T.C.
YEDITEPE UNIVERSITY
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NUTRITIONAL STATUS OF SENIOR HIGH SCHOOL STUDENTS AND DETERMINATION OF HEALTHY EATING INDICES

MASTER THESIS

BETÜL KAÇAR

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SUPERVISOR

Assist. Prof. Dr. HÜLYA DEMİR

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	Unvanı, Adı-Soyadı (Kurumu)	İmza
Jüri Başkanı:	Dr. Öğr. Üyesi Işıl IŞIK,Yeditepe Univ.	
Tez danışmanı:	Dr. Öğr.Üyesi Hülya DEMİR, Yeditepe Univ.	
Üye:	Dr. Öğr. Üyesi R.Selin Uysal AFACAN, Gedik Üniv.	
Üye:		
Üye:		

ONAY

Bu tez Yeditepe Üniversitesi Lisansüstü Eğitim-Öğretim ve Sınav Yönetmeliğinin ilgili maddeleri uyarınca yukarıdaki jüri tarafından uygun görülmüş ve Enstitü Yönetim Kurulu'nun 28../06/.2019 tarih ve 2019/11-06..... sayılı kararı ile onaylanmıştır.

Prof. Dr. Bayram YILMAZ
Sağlık Bilimleri Enstitüsü Müdürü

DECLARATION

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

Betül KAÇAR

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ABBREVIATIONS and SYMBOLS

BeBiS	Nutrition Information System
BMI	Body Mass Index
CDC	Center for Disease Control and Prevention
cm	centimeters
DALY	Disability Adjusted Life Year
DRI	Dietary Referance Intake
g	gram
HEI	Healthy Eating Index
kcal	kilocalorie
kg/m²	kilogram/meter²
kg	kilogram
mcg	microgram
MUFA	Monounsaturated fatty acid
NHANES	National Health and Nutrition Examination Survey
PUFA	Polyunsaturated fatty acid
SD	Standard Deviation
TBSA	Turkey Nutrition and Health Survey
TUBER	Turkey Nutrition Guide
WHO	World Health Organization
X	Mean

ABSTRACT

Kaçar, B. (2019). Nutritional Status of Senior High School Students and Determination of Healthy Eating Indices. Yeditepe University, Institute of Health Sciences, Department of Nutrition and Dietetics, MSc Thesis. İstanbul.

This study was conducted to determine the nutritional status and healthy eating index of the senior students of a public (Aldemir Atilla Konuk Anatolian High School) and a foundation high school (Istek Antalya Yeditepe High School) in the city center of Antalya. The study was carried out with 177 senior high school students who volunteered to participate in the study. General characteristics, health information, dietary habits, physical activity and nutrient consumption frequency of the students were investigated by the questionnaire. To determine food consumption and nutrition intake 24-hour dietary recall method was used. In all of the energy and nutrients, the mean values of males were higher than the mean values of females. The diet quality of the students who participated in the study was evaluated with 12-component Healthy Eating Index-2010 (HEI-2010). The HEI scoring was calculated using the data in the food consumption record. HEI was classified into three categories: "good" diet quality (over 80 points), "needs improvement" diet quality (51-80 points) and "poor" diet quality (50 and less points). In this study, there were not any students who had over 80 points to have good diet quality. The HEI scores showed statistically significant difference with respect to gender, maternal educational status and monthly income. The mean total HEI score of female students (X=43.9) was higher than the mean total score (X=37.6) of male students. In terms of the HEI component scores of females consumption of total fruit, total vegetables, greens and beans, whole grains, dairy and refined grains were higher than males. The only component in which the males score is high and the score is statistically significant was the total protein foods. According to the data obtained at the end of the study, the diet quality of senior high school students was not found good. This age group is a period in which nutritional habits can be changed and diseases which may occur in the adult period can be prevented. In order to improve the quality of their diet, students can be trained about gaining adequate and balanced nutrition habits and their sustainability.

Keywords: diet quality, eating habits, healthy eating index, nutrition in adolescents, nutritional status.

ÖZET

Kaçar, B. (2019). Lise Son Sınıf Öğrencilerinin Beslenme Durumu ve Sağlıklı Yeme İndekslerinin Belirlenmesi. Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Anabilim Dalı, Master Tezi. İstanbul.

Bu çalışma, Antalya il merkezinde yer alan bir devlet (Aldemir Atilla Konuk Anadolu Lisesi) ve bir vakıf lisesinin (İstek Antalya Yeditepe Koleji) son sınıf öğrencilerinin beslenme durumlarını ve sağlıklı yeme indekslerini belirlemek amacıyla yapılmıştır. Çalışmaya katılmayı gönüllü kabul eden 177 lise son sınıf öğrencisi ile çalışma yürütülmüştür. Anket aracılığıyla öğrencilerin genel özellikleri, sağlık bilgileri, beslenme alışkanlıkları, fiziksel aktivite durumları ve besin tüketim sıklıkları sorgulanmış, 24 saatlik geriye dönük besin tüketim kaydıyla bir günlük besin tüketim kayıtları alınmıştır. Enerji ve besin ögelerinin tamamında erkeklerin değer ortalamaları kızların değer ortalamalarından yüksek bulunmuştur. Çalışmaya katılan öğrencilerin diyet kalitesi 12 komponentten oluşan Sağlıklı Yeme İndeksi-2010 (SYİ-2010) ile değerlendirilmiştir. SYİ puanlaması besin tüketim kaydındaki verilerle hesaplanmıştır. Buna göre diyet kalitesi 50 puan ve altında olanlar "kötü", 51-80 puan arasında olanlar "geliştirilmesi gereken", 80 puan ve üzeri olanlar "iyi" diyet kategorisinde yer almıştır. Çalışmada 80 puan ve üzerinde olup iyi diyet kalitesine sahip bir bireye rastlanmamıştır. SYİ puanları cinsiyete, anne eğitim durumu ve aylık gelire göre istatistiksel olarak anlamlı farklılık göstermiştir. Kız öğrencilerin SYİ toplam puan ortalaması (X=43.9), erkek öğrencilerin toplam puan ortalamasından (X=37.6) yüksek bulunmuştur. SYİ bileşenleri açısından bakıldığında ise kızların toplam meyve, toplam sebze, koyu yeşil yapraklı sebze ve baklagiller, tam tahıllar, süt grubu ve rafine tahıllar komponent puanları erkeklerden yüksek bulunmuştur. Erkeklerin puanının yüksek olduğu ve aradaki puanın istatistiksel olarak anlamlı olduğu tek bileşen toplam protein yiyecekleridir. Çalışmanın sonucunda elde edilen verilere göre lise son sınıf öğrencilerinin diyet kalitesi iyi değildir. Bu yaş grubu, beslenme alışkanlıklarının değiştirilebileceği ve yetişkin dönemde ortaya çıkabilecek hastalıkların önlenebileceği bir dönemdir. Diyet kalitesinin iyileştirilmesi için öğrencilere yeterli ve dengeli beslenme alışkanlığının kazandırılması ve sürdürülebilirliği konusunda eğitimler verilebilir.

Anahtar sözcükler: adölesanlarda beslenme, beslenme durumu, beslenme alışkanlıkları, diyet kalitesi, sağlıklı yeme indeksi

1. INTRODUCTION AND PURPOSE

According to the World Health Organization (WHO), the adolescent period between the ages of 10-19, is one of the important stages of life which shows different alterations in terms of biological, psychological and social aspects. The attitudes and behaviors gained during this period influence the health of adolescents. Eating habit is one of them (1,2).

Adolescence is a period in which growth and development are faster than other periods of life. In this period, the daily energy and nutrient requirements of adolescents increase. Meeting these requirements is very important for healthy growth and development (3). The adolescent period is considered by WHO as a high-risk group in terms of nutritional status (4). While in this period, when unhealthy foods are started to be consumed, foods with high sugar content and salty-fatty foods especially in fast food style diet are preferred, there is a significant decrease in consumption of healthy foods such as vegetables and fruits, milk and dairy products (5). Irregular meals, skipping meals and unhealthy snacks between meals are frequently observed in adolescents and this results in poor diet and insufficient nutrient intake (6). Problems in the nutrition can negatively affect the growth-development, academic success and general health of adolescents (7).

