metabolomics in dairy science – Evaluation of milk and milk product quality. *Food Res Int*. 2022;154:110984 doi: 10.1016/j.foodres.2022.110984
66. O’Callaghan TF, Sugrue I, Hill C, Ross RP, Stanton C. Nutritional aspects of raw milk: A beneficial or hazardous food choice. In: *Raw Milk: Balance Between Hazards and Benefits*. Elsevier Inc.; 2018:127-148. doi:10.1016/B978-0-12-810530-6.00007-9
- 67.Sizer FS, Whitney E. *Nutrition: Concepts and Controversies*. 12 th Edit.;Chapter 4 .2010;105. Available at: https://books.google.com.tr/books?hl=tr&lr=&id=SzdTEAAQBAJ&oi=fnd&pg=PP1&dq=Nutrition:+Concepts+and+Controversies+book+12th&ots=_qSjQmnVgZ&sig=UfSkOxo5kkbBnfw1PRV4MH3mWXA&redir_esc=y#v=onepage&q&f=false
68. Barbaros B.,Kabaran S. Akdeniz Diyeti ve Sağlığı Koruyucu Etkileri. Published online 2014:140-147. Available at:

69. Estruch R, Ros E. The role of the Mediterranean diet on weight loss and obesity-related diseases. *Rev Endocr Metab Disord.* 2020;21(3):315-327. doi:10.1007/s11154-020-09579-0
70. D'innocenzo S, Biagi C, Lanari M. Obesity and the mediterranean diet: A review of evidence of the role and sustainability of the mediterranean diet. *Nutrients.* 2019;11(6). doi:10.3390/nu11061306
71. Dominguez LJ, Veronese N, Di Bella G, et al. Mediterranean diet in the management and prevention of obesity. *Exp Gerontol.* 2023;174(January). doi:10.1016/j.exger.2023.112121
72. Della Corte C, Mosca A, Vania A, Alterio A, Iasevoli S, Nobili V. Good adherence to the Mediterranean diet reduces the risk for NASH and diabetes in pediatric patients with obesity: The results of an Italian Study. *Nutrition.* 2017;39-40:8-14. doi:10.1016/j.nut.2017.02.008
73. Buscemi S, Corleo D, Galvano F, De Lorenzo A. The Mediterranean diet and its individual components: Linking with obesity in Italy. *Mediterr Diet.* Published online January 1, 2020:285-292. doi:10.1016/B978-0-12-818649-7.00026-6
74. Özer E-R. Yetişkin bireylerin beslenme alışkanlıklarının akdeniz diyetine uyumunun araştırılması. Published online 2022. Available at : file:///C:/Users/HP/Downloads/713855%20(4).pdf
75. Georgoulis M, Kontogianni MD, Yiannakouris N. Mediterranean diet and diabetes: Prevention and treatment. *Nutrients.* 2014;6(4):1406-1423. doi:10.3390/nu6041406
76. Esposito K, Giugliano D. Mediterranean diet and type 2 diabetes. *Diabetes Metab Res Rev.* Published online 2014:34-40. doi: 10.1002/dmrr.2516
77. Ghaemi F, Firouzabadi FD, Moosaie F, et al. Effects of a Mediterranean diet on the development of diabetic complications: A longitudinal study from the nationwide diabetes report of the National Program for Prevention and Control of Diabetes (NPPCD 2016-2020). *Maturitas.* 2021;153(August):61-67.

doi:10.1016/j.maturitas.2021.08.003

78. Kouvari M, Boutari C, Chrysoshoou C, et al. Mediterranean diet is inversely associated with steatosis and fibrosis and decreases ten-year diabetes and cardiovascular risk in NAFLD subjects: Results from the ATTICA prospective cohort study. *Clin Nutr.* 2021;40(5):3314-3324. doi:10.1016/j.clnu.2020.10.058
79. Martínez-González MA. No Title. *Mediterr Diet Cardiovasc Heal.* Published online 2019:779-798. doi:10.1161/CIRCRESAHA.118.313348.
80. Martínez-González MA, Gea A, Ruiz-Canela M. The Mediterranean Diet and Cardiovascular Health: A Critical Review. *Circ Res.* 2019;124(5):779-798. doi:10.1161/CIRCRESAHA.118.313348
81. Gómez-gracia E, Ph D, Ruiz-gutiérrez V, Ph D, Fiol M, Ph D. Primary prevention of cardiovascular disease with a mediterranean diet. *Zeitschrift fur Gefassmedizin.* 2013;10(2):28. doi:10.1056/nejmoa1200303
82. Karageorgou D, Micha R, Zampelas A. Mediterranean Diet and Cardiovascular Disease: An Overview of Recent Evidence. In: *The Mediterranean Diet: An Evidence-Based Approach.* Elsevier Inc.; 2015:91-104. doi:10.1016/B978-0-12-407849-9.00009-9
83. Salas-Salvadó J, Becerra-Tomás N, García-Gavilán JF, Bulló M, Barrubés L. Mediterranean Diet and Cardiovascular Disease Prevention: What Do We Know? *Prog Cardiovasc Dis.* 2018;61(1):62-67. doi:10.1016/j.pcad.2018.04.006
84. Mentella MC, Scaldaferri F, Ricci C, Gasbarrini A, Miggiano GAD. Cancer and mediterranean diet: A review. *Nutrients.* 2019;11(9):1-25. doi:10.3390/nu11092059
85. Uçak S.,Kızıltan G. Akdeniz Diyeti ve Kanser. *Başkent Üniversitesi Sağlık Bilimleri Fakültesi Dergisi.* 2021;6(2):105-121.Available at : file:///C:/Users/HP/Downloads/258-2066-1-PB%20(3).pdf
86. Demetriou CA, Maria G. Kakkoura b, Andreas Hadjisavvas MAL, Sacerdote C, Vineis P, Kyriacou K. Chapter 35 - The Mediterranean diet and breast cancer risk. In: *The Mediterranean Diet (Second Edition).* ; 2020:381-391.