The effect of nutrition on the overall health status and disease incidence was researched and various indexes in different forms (global & synthetic) were developed by the researchers in order to evaluate diet quality (2). Healthy Eating Index (HEI), one of these indexes, is a means of determining the nutritional status and it is used to evaluate the diet quality of individuals aged 2 years and older (8). The 2010 version of the index, which was updated in 2013 and consisted of 12 components, was prepared according to the 2010 Dietary Guideline and food patterns of Americans (9). When the diet pattern is evaluated with dietary indexes or scores, the effects of nutrients and other dietary components on health problems can be better understood (10). HEI is a useful index for monitoring the nutrition of adolescents and evaluating diet quality successfully (11).

It is observed that the senior high school students in the adolescent period have decreased their physical activities and their eating habits & diet quality have deteriorated under the intensive examination and course program (12). The aim of this study is to determine the nutritional status and healthy eating index of the senior

students of a public (Aldemir Atilla Konuk Anatolian High School) and a foundation high school (Istek Antalya Yeditepe High School) in the city center of Antalya.

2. GENERAL INFORMATION

2.1. Adolescent Nutrition

Nutrition is defined as the intake and use of nutrients which are essential for growth, development and a healthy life. Adequate and balanced nutrition is the intake and use of sufficient and balanced amounts of each of the energy and nutrients required for the growth, renewal and operation of the body (13).

WHO defines the 10-19 age group as “adolescent” and the 15-24 age group as “youth” (1). Adolescent period is a process of physiological, psychological and cognitive change that includes the transition from childhood to adulthood, where the growth and development is the fastest in humans (14,15). Changes in this process have a direct impact on the nutritional behavior and nutritional requirements of adolescents (15).

The difference between lean body mass and body fat in adolescent girls and boys affects the energy and nutrient requirements and causes their needs to be different. In this period, the requirement for macro and micro nutrients increases with the increase in energy requirement (15).

According to WHO, adolescents are considered as high-risk group in terms of nutritional status. Nutritional habits developed during this period of life are mostly affected by environmental factors. Under the influence of sociocultural, emotional and behavioral factors, they can make more independent decisions and develop their habit of eating outside the home (4). In this period when the trend towards unhealthy foods increases, consumption of foods with high saturated fat and sugar content increases and a significant decrease in consumption of vegetables, fruits and foods with high content of fiber and calcium is observed (16). Irregular meals, skipping meals and unhealthy snacks between meals are quite high among adolescents and this leads to poor diet quality and insufficient nutrient intake (6).

The aim of healthy nutrition in adolescence is;

- To ensure optimal growth and development,
- To improve learning and academic achievement,
- Preventing the development of acute illness (iron deficiency, malnutrition, insulin resistance, obesity, etc.) that may occur due to nutrition during adolescence.

- Protecting individuals from chronic diseases (diabetes, cardiovascular diseases, osteoporosis, etc.) that may occur in adulthood related to nutrition (7).

2.2. Energy and Nutrient Requirements of Adolescents

2.2.1. Energy

The energy used in many functions in the body, from breathing to circulation, from physical activity to maintaining body temperature, is important for maintaining general health. Daily energy requirement depends on age, gender, physical activity, body weight, height and so on. Nowadays, adolescents are reported to be mostly inactive and unable to spend the recommended energy. It is stated that the excess energy causes obesity, and the energy restriction to prevent obesity may cause malnutrition (7).

According to Turkey Nutrition Guide 2015 (TUBER-2015) daily energy intake in 17 years old males should be 2852 kcal, and in 17 years old females 2237 kcal. For 18 years old it should be 2919 kcal in males and 2252 kcal in females (17).

2.2.2. Carbohydrate

Carbohydrates are the body's main energy source. All tissues in the body primarily use carbohydrates for energy. It is recommended to consume 130 g/day carbohydrate at baseline. 45-60% of daily energy should be provided from carbohydrates (17, 18).

As a carbohydrate source, whole grains and products (bread, pasta, noodles, bulgur etc.), legumes, fruits can be preferred. Sugar and refined carbohydrates should be avoided. The daily energy from sugar has been determined by the European Society of Pediatric Hepatology and Nutrition to be <5% in childhood and adolescence. It is reported that sugar consumption above this rate may have negative effects on general health in the short and long term even if it does not cause obesity (19).

2.2.3. Protein

Proteins are macronutrients that form the structure of the cell and enzymes that catalyze metabolic reactions. Therefore, proteins are required for adolescent growth-development, lean body mass and cell repair (20). Significant increase in height and weight occurs in adolescence. Although muscle and adipose tissue increase in both genders, male adolescent tend to increase muscle tissue more. The amount of protein required to maintain and increase lean body mass is important in determining the protein requirement (21).

The daily protein requirement during adolescence ranges from 1.04 g/kg to 1.14 g/kg. It is recommended that 8-20% of daily energy is obtained from proteins.

According to TUBER-2015, daily protein intake is 55.7 g for 17 years old males and 46.3 g for 17 years old females and it is 53 g for 18 years old males and 47.3 g for 18 years old females (17).

2.2.4. Fat

Fats are the most energy giving nutrients. They provide 2 times more energy than an equal amount of carbohydrate and protein. Thus, the body can meet the energy requirement from fats economically (20).

It is recommended to keep the energy from fat between 20-35% during adolescence (17,18).

2.2.5. Dietary Fiber

Dietary fiber is a component of plants' cell walls, resistant to digestive enzymes. They are divided into two groups as water soluble and insoluble. Fiber helps in the prevention of obesity by giving a feeling of satiety, prevention of constipation by increasing bowel movements, cardiovascular diseases by regulating blood lipids, bowel diseases by regulating the functioning of the intestines and better control of diabetes (22).

According to TUBER-2015, sufficient daily dietary fiber intake is recommended as 21 g for 17 years old and 25 g for 18 years old males and females (17).

2.2.6. Vitamins and Minerals

Vitamins

According to their physical characteristics, the distribution of vitamins categorized in 2 groups, which are fat-soluble (A, D, E, K) and water-soluble (B and C), are different from each other. Some foods are rich in several vitamins, while others are poor in vitamins. Vitamins are nutrients that are easily lost during processing. Improper preparation, cooking and storage methods also cause losses in vitamins (20).

Vitamin requirements increase with age. While adequate and balanced diet can provide the vitamins needed, insufficiency of vitamins is frequently observed in limited, unidirectional, irregular and unbalanced nutrition of adolescents (23).

Daily vitamin requirements of adolescents in the 17-18 age group are given in Table 1 according to TUBER-2015.

Minerals

Minerals make up an average of 6% of the adult human body. Minerals such as calcium, phosphorus and magnesium are found in skeletal and dental structures, while minerals such as iron and cobalt are important in blood production and zinc is important for the immune system. Minerals, like vitamins, have important functions for maintaining the organism (17).

Daily mineral requirements of adolescents aged 17-18 are given in Table 1 according to TUBER-2015 recommendations.

Table 1. Daily vitamin and mineral requirements of adolescents aged 17-18

	Female		Male	
		TUBER		
Vitamins and Minerals	**(17 y)**	**(18 y)**	**(17 y)**	**(18 y)**
Vit A (mcg)	650	650	750	750
Vit B6 (mg)	1.2	1.2	1.3	1.3
Vit B12 (mcg)	4.0	4.0	4.0	4.0
Vit C (mg)	90.0	95.0	100	110
Vit E (mg)	11.0	11.0	13.0	13.0
Vit K (mcg)	75.0	75.0	75.0	75.0
Folate (mcg)	330	330	330	330
Niacin (mg/1000 kcal)	6.7	6.7	6.7	6.7
Thiamine (mg)	1.0	1.0	1.2	1.2
Riboflavin (mg)	1.0	1.0	1.3	1.3
Biotin (mcg)	35.0	40.0	35.0	40.0
Pantothenic acid (mg)	5.0	5.0	5.0	5.0
Calcium (mg/day)	1150	1000	1150	1000
Iron (mg/day)	13.0	11-16	11.0	11.0
Copper (mg/day)	1.1	1.3	1.3	1.6
Magnesium (mg/day)	250	300	300	350
Phosphorus (mg/day)	640	550	640	550
Sodium (g/day)	1.5	1.5	1.5	1.5
Potassium (g/day)	4.7	4.7	4.7	4.7
Zinc (mg/day)	11.9	7.5-12.7	14.2	9.4-16.3
Iodine (mcg/day)	130	150	130	150

2.3. Adolescent Eating Behaviors and Effects on Nutritional Status

The Center for Disease Control and Prevention (CDC) states that one of the most serious problems affecting adolescent health is unhealthy nutrition. In this period, irregular meals, skipping meals and eating out of the home are common unhealthy eating behaviors (24).