87. Turati F, Carioli G, Bravi F, et al. Mediterranean diet and breast cancer risk. *Nutrients*. 2018;10(3):1-11. doi:10.3390/nu10030326
88. Trichopoulou A, Bamia C, Lagiou P, Trichopoulos D. Conformity to traditional Mediterranean diet and breast cancer risk in the Greek EPIC (European Prospective Investigation into Cancer and Nutrition) cohort. *Am J Clin Nutr*. 2010;92(3):620-625. doi:10.3945/ajcn.2010.29619
89. Cheng S, Zheng Q, Ding G, Li G. Mediterranean dietary pattern and the risk of prostate cancer a meta-analysis. *Med (United States)*. 2019;98(27):1-7. doi:10.1097/MD.00000000000016341
90. Schneider L, Su LJ, Arab L, et al. Dietary patterns based on the Mediterranean diet and DASH diet are inversely associated with high aggressive prostate cancer in PCaP. *Ann Epidemiol*. 2019;29:16-22.e1. doi:10.1016/j.annepidem.2018.08.012
91. Nina Afshar, Hodge AM, Shivappa N, et al. Dietary Inflammatory Index, Alternative Healthy Eating Index-2010, Mediterranean Diet Score and the risk of pancreatic cancer. *Cancer Epidemiol*. 2023;82(cancer). doi:https://doi.org/10.1016/j.canep.2022.102295
92. Salem AA, Mackenzie GG. Pancreatic cancer: A critical review of dietary risk. *Nutr Res*. 2018;52:1-13. doi:10.1016/j.nutres.2017.12.001
93. Butler C, Lee YCA, Li S, et al. Diet and the risk of head-and-neck cancer among never-smokers and smokers in a Chinese population. *Cancer Epidemiol*. 2017;46:20-26. doi:10.1016/j.canep.2016.10.014
94. Leeuw IV, Dawson C, Licitra L, et al. European Head and Neck Society recommendations for head and neck cancer survivorship care. *Oral Oncol*. 2022;133(July). doi:10.1016/j.oraloncology.2022.106047
95. Müller-Richter U, Betz C, Hartmann S, Brands RC. Nutrition management for head and neck cancer patients improves clinical outcome and survival. *Nutr Res*. 2017;48:1-8. doi:10.1016/j.nutres.2017.08.007
96. Salvatore Benito A, Valero Zanuy MÁ, Alarza Cano M, et al. Adherence to

- Mediterranean diet: A comparison of patients with head and neck cancer and healthy population. *Endocrinol Diabetes y Nutr (English ed)*. 2019;66(7):417-424. doi:10.1016/j.endien.2018.12.005
97. Yıldız VL. 14-16 yaş Adölesanlarda Akdeniz Diyetine uyum ile bağırsak sağlığı arasındaki ilişkinin değerlendirilmesi. Published online 2022. Available at: file:///C:/Users/HP/Downloads/709150%20(7).pdf
98. Özsoy S. Polifenoller, Mikrobiyota ve Diyabet. *Bes Diy Derg*. Published online 2019:102-109. <https://doi.org/10.33076/2019.BDD.1321>
99. Ayyıldız F, Yıldırım H. Farklı Diyet Modellerinin Bağırsak Mikrobiyotası Üzerine Etkisi. *J Nutr Diet*. 2019;(January):1-10. doi:10.33076/0.bdd.1161
100. Özdemir A, Büyüktuncer Demirel Z. Beslenme ve Mikrobiyota İlişkisi. *J Biotechnol Strateg Heal Res*. Published online 2017:25-33.
101. Domínguez-López I, Arancibia-Riveros C, Marhuenda-Muñoz M, et al. Association of microbiota polyphenols with cardiovascular health in the context of a Mediterranean diet. *Food Res Int*. 2023;165(January):1-9. doi:10.1016/j.foodres.2023.112499
102. Albuquerque G, Moreira P, Rosário R, et al. Adherence to the Mediterranean diet in children: Is it associated with economic cost? *Porto Biomed J*. 2017;2(4):115-119. doi:10.1016/j.pbj.2017.01.009
103. Darabi Z, Vasmehjani AA, Darand M, Sangouni AA, Hosseinzadeh M. Adherence to Mediterranean diet and attention-deficit/hyperactivity disorder in children: A case control study. *Clin Nutr ESPEN*. 2022;47:346-350. doi:10.1016/j.clnesp.2021.11.014
104. Tapia-Serrano MA, Esteban-Cornejo I, Rodriguez-Ayllon M, Vaquero-Solís M, Sánchez-Oliva D, Sánchez-Miguel PA. Adherence to the Mediterranean diet and academic performance in adolescents: Does BMI status moderate this association? *Clin Nutr*. 2021;40(6):4465-4472. doi:10.1016/j.clnu.2020.12.036
105. Sahingöz SA, Yalçın E, Özgen L. Akdeniz Diyet Kalitesi Ölçeğinin (Mediterranean Diet Quality- KIDMED) Geçerlik ve Güvenirlik Çalışması. *Proc*