Nutrition of adolescents is generally irregular and environmental factors mostly affect food choice during this period. While the food of the school cafeteria is generally not preferred, foods with low nutritional value purchased from the school canteen or outside are often consumed. Unhealthy snacks consumed lead to loss of appetite during normal meal times, resulting in skipping meals and irregularity in meals. Snacks usually contain high fat, high sugar and low nutritional value. Chips, biscuits, chocolate are the most commonly consumed snacks in this period (25).

It is stated that the most skipped meal is breakfast in adolescents whose meal skipping is very frequent. Among the reasons for skipping breakfast meals, reasons such as desire to sleep in the morning, lack of appetite, lack of time and diet are shown (26).

Eating out of home is very common in adolescents and it contributes to daily energy intake. In particular, consumption of out of home foods and foods with high sugar content and soft carbonated beverages increase daily energy intake and increased energy intake causes an increase in body weight. Fruit flavored drinks with high sugar content and soft carbonated beverages, as well as frequently preferred sauces are among the products that increase energy intake (27).

Food and canteen services provided in schools are of great importance for adolescents' out of home nutrition. In our country, lunches are offered in all full-time private schools, and in some, snacks are provided in addition to lunch (28).

Increasing frequency of Western-style nutrition in adolescents causes some problems in cognitive development and this may result in low learning ability, low concentration and low school performance (29). In addition, increasing consumption of sugary drinks in out of home nutrition is reported to be among the modifiable risk factors affecting academic achievement (30).

Studies have shown that a high calorie diet with low nutritional value and low diet quality may lead to an increase in body mass and other health problems as the frequency of out of nutrition increases. Recent studies have highlighted the prevalence of obesity that increases with out of nutrition. It is stated that fast food style foods,

which are among obesogenic foods, may increase the risk of obesity due to their effects on satiety regulation center and energy metabolism (24).

2.4. Common Health Problems in Adolescence

Significant physical, cognitive and sensory changes occur during adolescence. The desire to be independent due to the impact of socioeconomic status, unrealistic expectations about body weight and shape, alienation from traditional food culture and lifestyle, being influenced by peers, and media may affect the nutritional behavior of adolescents and may cause some nutritional problems.

Common nutritional problems in this period:

- Bad eating habits such as obesity, iron deficiency anemia and other micronutrient deficiencies
- Negative body image and unhealthy diet practices (25).

2.4.1. Obesity

Obesity is an epidemiological public health problem that is widespread with the increase in the level of welfare along with unbalanced nutrition, sedentary life, urbanization & industrialization and integrated with the increase in total body fat. Genetic and environmental factors play an important role in the development of obesity. Environmental factors include changes in diet pattern and sedentary lifestyle. One of the factors that increase the risk of obesity in adolescents is that the time spent on television, internet and studying limits the time allocated for physical activity (31).

Obesity affects cardiovascular, endocrine, gastrointestinal, neurological, orthopedic, psycho-social and respiratory systems as well as increasing morbidity and mortality risk and decreasing life expectancy (32).

It is stated that individuals who are obese during adolescence and return to normal weight in older ages have higher mortality compared to other segments of the society. Therefore, adolescent obesity should be closely monitored and followed (31).

2.4.2. Anemia

Iron is one of the important minerals in the adolescent period. The third most important cause of disability adjusted life year (DALY) among 5 reasons in adolescents was found to be iron deficiency anemia (33). Iron deficiency anemia is a disease condition characterized by a decrease in the concentration of red blood cells (34).

Anemia is considered to be one of the most common nutritional deficiency diseases worldwide and 95% of anemia cases are associated with iron-deficient nutrition (35).

WHO states that approximately 30% of the world's population is anemia (35,36). The prevalence of anemia in developed countries varies between 4.3-20% depending on age and gender, and in developing countries it varies between 30-48%. The prevalence of anemia varies between 30 to 78% depending on the regions in Turkey (37,38).

The iron need of adolescents increases with the usual losses such as changes in blood volume, enzyme levels and menstruation, and especially in growth. Adequate iron intake can prevent iron deficiency anemia seen in adolescents (59).

It is recommended that iron-rich foods such as red meat, chicken, fish, eggs, legumes, dried fruits, dark green leafy vegetables and molasses should be consumed frequently in the treatment of iron deficiency anemia (20).

2.4.3. Eating Behavior Disorders

It has been observed that the incidences and prevalence of eating disorders (Anorexia Nervosa, Bulimia Nervosa, Binge Eating, etc.) among adolescents are increasing and malnutrition becomes widespread. Compared to the past, it is reported that eating disorders which has high prevalence among girls is increasing among boys. Early diagnosis and intervention of eating disorders, which cause serious health problems, make treatment easier (40).

Anorexia Nervosa; is a disorder that mostly affects women. Aneroxia Nervosa is one of the psychiatric disorders with the highest mortality. The fear of weight gain and fat and being on constant diet is the result of cognitive disorder in patients with Aneroxia Nervosa. Generally, there is no loss of appetite, but satisfaction from “emptiness” and hunger are common in these patients. Weight loss is seen as a success in patients with Aneroxia Nervosa. Therefore, these patients are not open to change and their approach to treatment is quite difficult (41).

Bulimia Nervosa; is much more food intake than most people can consume and inability to stop or control what they eat in a given time period . These individuals tend to use vomiting and laxatives to prevent weight gain (42).

The majority of patients with Bulimia Nervosa experience loss of control over eating and feel embarrassed because of this behavior. Therefore, their treatment demands are higher than individuals with Anorexia Nervosa. Body weight of patients with bulimia may be within normal limits or more (43).

Binge Eating Disorders; the most important factor that causes attacks is negative emotion state. The patient has a preoccupation period with a sense of loss of control over food intake and body weight / shape, but does not use compensatory behavior after binge eating periods. As a result, individuals are usually overweight. After a binge eating attack, one can evaluate himself negatively (blame, regret) and anger (41).

2.5. Assessment of Nutritional Status

Determination of the nutritional status of the individual is an indicator of the extent to which the nutrient requirements are met. Maintaining a balance between nutrient intake and nutrient requirements is important for general health. Nutrient intake is based on the individual's usual nutrient consumption. Economic status, eating habits, emotional state, climate, cultural structure, various diseases and appetite impact the intake of nutrients (44).

While traditional epidemiological studies have focused on a only nutrient, food group or nutrient intake in evaluating the nutritional status of individuals, studies conducted over the last 20 years have turned the focus on diet quality (45). It is thought that individuals' diet, together with evaluation of diet index or scores, the combined effects of nutrients and other components on many health problems can be understood (46).

2.6. Healthy Eating Index-2010

Healthy Eating Index (HEI), which is one of the frequently used diet quality indexes in recent studies, is a nutritional status determination tool developed by the United States Department of Agriculture (USDA). HEI was established according to nutritional guidelines specific to the United States (47).

The Healthy Eating Index was first developed in 1995 to measure the dietary quality of individuals aged 2 years and older in terms of compliance with the American Nutrition Guidelines and to monitor the change in diet quality (9).

The first developed HEI (1995) was revised in 2008 with the publication of the Dietary Guidelines for Americans in 2005 and was updated as HEI-2005. HEI-2005 and its previous version (HEI-1995) have been used extensively in epidemiological studies (48). A significant difference in the HEI-2005 compared to HEI-1995 is the use of the scoring technique according to the amount of nutrients per 1000 kcal taken by the

individual. The reason for this change is that the minimum intake levels of a person consuming too much energy and nutrients for energy and nutrients may be higher than those consuming less energy and nutrients (49).

The Healthy Eating Index (HEI-2010) which is composed of 12 components, is an updated version of the HEI-2005 arranged according to the 2010 Dietary Guidelines recommendations and nutritional patterns of the Americans (9).

3. MATERIALS AND METHODS

3.1. Research Place, Time and Sample Selection

The sample of the study consists of 208 senior students from a public (Aldemir Atilla Konuk Anatolian High School) and a foundation high school (Istek Antalya Yeditepe High School) located in the city center of Antalya, and on the dates of the study, and after the purpose of the study was announced, 177 students accepted to participate in the study voluntarily.

The data were collected between March 2018 and April 2018 through a questionnaire.

Ethics committee approval of the study was obtained from Akdeniz University Health Sciences Scientific Research and Publication Ethics Committee with the agenda numbered 02/1 on 19/12/2017. The permit is in the appendices.

The necessary permission for conducting the research in the mentioned schools was obtained from Antalya Provincial Directorate of National Education. The permit is in the appendices.

3.2. General Research Plan

The information obtained from the study (information about the individual and family, health information, information on nutrition habits, information about physical activity, food consumption frequency form and 24-hour dieatary recall form) were obtained through the questions in the questionnaire form.

3.2.1. Information about the Individual and Family

Information about the individual and family includes age, gender, educational background of the parents and monthly income of the family. Anthropometric measurements of individuals are also included in this section.

Body weight was measured with a portable scale 0.1 kg (kilograms). Individuals were allowed to weigh with light clothes and without shoes, and the data were recorded in kg.

The height of the individuals was measured with a non-stretching tape measure and recorded in cm (centimeters).

3.2.2. Health Information

In the health information section, individuals were asked how they define their own health, whether there is a disease diagnosed by the doctor and if there is a drug used continuously.

3.2.3. Information about Nutritional Habits

In the Nutrition Habits section, the students were asked about their appetite status, whether they were fed in a healthy way, how many meals they had a day, whether they skipped meals, if they skipped meals the most skipped meal, the reason for skipping meals, the foods and drinks consumed frequently between meals and daily water consumption.

3.2.4. Information on Physical Activity

In this section, the status and frequency of students' regular physical activity was questioned.

3.2.5. Food Consumption Frequency Form

Questionnaire of food consumption frequency questioned what food they consumed in the last 1 month and how often. With options of 'everyday', '2-3 times a week', 'once a week', '1 in 15 days', '1 in a month' and 'never' their food intake frequency was determined.

3.2.6. 24-Hour Dietary Recall Form

A 24-Hour Dietary Recall Form was used to record the daily 1-day food consumption of the individuals, and nutrient analyze was conducted by using the BeBiS 8 full version program.

Adequacy of energy and nutrients was evaluated according to Turkey Nutrition Guide (TUBER-2015).

3.3. Calculation of Healthy Eating Index-2010 (HEI-2010) Score

Healthy Eating Index-2010 consists of 12 components in total. The first 9 (total fruit, whole fruit, total vegetables, greens and beans, whole grains, dairy, total protein foods, seafood and plant proteins, fatty acids) show the adequacy of diet, the last 3 (refined grains, sodium, empty calories) indicate the products which should be limited (9).

Each component has its own standards. Scores show a proportional increase in consumption in the first 9 qualification components. In the limited consumption component, low consumption increases the score. Healthy Eating Index-2010 is evaluated maximum total score of 100 points. If the score is below 50, it is defined as "poor" diet quality. If it is in the range of 50 and 80, it is considered as "needs improvement" and if it is above 80 diet quality is "good".

In the calculations, for the food consumption records of the individuals 24-Hour Dietary Recall Form was used, and the daily energy and nutrient intake of each individual was calculated with BeBiS.

3.3.1. Total Fruit

The total fruit component is the fruit consumption per 1000 calories of the energy taken per day. If there is a consumption of 192 g or more fruits "5" points are given, and if there is no consumption "0" point is given (51).

3.3.2. Whole Fruit

The whole fruit component is the consumption of fresh, canned, frozen and dried fruits per 1000 calories per day of energy intake. Fresh fruit juice is outside this group. If there is a consumption of 96 g and above, "5" points are given, and if there is no consumption "0" point is given (51).

3.3.3. Total Vegetables

The total vegetable component is the consumption of vegetables per 1000 calories of the energy taken per day. If there is a consumption of 264 g or more "5" points are given and if there is no consumption "0" point is given (51).

3.3.4. Greens and Beans

The greens and beans component is the consumption of dark green vegetables, legumes and peas per 1000 calories of the energy taken daily. "5" points are given if there is a consumption of 48 g or more and if there is no consumption "0" point is given. If the total protein food category score is not fully met, the amount to be met was transferred to the total protein food and seafood & plant proteins categories; when the total protein food category score is fully met, the remaining amount is included in this category (greens and beans) and the total vegetable component (51).

3.3.5. Whole Grains

The whole grains component is the consumption of whole grains per 1000 calories of daily energy. "10" points are given if there is a consumption of 42.52 g or more, and "0" point is given if there is no consumption (51).

3.3.6. Dairy

The dairy component is the consumption of milk, yoghurt, cheese and all other dairy products per 1000 calories per day of energy intake. If there is a consumption of 312 g and above, "10" points are given and if there is no consumption, "0" point is given (51).

3.3.7. Total Protein Foods

The total protein foods component is the consumption of seafood, lean red meat, poultry, eggs, legumes, peas and oilseeds per 1000 calories of energy intake per day. "5" points are given if there is a consumption of 70.87 g or more, and "0" point is given if there is no consumption (51).

3.3.8. Seafood and Plant Proteins

The component of seafood and plant proteins is the consumption of seafood, plant-based proteins and oilseeds per 1000 calories of energy taken per day. If there is a consumption of 22.68 g or more, "5" points are given and if there is no consumption "0" point is given (51).

3.3.9. Fatty acids

The fatty acids component is the ratio of (PUFA + MUFA) / saturated fatty acid. If this ratio is 2.5 or higher, "10" points is given, and if it is 1.2 and below "0" point is given (51).

3.3.10. Refined Grains

The refined grains component is the consumption of processed grains per 1000 calories of the energy taken per day. If there is consumption of 51.03 g and below, "10" points are given, "0" point is given if there is consumption of 121.90 g and above (51).

3.3.11. Sodium

The sodium component is the consumption of sodium per 1000 calories of the energy taken per day. "10" points are given if there is a consumption of 1.1 g or less, and "0" point is given if there is a consumption of 2 g or more (51).

3.3.12. Empty Calories

The component of empty calories include energy from solid fats, alcohol and added sugar. "20" points are given if empty calories below 19% or less than the daily energy intake, and "0" point is given if they are above 50% or more (51).

3.4. Statistical Analyses

In the study, 24th version of SPSS analysis program was used.

Chi-square test was used when two or more independent groups were compared in the categorical variables. In terms of comparing the mean value of the difference between groups with two categories (eg male and female) t-test was used. On the other hand, the statistical relationship between two continuous variables was measured by Pearson Correlation Coefficient test. The results of the analysis are within the 95% confidence interval. In addition, the level of statistical significance was assumed to be significant at $p<0.05$.

4. RESULTS

4.1. Demographic Characteristics of Students

A total of 177 senior high school students participated in the survey. 98 (55.4%) of them were female, and 79 (44.6%) were male students. Table 2 presents the comparative statistics of the demographic characteristics of the participants by gender.

When the data in Table 2 was examined, it was seen that the 17 and 18 age groups were quite balanced among female and male students. 48% of female students were 17 years old and 48.1% of male students were 17 years old. On the other hand, 52% of female students were 18 years old and 51.9% of male students were 18 years old. No statistically significant difference was found between age groups according to gender ($p>0.05$).