- B 5th Int Eurasian Congr Nat Nutr Heal Life Sport*. Published online 2019. Available at : <https://toad.halileksi.net/wp-content/uploads/2022/10/akdeniz-diyet-kalitesi-olcegi-21940-toad.pdf>
106. Karıмова DG. Wilson Hastalarında Beslenme Özelliklerinin KIDMED İndeksi (Akdeniz Diyeti Kalite İndeksi) ile Değerlendirilmesi. Published online 2020. Available at : [file:///C:/Users/HP/Downloads/641872%20\(3\).pdf](file:///C:/Users/HP/Downloads/641872%20(3).pdf)
107. WHO. A healthy lifestyle - WHO recommendations. Published 2010. <https://www.who.int/europe/news-room/fact-sheets/item/a-healthy-lifestyle---who-recommendations>
108. Woo JG. Using body mass index Z-score among severely obese adolescents: A cautionary note. *Int J Pediatr Obes*. 2009;4(4):405-410. doi:10.3109/17477160902957133
109. Chung S. Body mass index and body composition scaling to height in children and adolescent. *Ann Pediatr Endocrinol Metab*. 2015;20(3):125-129. doi:10.6065/apem.2015.20.3.125
110. Tellioğlu M. Kütahya İli Tavşanlı İlçesindeki Lise Öğrencilerinde Hipertansiyon Ve Obezite Prevelansinin Belirlenmesi ve Hipertansiyon İle Obezite İlişkisinin Değerlendirilmesi. Published online 2022. Available at : [file:///C:/Users/HP/Downloads/708243%20\(2\).pdf](file:///C:/Users/HP/Downloads/708243%20(2).pdf)
111. Kabaran S, Gezer C. Determination of the Mediterranean Diet and the Obesity Status of Children and Adolescents in Turkish Republic of Northern Cyprus. *Turkish J Pediatr Dis*. 2013;7(1):11-20. doi:10.12956/tjpd.2013.1.03
112. Kaplan C. 14-18 Yaş Grubu Adölesan Erkek Basketbolcularda Beslenme Durumunun Akdeniz Diyeti Kalite İndeksine (Kidmed) Göre Değerlendirilmesi. Published online 2019. Available at : [file:///C:/Users/HP/Downloads/626487%20\(2\).pdf](file:///C:/Users/HP/Downloads/626487%20(2).pdf)
113. Torun NT, Yıldız Y. Assessment of Nutritional Status of 10 – 14 Years Old Adolescents Using Mediterranean Diet Quality Index (kidmed). *Soc Behav Sci*. 2013;106:512-518. <https://doi.org/10.1016/j.sbspro.2013.12.057>

114. Mistretta A, Marventano S, Antoci M, et al. Mediterranean diet adherence and body composition among Southern Italian adolescents. *Obes Res Clin Pract.* 2017;11(2):215-226. doi:10.1016/j.orcp.2016.05.007
115. Kontogianni MD, Vidra N, Farmaki AE, et al. Adherence rates to the mediterranean diet are low in a representative sample of greek children and adolescents. *J Nutr.* 2008;138(10):1951-1956. doi:10.1093/jn/138.10.1951
116. Filiz Ş. Ankara’da bir ilköğretim okulu ve lisede obezite sıklığı Obesity prevalence in a primary school and a high school in Ankara. *Ankara Üniversitesi Tıp Fakültesi Mecmuası.* 2005;58(4):1. doi:10.1501/tipfak_0000000166
117. Aydın G. Lise Öğrencilerinin Akdeniz Diyetine Uyumu, Fiziksel Aktivite Düzeyi Ve Obeziteye İlişkin Ön Yargılarının Değerlendirilmesi: Üsküdar Ahmet Keleşoğlu Anadolu Lisesi Örneği. Published online 2020. Available at: file:///C:/Users/HP/Downloads/662794%20(3).pdf
118. Doğan L. Adölesanlarda Beslenme Eğitimi: Akdeniz Diyeti Örneği. Published online 2017. Available at : file:///C:/Users/HP/Downloads/486047%20(4).pdf
119. Santomauro F, Lorini C, Tanini T, et al. Adherence to mediterranean diet in a sample of tuscan adolescents. *Nutrition.* 2014;30(11-12):1379-1383. doi:10.1016/j.nut.2014.04.008
120. Metro D, Tardugno R, Papa M, et al. Adherence to the Mediterranean diet in a Sicilian student population. *Nat Prod Res.* 2018;32(15):1775-1781. doi:10.1080/14786419.2017.1402317

7. APPENDICES

7.1. Ethics Committee Approval

	T.C. YEDİTEPE ÜNİVERSİTESİ GİRİŞİMSSEL OLMAYAN KLİNİK ARAŞTIRMALAR ETİK KURULU	Versiyon No 1.0 Sayfa 1 / 2																																										
KARAR FORMU		31.08.2021																																										
ETİK KURULU BİLGİLERİ	<table><tr><td>Etik Kurulun Adı</td><td>Yeditepe Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu</td></tr><tr><td>Açık Adres</td><td>Yeditepe Üniversitesi Diş Hekimliği Fakültesi, Bağdat Cad. No. 238 Göztepe 34728 Kadıköy, İstanbul</td></tr><tr><td>İnternet Sayfası</td><td>http://goetik.yeditepe.edu.tr/</td></tr><tr><td>Telefon</td><td>0216 363 60 44</td></tr><tr><td>E-posta</td><td>goetik@yeditepe.edu.tr</td></tr></table>	Etik Kurulun Adı	Yeditepe Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu	Açık Adres	Yeditepe Üniversitesi Diş Hekimliği Fakültesi, Bağdat Cad. No. 238 Göztepe 34728 Kadıköy, İstanbul	İnternet Sayfası	http://goetik.yeditepe.edu.tr/	Telefon	0216 363 60 44	E-posta	goetik@yeditepe.edu.tr																																	
Etik Kurulun Adı	Yeditepe Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu																																											
Açık Adres	Yeditepe Üniversitesi Diş Hekimliği Fakültesi, Bağdat Cad. No. 238 Göztepe 34728 Kadıköy, İstanbul																																											
İnternet Sayfası	http://goetik.yeditepe.edu.tr/																																											
Telefon	0216 363 60 44																																											
E-posta	goetik@yeditepe.edu.tr																																											
DEĞERLENDİRİLEN BELGELER	<table><tr><td>İslak imzalı başvuru dosyası, CD'si ve elektronik başvuru</td><td>☒</td></tr><tr><td>Araştırma başlığı ve araştırmacıların isimleri</td><td>☒</td></tr><tr><td>Başvuru dilekçesi</td><td>☒</td></tr><tr><td>Araştırmanın:</td><td>☒</td></tr><tr><td>• Niteliği</td><td>☒</td></tr><tr><td>• Önemi ve özgün değeri</td><td>☒</td></tr><tr><td>• Amaç ve hedefleri</td><td>☒</td></tr><tr><td>• Yöntemi</td><td>☒</td></tr><tr><td>• Yönetimi</td><td>☒</td></tr><tr><td>• Yaygın etkisi</td><td>☒</td></tr><tr><td>• Araştırma bütçesi (Mevcutsa)</td><td>☒</td></tr><tr><td>• Süresi ve uygunluğu (Zaman cetveli)</td><td>☒</td></tr><tr><td>• Kaynakları</td><td>☒</td></tr><tr><td>Araştırma izin belgesi / belgeleri</td><td>☒</td></tr><tr><td>Bilgilendirilmiş Gönüllü Olur Formu (yapılan araştırmaya özel olarak hazırlanmış)</td><td>☒</td></tr><tr><td>Taahhütname-1 Dünya Tıp Birliği Helsinki Bildirgesinin son versiyonunun ve Sağlık Bakanlığı'nın ilgili tüm kılavuzlarının okunmasına dair taahhüt</td><td>☒</td></tr><tr><td>Taahhütname-2 Daha önce yapılmış etik kurul başvuruları mevcut olup olmadığına dair taahhüt</td><td>☒</td></tr><tr><td>Taahhütname-3 Araştırma sırasında araştırma bütçesinde yer almayan ve gönüllünün kendisine veya Sosyal Güvenlik Kurumuna ek yük getirecek hiçbir işlem uygulanmayacağına dair taahhüt</td><td>☒</td></tr><tr><td>Taahhütname-4 COVID-19 hastalarında tedavi yaklaşımları ve bilimsel araştırmalar genelgesi okunmasına dair taahhüt</td><td>☒</td></tr><tr><td>Araştırmacıların her birisine ait özgeçmiş formu</td><td>☒</td></tr><tr><td>Ek belgeler (Varsa kullanılan ölçek izinleri vb.)</td><td>☒</td></tr></table>	İslak imzalı başvuru dosyası, CD'si ve elektronik başvuru	☒	Araştırma başlığı ve araştırmacıların isimleri	☒	Başvuru dilekçesi	☒	Araştırmanın:	☒	• Niteliği	☒	• Önemi ve özgün değeri	☒	• Amaç ve hedefleri	☒	• Yöntemi	☒	• Yönetimi	☒	• Yaygın etkisi	☒	• Araştırma bütçesi (Mevcutsa)	☒	• Süresi ve uygunluğu (Zaman cetveli)	☒	• Kaynakları	☒	Araştırma izin belgesi / belgeleri	☒	Bilgilendirilmiş Gönüllü Olur Formu (yapılan araştırmaya özel olarak hazırlanmış)	☒	Taahhütname-1 Dünya Tıp Birliği Helsinki Bildirgesinin son versiyonunun ve Sağlık Bakanlığı'nın ilgili tüm kılavuzlarının okunmasına dair taahhüt	☒	Taahhütname-2 Daha önce yapılmış etik kurul başvuruları mevcut olup olmadığına dair taahhüt	☒	Taahhütname-3 Araştırma sırasında araştırma bütçesinde yer almayan ve gönüllünün kendisine veya Sosyal Güvenlik Kurumuna ek yük getirecek hiçbir işlem uygulanmayacağına dair taahhüt	☒	Taahhütname-4 COVID-19 hastalarında tedavi yaklaşımları ve bilimsel araştırmalar genelgesi okunmasına dair taahhüt	☒	Araştırmacıların her birisine ait özgeçmiş formu	☒	Ek belgeler (Varsa kullanılan ölçek izinleri vb.)	☒	
İslak imzalı başvuru dosyası, CD'si ve elektronik başvuru	☒																																											
Araştırma başlığı ve araştırmacıların isimleri	☒																																											
Başvuru dilekçesi	☒																																											
Araştırmanın:	☒																																											
• Niteliği	☒																																											
• Önemi ve özgün değeri	☒																																											
• Amaç ve hedefleri	☒																																											
• Yöntemi	☒																																											
• Yönetimi	☒																																											
• Yaygın etkisi	☒																																											
• Araştırma bütçesi (Mevcutsa)	☒																																											
• Süresi ve uygunluğu (Zaman cetveli)	☒																																											
• Kaynakları	☒																																											
Araştırma izin belgesi / belgeleri	☒																																											
Bilgilendirilmiş Gönüllü Olur Formu (yapılan araştırmaya özel olarak hazırlanmış)	☒																																											
Taahhütname-1 Dünya Tıp Birliği Helsinki Bildirgesinin son versiyonunun ve Sağlık Bakanlığı'nın ilgili tüm kılavuzlarının okunmasına dair taahhüt	☒																																											
Taahhütname-2 Daha önce yapılmış etik kurul başvuruları mevcut olup olmadığına dair taahhüt	☒																																											
Taahhütname-3 Araştırma sırasında araştırma bütçesinde yer almayan ve gönüllünün kendisine veya Sosyal Güvenlik Kurumuna ek yük getirecek hiçbir işlem uygulanmayacağına dair taahhüt	☒																																											
Taahhütname-4 COVID-19 hastalarında tedavi yaklaşımları ve bilimsel araştırmalar genelgesi okunmasına dair taahhüt	☒																																											
Araştırmacıların her birisine ait özgeçmiş formu	☒																																											
Ek belgeler (Varsa kullanılan ölçek izinleri vb.)	☒																																											
KARAR BİLGİLERİ	<table><tr><td>Başvuru Numarası</td><td>202106069</td></tr><tr><td>Toplantı Tarihi</td><td>13.08.2021</td></tr><tr><td>Toplantı Yeri</td><td>Çevirim içi (Google Meet)</td></tr><tr><td>Karar No</td><td>18</td></tr></table>	Başvuru Numarası	202106069	Toplantı Tarihi	13.08.2021	Toplantı Yeri	Çevirim içi (Google Meet)	Karar No	18																																			
Başvuru Numarası	202106069																																											
Toplantı Tarihi	13.08.2021																																											
Toplantı Yeri	Çevirim içi (Google Meet)																																											
Karar No	18																																											