It was observed that the rate of female students (46.9%) in foundation high school was higher than male students (35.4%). While 53.1% of the females were studied in the public high school, 64.6% of the students were male. However, the difference was not statistically significant ($p>0.05$).

When the education level of the mothers of both male and female students was examined, 42.4% were university graduates (F=42.9%; M=41.8%). 15.8% of the mothers of the students were primary school, 11.9% were secondary school and 29.9% were high school graduates. No statistically significant difference was found in the educational status of mothers by gender ($p>0.05$).

It was seen that the educational level of the fathers of the students was slightly higher than that of the mothers. Although these rates were quite balanced for female and male students, 10.2% of the fathers of the students were primary, 9% were secondary, 29.9% were high school and 50.8% were university graduates. No statistically significant difference was found in the educational status of fathers by gender ($p>0.05$).

15.3% of both male and female students (F=15.3%; M=15.2%) did not want to indicate the monthly income of their families. The ratio of students with monthly income of 1500 TL or less (n=6) to all students was 3.4% (F=5.1%; M=1.3%). The proportion of students with monthly income of 1501-3000 TL was 27.1% (F=26.5%; M=27.8%), the proportion of students with monthly income of 3001-5000 TL was 19.8% (F=16.3%; M=24.1%) and 5001 TL and above was 34.5% (F=36.7%; M=31.6%). The difference between income status by gender was not statistically significant ($p>0.05$).

In chi-square tests, it was seen that gender did not have any effect on the variables of age, high school, mother's / father' education level and monthly income.

Table 2. Comparative statistics of students' demographic characteristics by gender

General characteristics		Female (n=98)		Male (n=79)		Total (n=177)		Chi-square	p
		n	%	n	%	n	%		
Age									
	17	47	48	38	48.1	85	48	0	0.985
	18	51	52	41	51.9	92	52		
	(X) ± SS (yıl)	17.52 ± 0.502		17.51 ± 0.502		17.51 ± 0.501			
School									
	Public High School	52	53.1	51	64.6	103	58.2	2.376	0.123
	Foundation High School	46	46.9	28	35.4	74	41.8		
Mother's Education Level									
	Primary	14	14.3	14	17.7	28	15.8	2.95	0.399
	Secondary	15	15.3	6	7.6	21	11.9		
	High School	27	27.6	26	32.9	53	29.9		
	College/University	42	42.9	33	41.8	75	42.4		
Father's Education Level									
	Primary	12	12.2	6	7.6	18	10.2	1.548	0.671
	Secondary	10	10.2	6	7.6	16	9		
	High School	28	28.6	25	31.6	53	29.9		
	College/University	48	49	42	53.2	90	50.8		
Monthly Income									
	Does not know/want to share	15	15.3	12	15.2	27	15.3	3.576	0.466
	1500 TL and below	5	5.1	1	1.3	6	3.4		
	1501-3000 TL	26	26.5	22	27.8	48	27.1		
	3001-5000 TL	16	16.3	19	24.1	35	19.8		
	5001 TL and above	36	36.7	25	31.6	61	34.5		

$p<0.05$ was accepted as statistically significance

Table 3 shows the anthropometric measurements of the students by gender. When the height, weight and body mass index (BMI) of the students were examined, it was seen that the measurement values of male students were higher than that of female students in all three units of measurement and the difference was statistically significant. In this respect, the average height of males (X=180.18) was higher than the average height of females (X=164.54); the average weight of males (X=76.33) was higher than the average weight of females (X=59.54), and the average of males' BMI (X=23.40) was higher than that of females (X=22.03). These mean differences were statistically significant (p<0.001 for all three).

Table 3. Anthropometric measurements of students by gender

Anthropometry	Female				Male				(t-test)	
	X	SD	Min	Max	X	SD	Min	Max	t	p
Height (cm)	164.54	6.07	151	182	180.18	6.73	160	198	-16.23	**<.001**
Weight (kg)	59.54	8.55	42.6	84.1	76.33	12.97	54.1	119.2	-9.9	**<.001**
BMI (kg/m²)	22.03	3.32	14.9	33.5	23.40	3.62	166	34.8	-2.63	**<.001**

p<0.05 was accepted as statistically significance

Table 4 shows the comparative statistics of students' BMI percentile classification by gender. Accordingly, 1.1% of individuals were weak (F=2%; M=0), 5.6% were under the risk of weakness (F=6.1%; M=5.1%), 62.1% were normal (F=73.5%; M=48.7%), 23.7% were mildly obese (F=13.3%; M=36.7%), 7.3% were obese (F=5.1%; M=10.1%). It was understood that the ratio of male students in the mildly obese and obese categories was higher than female students. As a result of the chi-square test, a statistically significant difference was found between gender and BMI percentile categories (p=0.001).

Table 4. Comparative statistics of students' BMI classification by gender

BMI percentile	Female (n=98)		Male (n=79)		Total (n=177)		Chi-square	p
	n	%	n	%	n	%		
Weak (<3.p)	2	2	0	0	2	1.1		
Risk of weakness (3-15.p)	6	6.1	4	5.1	10	5.6		
Normal (15-85.p)	72	73.5	38	48.1	110	62.1	17.863	**0.001**
Mildly obese (85-97.p)	13	13.3	29	36.7	42	23.7		
Obese (>97.p)	5	5.1	8	10.1	13	7.3		

p<0.05 was accepted as statistically significance

4.2. Health Information of Students

Table 5 presents the comparative statistics of students' health information by gender. When these data were examined, 64.4% of the students (F=63.3%; M=65.8%) defined their health status as good. While the proportion of students who defined their health status as moderate was 32.8% (F=33.7%; M=31.6%), the proportion of students who stated that their health status as poor was 2.8% (F=3.1%; M=2.5%). The status of defining health by gender was not found to be statistically significant (p>0.05).

The proportion of female students (17.3%) with a disease diagnosed by the doctor was approximately three times more than that of males (6.3%). While 82.7% of female students did not have a disease diagnosed by a doctor, this rate was 93.7% for males. Proportional difference between gender and disease status was statistically significant in the chi-square test (p=0.027).

While 13.3% of female students continuously used medication, this rate was 5.1% for male students. However, the proportional difference was not statistically significant (p>0.05).

Table 5. Comparative statistics of students' health information by gender

Health Information	Female (n=98)		Male (n=79)		Total (n=177)		Chi-square	p
	n	%	n	%	n	%		
Definiton of Health								
Bad	3	3.1	2	2.5	5	2.8	0.143	0.931
Avarage	33	33.7	25	31.6	58	32.8		
Good	62	63.3	52	65.8	114	64.4		
Disease status								
Yes	17	17.3	5	6.3	22	12.4	4.878	**0.027**
No	81	82.7	74	93.7	155	87.6		
Medication use								
Yes	13	13.3	4	5.1	17	9.6	3.389	0.066
No	85	86.7	75	94.9	160	90.4		

p<0.05 was accepted as statistically significance

4.3. Nutritional Habits of Students

Table 6 shows the comparative statistics of students' eating habits by gender. 66.1% of the students stated that their appetite was generally good. There were 1 female student and 5 male students who stated that their appetite was bad. No statistically significant difference was found between the responses to appetite status by gender (p>0.05).

Proportion of the students who think they do not eat healthy 58.8% (F=58.2%; M=59.5%) was higher than those who think they eat healthy 41.2% (F=41.8%; M=40.5%). However, the difference was not statistically significant according to gender ($p>0.05$).

There were no students have only one meal per day in the sample. A little more than half of the students (54.8%) had three meals a day. While 14.1% had two meals a day, 31.1% had four or more meals a day. No statistically significant difference was found in the number of meals by gender ($p>0.05$).

54.2% of the students (F=53.1%; M=55.7%) stated that the main meal was skipped. Among the 96 students who stated that they skipped the main meal, the most frequently skipped was breakfast with 55.2% (F=59.6%; M=50%). The least skipped meal was dinner with 14.6% (F=13.5%; M=15.9%). There was no statistically significant difference between the main skipped meals by gender ($p>0.05$).