Araştırmanın Başlığı	14-18 yaş arası adolesanlarda Akdeniz diyetine uyumun saptanması ve obezite ile arasında ilişkinin değerlendirilmesi
Araştırmacılar	Seren Peker, İrem Kaya Cabioglu



BAŞVURU NUMARASI: 202106069

KARAR

31.08.2021

☒ KABUL	☐ RET ☐ KAPSAM DIŞI (GİRİŞİMSSEL) ☐ BİLİMSEL VE/VEYA ETİK KURALLARA AYKIRI ☐ BİR SORUMLU ARAŞTIRMACININ (TEZ İSE TEZ DANIŞMANI), BİR TOPLANTIYA İKİ (2) ADETTEN FAZLA ÇALIŞMA BAŞVURUSUNDA BULUNMASI ☐ KURUM İÇİ BAŞVURULARINDA YEDİTEPE UZANTILI E-POSTA HESABI İLE GİRİŞ YAPILMAMIŞ OLMASI ☐ ŞARTLI KABULDE BELİRTİLEN REVİZYONLARIN ZAMANINDA VE/VEYA İSTENİLDİĞİ ŞEKİLDE YAPILMAMIŞ OLMASI
--	---

Prof. Dr. Didem ÖZDEMİR ÖZENER Başkan		Doç. Dr. Gökhan ERTAŞ Başkan Yardımcısı		Doç. Dr. Elif SUNGURTEKİN EKÇİ Raporör	
Katılım	İlişk	Katılım	İlişk	Katılım	İlişk
☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok
Prof. Dr. Feryal SUBAŞI Üye		Doç. Dr. Mehmet Engin CELEP Üye		Dr. Öğr. Üyesi E. Çiğdem KELEŞ Üye	
Katılım	İlişk	Katılım	İlişk	Katılım	İlişk
☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok
Dr. Öğr. Üyesi Binnur OKAN BAKIR Üye		Dr. Öğr. Üyesi E. Nur ÖZDAMAR Üye		Dr. Öğr. Üyesi SEVİM ŞEN Üye	
Katılım	İlişk	Katılım	İlişk	Katılım	İlişk
☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok	☐ Var ☐ Yok