Half of the 96 students who stated that they skipped the main meal (F=53.8%; M=45.5%) stated that they skipped the main meals because they did not have any time. While there was no female student skipping the main meal due to economic problems, there was only one male student skipping the main meal for that reason. No statistically significant difference was found between the reasons for skipping meals by gender ($p>0.05$).

The ratio of male students who prefer to eat biscuits, crackers and wafers between meals (45.6%) was two times higher (22.4%) than females. On the other hand, the proportion of female students who prefer to eat chocolate/candy and eat fruit/dried fruits between meals was 28.6% and 26.5%, respectively while it was only 11.4% and 12.7% for male students. There was a statistically significant difference in food preferences between meals by gender ($p=0.001$).

It was seen that the ratio of tea/coffee consumption was much higher among females (F=70.4%; M=43%) and that of males was much higher (M=32.9%, F=11.2%) consuming coke/carbonated drinks. There was a statistically significant difference in beverage preferences between meals by gender ($p=0.001$).

At the bottom of Table 6, daily water consumption of female and male students is given. Accordingly, female students consumed an average of 1.79 liters of water per day, while male students consumed an average of 2.10 liters of water per day. As a result of t-test analysis, this difference was found to be statistically significant ($p=0.01$).

Table 6. Comparative statistics of students' eating habits by gender

Eating Habits	Female(n=98)		Male (n=79)		Total (n=177)		Chi-square	p
	n	%	n	%	n	%		
Appetite								
Bad	1	1	5	6.3	6	3.4	4.378	0.112
Average	33	33.7	21	26.6	54	30.5		
Good	64	65.3	53	67.1	117	66.1		
Thinks s/he eats healty								
Yes	41	41.8	32	40.5	73	41.2	0.032	0.858
No	57	58.2	47	59.5	104	58.8		
Numbers of meals								
Two	14	14.3	11	13.9	25	14.1	1.333	0.513
Three	57	58.2	40	50.6	97	54.8		
Four and more	27	27.6	28	35.4	55	31.1		
Skipping meals								
Yes	52	53.1	44	55.7	96	54.2	0.122	0.726
No	46	46.9	35	44.3	81	45.8		
The most frequent skipped meal	**(n=52)**		**(n=44)**		**(n=96)**			
Breakfast	31	59.6	22	50	53	55.2	0.902	0.637
Lunch	14	26.9	15	34.1	29	30.2		
Dinner	7	13.5	7	15.9	14	14.6		

$p<0.05$ was accepted as statistically significance

Table 6. (devam)

Eating Habits	n	%	n	%	n	%	Chi-square	p
Reasons for skipping meals	**(n=52)**		**(n=44)**		**(n=96)**			
I don't have appetite	9	17.3	10	22.7	19	19.8	6.047	0.302
Not used to	6	11.5	8	18.2	14	14.6		
No one prepares	5	9.6	5	11.4	10	10.4		
Due to economic problems	0	0	1	2.3	1	1		
In order to lose weight	4	7.7	0	0	4	4.2		
Does not have time	28	53.8	20	45.5	48	50		
Preference of snacks between meals								
Biscuit, crackers, wafer	22	22.4	36	45.6	58	32.8	20.967	**0.001**
Chips	0	0	2	2.5	2	1.1		
Chocolate, candy	28	28.6	9	11.4	37	20.9		
Nuts	6	6.1	4	5.1	10	5.6		
Fruit, dried fruit	26	26.5	10	12.7	36	20.3		
Bagel, pastry, toast	16	16.3	18	22.8	34	19.2		
Preference of bevarages btwn meals								
Tea, coffee	69	70.4	34	43	103	58.2	16.454	**0.001**
Coke and carbonated drinks	11	11.2	26	32.9	37	20.9		
Fruit Juice	6	6.1	8	10.1	14	7.9		
Milk, Ayran	12	12.2	11	13.9	23	13		
Water consumption								
(X)±SS (liter)	1.79 ± 0.72		2.10 ± 0.84		1.93 ± 0.79		-2.587	**0.01**

$p<0.05$ was accepted as statistically significance

4.4. Students' Physical Activity Information

Table 7 provides a comparison of students' physical activity status by gender. The proportion of male students doing regular physical activity (32.9%) was higher than that of female students (20.4%). However, physical activity status did not differ significantly by gender ($p>0.05$).

There were a total of 46 students who reported regular physical activity. 42.3% of the males who stated that they do regular physical activity did physical activity 4 hours or more per week. In female students, the highest frequency of physical activity was 2 hours per week (30%) and 3 hours per week (30%). The frequency of physical activity did not differ significantly by gender ($p>0.05$).

Table 7. Comparative statistics of students' physical activity status by gender

Physical Activity Status	Female (n=98)		Male (n=79)		Total (n=177)		Chi-square	p
	n	%	n	%	n	%		
Physical Activity								
Regular	20	20.4	26	32.9	46	26	3.555	0.059
No	78	79.6	53	67.1	131	74		
Frequency								
Less than one hour a week	4	20	1	3.8	5	10.9	4.515	0.211
2 hours a week	6	30	7	26.9	13	28.3		
3 hours a week	6	30	7	26.9	13	28.3		
4 hours a week and more	4	20	11	42.3	15	32.6		

4.5. Food Intake Frequencies of Students

Table 8 shows the comparative statistics of the frequency of food consumption by students. According to these data, the proportion of students who consumed pasteurized/UHT whole milk every day was found 20% for both male and female students. While 24.5% of female students never consumed pasteurized / UHT whole milk, this rate was 19% for males. The majority of students never consumed raw milk (M=68.4%, F=73.5%).

Yoghurt (38.8%), full-fat cheese (33.7%) and pasteurized / UHT milk (21.4%) were found the most consumed products by female students in dairy products. In male students, the most consumed dairy products were full-fat cheese (34.2%), yoghurt (22.8%), pasteurized milk (19%) and kashar cheese (19%). Kefir (79.6%), raw milk (73.5%) and semi-skimmed milk (67.3%) were never consumed by female students in

dairy products. In male students, dairy products that were never consumed were kefir (78.5%), raw milk (68.4%) and semi-skimmed milk (67.1%).

In the meat-egg-legumes-oilseed group, the most consumed products by female students each day were oil seeds (33.7%) and eggs (25.5%). In male students, the most consumed products were eggs (35.4%), oilseeds (19%) and red meat (8.9%). The products that were never consumed by female students in meat-egg-leguminous-oilseed products were other poultry (69.4%), offal (66.3%) and salami/sausage (21.4%), respectively. In male students, meat-egg-legumes-oilseed products that never consumed were found other poultry (57%), offal (44.3%) and salami/sausage (7.6%).

Fresh fruits (42.9%), green leafy vegetables (39.8%) and dried fruits (21.4%) were the most consumed products of female students in vegetable and fruit products every day. In male students, the most consumed vegetables and fruit products were found fresh fruits (36.7%), green leafy vegetables (27.8%) and other vegetables (21.5%). While 12.2% of female students never consumed dried fruits, this rate was 20.3% for male students.

Among bread and cereal products, white bread was the most consumed product for both male and female students (72.2% and 51%, respectively). While 13.9% of male students stated that they consume brown bread every day, this rate was higher in female students (19.4%). 38% of male students and 34.7% of female students did not consume breakfast cereals at all. The proportion of female students who never consumed white bread (24.5%) was about 3 times higher than that of male students who never consumed white bread (7.6%).

Looking at sugar and sweet products, 54.1% of the female students and 32.9% of the male students did not add any sugar in the tea. Chocolate/wafer (37.8%), biscuit (30.6%) and honey (14.3%) were the most preferred sugar and sweet products of the female students. The most preferred sugar and sweet products of male students were similar and chocolate/wafer (25.3%), biscuit (25.3%) and honey (13.9%) respectively. 38.8% of the female students did not consume molasses and candy. In males, this rate was 26.6% and 16.5%, respectively. Among the milk, fruit and pastry desserts, it was stated that both female and male students consume fruit desserts the less (F=22.4%; M=13.9%).