Araştırmanın Başlığı: 14-18 yaş arası adolesanlarda Akdeniz diyetine uyumun saptanması ve obezite ile
arasında ilişkinin değerlendirilmesi

Araştırmacılar: Seren Peker, İrem Kaya Cabioglu

7.2. Curriculum Vitae

Kişisel Bilgiler

Adı	SEREN	Soyadı	PEKER
-----	-------	--------	-------

Öğrenim Durumu

Derece	Alan	Mezun Olduğu Kurumun Adı	Mezuniyet Yılı
Lisans	Beslenme ve diyetetik	Yeditepe Üniversitesi	2018
Lise	-	Bornova Anadolu lisesi	2012

Bildiği Yabancı Dilleri	Yabancı Dil Sınav Notu (#)
İngilizce	

Başarılmış birden fazla sınav varsa(KPDS, ÜDS, TOEFL; EELTS vs), tüm sonuçlar yazılmalıdır

İş Deneyimi (Sondan geçmişe doğru sıralayın)

Görevi	Kurum	Süre (Yıl - Yıl)
Diyetisyen	Op.Dr.Ahmet BEKİN Muayenesi	2023-halen
Diyetisyen	Bewell application	2021-2022

Bilgisayar Bilgisi

Program	Kullanma becerisi

***Çok iyi, iyi, orta, zayıf olarak değerlendirin**

7.3. Informed Consent Form

Araştırmanın Adı: “14-18 yaş arası adölesan bireylerde ;akdeniz diyetine uyumunun belirlenmesi ve akdeniz diyeti ile obezite arasındaki ilişkinin değerlendirilmesi “

Sayın Katılımcı ve /veya Yasal Velisi,

Yukarıda adı yazılı Dr. Öğr. Üyesi İrem Kaya Cebioğlu danışmanlığında yüksek lisans öğrencisi Dyt. Seren Peker tarafından yürütülen araştırmaya katılmak üzere davet edilmiş bulunmaktasınız. Bu araştırmada yer almayı kabul etmeden önce, araştırmanın ne amaçla yapılmak istendiğini anlamanız gerekmektedir. Aşağıdaki bilgileri lütfen dikkatlice okuyunuz, sorularınız olursa sorunuz ve açık yanıtlar isteyiniz.

Bu araştırma; 14 -18 yaş arası lise eğitimine devam eden bireylerde bireylerde akdeniz diyetine uyumun belirlenmesi ve akdeniz diyetine yüksek uyum sağlayan adölesanlar ile akdeniz diyetine düşük uyum sağlayan adölesanlardaki obezite durumunu karşılaştırması amacıyla yürütülecektir. Araştırma için etik kurul ve İstanbul Valiliği ve İl Milli Eğitim Müdürlüğü’nden gerekli yasal izinler alınmıştır. Bu araştırma ; İstanbul ilinin Ataşehir semtinde devlet liselerinde eğitim alan 14-18 yaş arası çalışmaya gönüllü katılmak isteyen adölesan bireyler üzerinde yapılacaktır.Bu araştırmaya tahmini olarak 377 gönüllü katılacaktır.

Sizden bu çalışmada verilen anket formunu doldurmanız istenmektedir. Soruları cevaplamanız yaklaşık 20 dakika sürecektir. Bunun size ve yakınlarınıza hiçbir zararı olmayacaktır.

Bu çalışmaya katılmak tamamen gönüllülük esasına dayanmaktadır. Bu araştırmada yer almanız nedeniyle size hiçbir ödeme yapılmayacaktır, sizden veya bağlı bulunduğunuz sosyal güvenlik kuruluşundan hiçbir ücret istenmeyecektir.Gerek duyduğunuz tüm bilgileri istemeye ve doğru, açık, anlaşılır bilgi almaya hakkınız vardır. Gerekli gördüğü takdirde araştırmanın herhangi bir kısmında katılımcı araştırmadan çıkabilir, araştırmacı çalışmayı sonlandırabilir. Araştırmanın tüm aşamalarında kimlik bilgileriniz gizli tutulacaktır. Araştırma kapsamında elde edilen bilgiler bilimsel amaçlarla kullanılabilir gizlilik kurallarına uyulmak kaydıyla sunulabilir ve yayınlanabilir. Araştırma ile ilgili daha fazla bilgiye ihtiyaç duyarsanız araştırmacıya serenpkr.1894@outlook e-posta adresi veya 05535435245 numaralı telefondan ulaşabilirsiniz.

Araştırma Sorumlusu

(Adı-Soyadı-Ünvanı-imza)

Seren Peker-Diyetisyen-

“Bilgilendirilmiş Gönüllü Olur Formundaki tüm açıklamaları okudum. Bana, yukarıda konusu ve amacı belirtilen araştırma ile ilgili açıklamalar, sorumlu araştırmacılar tarafından yapıldı. Araştırmaya gönüllü olarak katıldığımı, istediğim zaman gerekçeli veya gerekçesiz olarak araştırmadan ayrılabilceğimi biliyorum Ek başkaca bir açıklamaya gerek duymadan, hiçbir baskı altında kalmadan ve bilinçli olarak bu araştırmaya katılmayı onaylıyorum.”

Gönüllünün (Kendi el yazısı ile)

Adı-Soyadı:

İletişim

Tarih:

İmzası:

Velayet veya Vesayet Altında Bulunanlar İçin Veli veya

Vasisinin (kendi el yazısı ile)

Adı-Soyadı:

İletişim:

Tarih:

İmzası:

Varsa Onay Alma İşlemine Başından Sonuna Kadar Tanıklık

Eden Kişi (kendi el yazısı ile)

Adı-Soyadı:

İletişim:

Tarih:

İmzası:

7.4. Survey Form

Katılımcı Adı-Soyadı:

Anket No:

14-18 yaş arası adölesanlarda; Akdeniz diyetine uyumun saptanması ve obezite ile arasındaki ilişkinin değerlendirilmesi

Sayın katılımcı,

Bu anket formundan elde edilecek bilgiler Diyetisyen Seren Peker tarafından Yeditepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Bölümü'nde yürütülen "14-18 yaş arası adölesan bireylerde; Akdeniz diyetine uyumun belirlenmesi ve Akdeniz diyeti ile obezite arasındaki ilişkinin değerlendirilmesi " adlı araştırmada kullanılacaktır. İlginiz ve sabrınız için teşekkür ederim.

A) GENEL BİLGİLER

1. Cinsiyet

Kadın

Erkek

2. Yaş.....

5. Kaçınıcı sınıfta okuyorsun?

6. Herhangi bir hastalığınız var mı?

1. Hastalığı yok

2. Hastalığı varsa, nedir?.....

7. Bazı Antrometrik Ölçümler

Boy:

Vücut Ağırlığı;

Beden Kütle indeksi (BKİ):

B) BESLENME DURUMUNU DEĞERLENDİRİLMESİ

8. Genellikle kaç ana öğün yemek yersiniz? _____ ana öğün

9. Genellikle kaç ara öğün yemek yersiniz? _____ ara öğün

10. Günde kaç bardak su içiyorsunuz? Bardak

11. Genellikle öğünlerinizde sağlıklı yemekleri tercih ettiğinizi düşünüyor musunuz?

Evet

Hayır

12. Her hangi bir spor yapıyor musunuz?

Evet (belirtiniz)

Hayır

13. Genel olarak iştah durumunuzu belirtiniz.

İştahsızım

Normal iştahlıyım

Çok iştahlıyım

14. Sabah kahvaltısını çoğunlukla nerede tüketirsiniz?

Ev

Evden getirip okulda

Okul kantini

4) Pastane/fırın

15. Öğle yemeğini genellikle nerede tüketirsiniz?

Ev

Okul yemekhanesi /Okul kantini

Restaurant/ lokanta

Diğer

16. Akşam yemeğini genellikle nerede tüketiyorsunuz?

Ev

Restaurant/lokanta

Diğer..

18. Dışarıda (restaurant, cafeterya, lokanta, fastfood restaurantı vs.) ne sıklıkta yemek yersiniz?

Haftada 1-2 kez

Haftada 3-4 kez

Her gün

Ara sıra

Diğer.....

20. BESİN TÜKETİM SIKLIK FORMU

Son 6 ayı göz önünde bulundurarak tabloyu doldurunuz.

Besinler	Her Gün	Haftada 5-6 Kere	Haftada 3-4 Kere	Haftada 1-2 Kere	15 Günde 1 Kere	Ayda 1 Kere	Hiç	Miktar
<i>SÜT GRUBU BESİNLER</i>								
Süt- Tam Yağlı								
Süt- Yarım Yağlı								
Süt - Light								
Kefir								
Yoğurt								
Peynir								
Kaşar								
Tulum								
Çökelek								
Krem peynir								
Diğer (.....)								
Sütlü tatlılar (Sütlaç,muhallebi, puding vb.)								
<i>ET GRUBU BESİNLER</i>								
Kırmızı etler								
Et ürünleri(salam, sucuk, pastırma vb.)								
Beyaz etler(tavuk,hindi)								
Sakatlar (.....)								
Balık								
Kuru baklagiller								
Yağlı tohumlar(ceviz,fındık vb.)								
Yumurta								
<i>SEBZE-MEYVELER</i>								
Yeşil yapraklı sebzeler								
Diğer sebzeler								
Patates								

Turunçgiller								
Diğer meyveler (.....)								
Kuru meyveler(.....)								
<i>TAHİL GRUBU</i> <i>BESİNLER</i>								
Beyaz Ekmek								
Kepek ekmek								
Bazlama/Yufka								
Simit								
Pirinç								
Bulgur								
Makarna-erişte vb								
Kahvaltılık tahıl ürünleri(cornflakes vb.)								
Diğer(.....)								
<i>YAĞLAR</i>								
Zeytinyağı								
Diğer sıvı yağlar(.....)								
Margarin								
Tereyağı								
<i>ŞEKER VE TATLILAR</i>								
Çikolata								
Şeker								
Bal								
Reçel								
Pekmez								
Şekerleme-Lokum								
<i>İÇECEKLER</i>								
Çay								
Kahve								
Kola-Normal								
Kola-Light								
Bitki Çayları								
Meyve Suları								
Maden Suları								
Alkol(...)								