Among the fats and oils, olive oil was the most consumed type of oil for both female and male students every day (F=54.1%; M=49.4%). Margarine was the least consumed for both female and male students (F=53.1%; M=32.9%).

For both female and male students, the two most consumed beverages were tea and coffee each day (F=61.2% and 59.2%; M=65.8% and 54.4%). While 35.7% of female students never consumed carbonated soft beverages, this rate was 17.7% for males. Half of the females and 35% of the males stated that they never consumed fruit flavored soda.

Finally; in the hamburger/pizza, pita/lahmacun and French fries categories, the rate of female students who never consume these products was found higher (9.2%, 11.2%, 10.2%) than male students (5.1%, 2.5% and 3.8%, respectively).

Table 8. Comparative statistics of students' nutritional consumption frequency by gender

Foods		Never		Once a month		Twice a month		Once a week		2-3 times a week		Everyday	
		n	%	n	%	n	%	n	%	n	%	n	%
Dairy Products													
Whole milk (UHT/pasteurized)	Female	24	24.5	6	6.1	5	5.1	13	13.3	29	29.6	21	21.4
	Male	15	19	7	8.9	5	6.3	12	15.2	25	31.6	15	19
Whole milk (raw)	Female	72	73.5	10	10.2	4	4.1	4	4.1	6	6.1	2	2
	Male	54	68.4	12	15.2	3	3.8	5	6.3	4	5.1	1	1.3
Semi-skimmed milk	Female	66	67.3	4	4.1	5	5.1	4	4.1	13	13.3	6	6.1
	Male	53	67.1	7	8.9	2	2.5	5	6.3	9	11.4	3	3.8
Yoghurt	Female	2	2	4	4.1	5	5.1	15	15.3	34	34.7	38	38.8
	Male	2	2.5	1	1.3	1	1.3	12	15.2	45	57	18	22.8
Ayran	Female	4	4.1	12	12.2	18	18.4	30	30.6	25	25.5	9	9.2
	Male	4	5.1	3	3.8	7	8.9	19	24.1	39	49.4	7	8.9
Kefir	Female	78	79.6	10	10.2	2	2	5	5.1	2	2	1	1
	Male	62	78.5	9	11.4	3	3.8	2	2.5	2	2.5	1	1.3
Full fat cheese	Female	22	22.4	6	6.1	3	3.1	8	8.2	26	26.5	33	33.7
	Male	15	19	2	2.5	2	2.5	6	7.6	27	34.2	27	34.2
Low fat cheese	Female	54	55.1	9	9.2	1	1	17	17.3	9	9.2	8	8.2
	Male	35	44.3	6	7.6	4	5.1	6	7.6	16	20.3	12	15.2
Kashar cheese	Female	14	14.3	10	10.2	14	14.3	25	25.5	28	28.6	7	7.1
	Male	4	5.1	6	7.6	4	5.1	11	13.9	39	49.4	15	19
Cream cheese	Female	43	43.9	12	12.2	20	20.4	13	13.3	7	7.1	3	3.1
	Male	19	24.1	11	13.9	7	8.9	21	26.6	18	22.8	3	3.8

Table 8. (continues)

Foods			Never		Once a month		Twice a month		Once a week		2-3 times a week		Everyday	
			n	%	n	%	n	%	n	%	n	%	n	%
Meat-Egg-Legumes-Oil Seeds														
	Red Meat	Female	6	6.1	10	10.2	18	18.4	28	28.6	33	33.7	3	3.1
		Male	0	0	9	11.4	9	11.4	21	26.6	33	41.8	7	8.9
	Chicken	Female	1	1	8	8.2	17	17.3	27	27.6	44	44.9	1	1
		Male	1	1.3	2	2.5	7	8.9	17	21.5	47	59.5	5	6.3
	Fish	Female	7	7.1	30	30.6	23	23.5	33	33.7	5	5.1	0	0
		Male	3	3.8	24	30.4	15	19	31	39.2	6	7.6	0	0
	Offal	Female	65	66.3	26	26.5	3	3.1	3	3.1	1	1	0	0
		Male	35	44.3	22	27.8	14	17.7	5	6.3	2	2.5	1	1.3
	Sausage/salami	Female	21	21.4	16	16.3	19	19.4	24	24.5	15	15.3	3	3.1
		Male	6	7.6	10	12.7	11	13.9	20	25.3	27	34.2	5	6.3
	Other poultary	Female	68	69.4	17	17.3	2	2	3	3.1	6	6.1	2	2
		Male	45	57	18	22.8	5	6.3	6	7.6	4	5.1	1	1.3
	Egg	Female	13	13.3	3	3.1	4	4.1	20	20.4	33	33.7	25	25.5
		Male	3	3.8	1	1.3	5	6.3	15	19	27	34.2	28	35.4
	Legumes	Female	1	1	3	3.1	11	11.2	35	35.7	46	46.9	2	2
		Male	4	5.1	1	1.3	7	8.9	28	35.4	35	44.3	4	5.1
	Oil seeds	Female	1	1	9	9.2	6	6.1	21	21.4	28	28.6	33	33.7
		Male	3	3.8	4	5.1	3	3.8	16	20.3	38	48.1	15	19

Table 8. (continues)

Foods			Never		Once a month		Twice a month		Once a week		2-3 times a week		Everyday	
			n	%	n	%	n	%	n	%	n	%	n	%
Vegetables and Fruits														
	Green leafy vegetables	Female	3	3.1	0	0	4	4.1	11	11.2	41	41.8	39	39.8
		Male	4	5.1	5	6.3	4	5.1	10	12.7	34	43	22	27.8
	Other vegetables	Female	3	3.1	0	0	3	3.1	11	11.2	61	62.2	20	20.4
		Male	3	3.8	7	8.9	4	5.1	13	16.5	35	44.3	17	21.5
	Potato	Female	1	1	0	0	7	7.1	38	38.8	44	44.9	8	8.2
		Male	1	1.3	0	0	8	10.1	19	24.1	43	54.4	8	10.1
	Fresh fruit	Female	2	2	0	0	0	0	10	10.2	44	44.9	42	42.9
		Male	3	3.8	3	3.8	4	5.1	13	16.5	27	34.2	29	36.7
	Dried fruit	Female	12	12.2	6	6.1	18	18.4	24	24.5	17	17.3	21	21.4
		Male	16	20.3	8	10.1	15	19	17	21.5	18	22.8	5	6.3
Bread and cereals														
	Bread (white)	Female	24	24.5	4	4.1	0	0	4	4.1	16	16.3	50	51
		Male	6	7.6	2	2.5	1	1.3	2	2.5	11	13.9	57	72.2
	Bread (brown)	Female	25	25.5	11	11.2	4	4.1	15	15.3	24	24.5	19	19.4
		Male	30	38	13	16.5	4	5.1	8	10.1	13	16.5	11	13.9
	Pasta, noodles	Female	4	4.1	3	3.1	16	16.3	37	37.8	34	34.7	4	4.1
		Male	2	2.5	2	2.5	5	6.3	31	39.2	34	43	5	6.3
	Rice	Female	4	4.1	6	6.1	12	12.2	38	38.8	36	36.7	2	2
		Male	3	3.8	2	2.5	6	7.6	24	30.4	42	53.2	2	2.5
	Bulgur	Female	3	3.1	4	4.1	16	16.3	45	45.9	28	28.6	2	2
		Male	4	5.1	5	6.3	9	11.4	33	41.8	27	34.2	1	1.3
	Breakfast cereals	Female	34	34.7	16	16.3	14	14.3	12	12.2	13	13.3	9	9.2
		Male	30	38	13	16.5	4	5.1	13	16.5	14	17.7	5	6.3

Table 8. (continues)