21. Akdeniz Diyeti Kalite İndeksi (KIDMED)

16 sorudan oluşan Akdeniz Diyeti Kalite İndeksi sorularını evet yada hayır olarak cevaplayınız.

	EVET	HAYIR
Her gün bir meyve yer ya da meyve suyu içer misiniz?		
Her gün ikinci bir meyve yer misiniz ?		
Düzenli olarak günde bir kez taze veya pişmiş sebze tüketir misiniz?		
Günde birden fazla taze veya pişmiş sebze tüketir misiniz?		
Düzenli olarak haftada en az 2-3 kez balık yer misiniz?		
Haftada bir kereden fazla fast-food restoranlara gider misiniz?		
Kuru baklagilleri sever ve haftada bir kereden fazla yer misiniz?		
Makarna ve pilavı hemen hemen her gün (haftada 5 veya daha fazla) tüketir misiniz?		
Kahvaltıda kahvaltılık gevrek (corn-fleks vb) ya da tahıl ürünleri (ekmek) tüketir misiniz?		
Düzenli olarak (haftada en az 2-3 kez) kuruyemiş tüketir misiniz?		
Zeytinyağı tüketiyor musunuz?		
Kahvaltı öğününü atlar mısınız?		
Kahvaltıda süt ve süt ürünleri (süt, yoğurt vb) tüketir misiniz?		
Kahvaltıda hazır fırın ürünleri (poğaç vb) veya pasta yer misiniz?		
Günde 2 kez süt/yoğurt ve/veya peynir (40 g) tüketir misiniz?		
Her gün birkaç kez tatlı ve şeker/şekerleme yer misiniz?		

7.5.Istanbul M.E.B. Work Permit



T.C.
İSTANBUL VALİLİĞİ
İl Millî Eğitim Müdürlüğü

Sayı : E-59090411-20-37626335
Konu : Anket ve Araştırma İzni (Seren PEKER)

25/11/2021

VALİLİK MAKAMINA

İlgi : a) Yenilik ve Eğitim Teknolojileri Genel Müdürlüğünün 21.01.2020 tarihli ve 2020/2 sayılı genelgesi.
b) Yeditepe Üniversitesinin 04.11.2021 tarihli ve 1031 sayılı yazısı.
c) Müdürlüğümüz Araştırma ve Anket Komisyonunun 19.11.2021 tarihli tutanağı.

Araştırma Konusu : 14-18 Yaş Arası Adolesanlarda Akdeniz Diyetine Uyumun Belirlenmesi ve Obezite ile İlişkisinin Değerlendirilmesi
Araştırma Türü : Anket
Araştırma Yeri : İstanbul
Araştırma Kişiler : Resmi / Özel Lise Öğrenci
Araştırmanın Süresi : 2021 - 2022 Eğitim ve Öğretim Yılı

Yukarıda bilgileri verilen araştırmanın; 6698 sayılı Kişisel Verilerin Korunması Kanununa aykırı olarak kişisel veri istenmemesi, öğrenci velilerinden açık rıza onayı alınması, yüz yüze eğitime geçmiş olan kurumlarımızda, Covid-19 tedbirlerinin araştırmacı ve ilgili kurum idarelerince alınması, bilimsel amaç dışında kullanılmaması, bir örneği Müdürlüğümüzde muhafaza edilen mühürbâ ve imzalı veri toplama araçlarının kurumlarınıza araştırmacı tarafından ulaştırılarak uygulanması, katılımcıların gönüllülük esasına göre seçilmesi, araştırma sonuç raporunun kamuoyuyla paylaşılması ve araştırma bittikten sonra 2 (iki) hafta içerisinde Müdürlüğümüze gönderilmesi, okul idarelerinin denetim, gözetim ve sorumluluğunda, eğitim ve öğretimi aksatmayacak şekilde, ilgi (a) genelge esasları dâhilinde uygulanması kaydıyla Müdürlüğümüzce uygun görülmektedir.

Makamınızca da uygun görüldüğü takdirde olurlarınızı arz ederim.

Levent YAZICI
İl Millî Eğitim Müdürü

OLUR
25/11/2021
Dr. Hasan Hüseyin CAN
Vali a.
Vali Yardımcısı

Ek:
1- İlgi (b) Yazı ve Ekleri (13 Sayfa)
2- İlgi (c) Tutanak (1 Sayfa)

Bu belge çevrimiçi elektronik imza ile onaylanmıştır.

Adres : Bosphorus Mah. İsmail Özlü Cad. No: 1 Sultanahmet Fatih İstanbul | Belge Doğrulama : <https://www.meb.gov.tr/meb-ebys>
Telefon : 0212 384 36 30 | Bilgi için : Aykut ÇELİK
E-posta : strateji@gov.tr | Uzman : Büro Hizmetleri
Kep Adresi : meb@t11.kep.tr | İnternet Adresi : <http://istanbul.meb.gov.tr/>