Foods		Never		Once a month		Twice a month		Once a week		2-3 times a week		Everyday	
		n	%	n	%	n	%	n	%	n	%	n	%
Sugar and sweets													
Sugar (in tea)	Female	53	54.1	1	1	0	0	2	2	8	8.2	34	34.7
	Male	26	32.9	1	1.3	0	0	6	7.6	5	6.3	41	51.9
Sugar (in coffee)	Female	58	59.2	0	0	0	0	3	3.1	10	10.2	27	27.6
	Male	33	41.8	1	1.3	0	0	4	5.1	12	15.2	29	36.7
Honey	Female	15	15.3	15	15.3	13	13.3	21	21.4	20	20.4	14	14.3
	Male	10	12.7	6	7.6	10	12.7	22	27.8	20	25.3	11	13.9
Jam	Female	29	29.6	18	18.4	13	13.3	19	19.4	10	10.2	9	9.2
	Male	13	16.5	9	11.4	9	11.4	21	26.6	21	26.6	6	7.6
Molasses	Female	38	38.8	23	23.5	16	16.3	13	13.3	3	3.1	5	5.1
	Male	21	26.6	14	17.7	11	13.9	16	20.3	14	17.7	3	3.8
Candy	Female	38	38.8	19	19.4	11	11.2	13	13.3	11	11.2	6	6.1
	Male	13	16.5	19	24.1	11	13.9	15	19	15	19	6	7.6
Chocolate, wafer	Female	7	7.1	3	3.1	5	5.1	12	12.2	34	34.7	37	37.8
	Male	3	3.8	1	1.3	2	2.5	5	6.3	48	60.8	20	25.3
Biscuits	Female	9	9.2	6	6.1	6	6.1	21	21.4	26	26.5	30	30.6
	Male	5	6.3	1	1.3	5	6.3	12	15.2	36	45.6	20	25.3
Milk desserts	Female	9	9.2	15	15.3	33	33.7	24	24.5	11	11.2	6	6.1
	Male	6	7.6	10	12.7	14	17.7	28	35.4	19	24.1	2	2.5
Fruit desserts	Female	22	22.4	24	24.5	25	25.5	17	17.3	6	6.1	4	4.1
	Male	11	13.9	20	25.3	14	17.7	25	31.6	8	10.1	1	1.3
Pastry	Female	15	15.3	28	28.6	24	24.5	17	17.3	8	8.2	6	6.1
	Male	10	12.7	10	12.7	23	29.1	27	34.2	8	10.1	1	1.3

Table 8. (continues)

Foods		Never		Once a month		Twice a month		Once a week		2-3 times a week		Everyday	
		n	%	n	%	n	%	n	%	n	%	n	%
Fats and Oils													
Margarine	Female	52	53.1	10	10.2	7	7.1	10	10.2	11	11.2	8	8.2
	Male	26	32.9	7	8.9	10	12.7	11	13.9	13	16.5	12	15.2
Butter	Female	7	7.1	3	3.1	11	11.2	16	16.3	29	29.6	32	32.7
	Male	4	5.1	3	3.8	5	6.3	9	11.4	28	35.4	30	38
Sunflower oil	Female	14	14.3	4	4.1	7	7.1	7	7.1	28	28.6	37	37.8
	Male	7	8.9	4	5.1	3	3.8	10	12.7	20	25.3	35	44.3
Olive oil	Female	9	9.2	1	1	3	3.1	7	7.1	25	25.5	53	54.1
	Male	2	2.5	2	2.5	5	6.3	3	3.8	28	35.4	39	49.4
Beverages													
Tea	Female	4	4.1	1	1	2	2	1	1	30	30.6	60	61.2
	Male	3	3.8	1	1.3	0	0	7	8.9	16	20.3	52	65.8
Coffee	Female	8	8.2	2	2	0	0	7	7.1	23	23.5	58	59.2
	Male	8	10.1	3	3.8	0	0	8	10.1	17	21.5	43	54.4
Convenient fruit juice	Female	35	35.7	8	8.2	8	8.2	21	21.4	14	14.3	12	12.2
	Male	14	17.7	6	7.6	4	5.1	16	20.3	27	34.2	12	15.2
Fresh fruit juice	Female	18	18.4	15	15.3	12	12.2	25	25.5	19	19.4	9	9.2
	Male	13	16.5	9	11.4	14	17.7	16	20.3	16	20.3	11	13.9
Carbonated soft drinks	Female	35	35.7	19	19.4	12	12.2	14	14.3	11	11.2	7	7.1
	Male	14	17.7	8	10.1	7	8.9	6	7.6	30	38	14	17.7
Soda	Female	38	38.8	14	14.3	13	13.3	14	14.3	16	16.3	3	3.1
	Male	31	39.2	10	12.7	10	12.7	13	16.5	11	13.9	4	5.1
Fruit flavored soda	Female	49	50	15	15.3	13	13.3	11	11.2	7	7.1	3	3.1
	Male	28	35.4	20	25.3	8	10.1	15	19	7	8.9	1	1.3

Table 8. (continues)

Foods			Never		Once a month		Twice a month		Once a week		2-3 times a week		Everyday	
			n	%	n	%	n	%	n	%	n	%	n	%
Others														
	Hamburger, pizza	Female	9	9.2	22	22.4	22	22.4	32	32.7	11	11.2	2	2
		Male	4	5.1	9	11.4	12	15.2	31	39.2	20	25.3	3	3.8
	Pita, lahmacun	Female	11	11.2	27	27.6	21	21.4	27	27.6	9	9.2	3	3.1
		Male	2	2.5	8	10.1	14	17.7	30	38	24	30.4	1	1.3
	French fries	Female	10	10.2	14	14.3	21	21.4	27	27.6	23	23.5	3	3.1
		Male	3	3.8	7	8.9	18	22.8	26	32.9	21	26.6	4	5.1

4.6. Energy and Nutrient Intake of Students

Table 9 presents comparative statistics of students' energy and nutrient intake by gender. When the data in Table 9 were examined, it was observed that the mean values of males were higher than the mean values of female students in all of the energy, carbohydrate, protein, fat, saturated fatty acid, MUFA, PUFA and dietary fiber and the differences between the genders in all these items were found to be statistically significant. ($p < 0.001$ for all test results).

Table 9. Comparative statistics of energy and nutrient intake by gender

	Female		**Male**		**Total**		**t-test**	
Energy and nutrients	**X**	**SD**	**X**	**SD**	**X**	**SD**	**t**	**p**
Energy (kcal)	1753.4	362.7	2632.6	354.5	2145.8	566.0	-16.194	**<0.001**
Carbohydrate (g)	213.5	65.1	338.6	66.9	269.3	90.6	-12.551	**<0.001**
Protein (g)	61.6	17.9	90.3	20.5	74.4	23.8	-9.955	**<0.001**
Fat (g)	70.8	18.6	99.1	18.4	83.5	23.2	-10.121	**<0.001**
Saturated fattyacid (g)	29.5	8.5	41.7	9.4	35.0	10.7	-8.996	**<0.001**
MUFA (g)	25.4	7.7	35.4	8.7	29.9	9.5	-8.105	**<0.001**
PUFA (g)	11.6	5.5	15.4	6.4	13.3	6.2	-4.269	**<0.001**
Dietary fiber (g)	17.5	6.0	22.1	7.4	19.6	7.0	-4.547	**<0.001**

$p<0.05$ was accepted as statistically significance

Table 10 shows the comparative statistics of vitamin and mineral intake by gender. According to the data, the mean values of vitamin K and Niacin for female students (X=86.1 and X=7.6, respectively) were found higher than the mean values of vitamin K and Niacin for males (X=79.9 and X=7.3, respectively). For vitamin C the mean value was found equal both for males and females (X=82.7). It was observed that the mean value of males was higher than that of females in all items in Table 10 except these three items. In Table 10, there were vitamins and minerals in which the difference between the mean values of male and females were not found statistically significant. These were vitamin A ($p>0.05$), vitamin C ($p>0.05$), vitamin K ($p>0.05$) and Niacin ($p>0.05$).

In all vitamin and mineral intake except these four items, the mean value of males was higher than that of females and these differences were statistically significant.

Table 10 shows adequate intake amounts for both female and male students for the 17 and 18 age groups according to TUBER-2015.

Vitamins and minerals that higher than adequate intake in female students were Sodium, Phosphorus, Vitamin A, Copper, Riboflavin, Vitamin K and Niacin. In the other vitamins and minerals in the table, the current values of female students were lower than the required values. In males, vitamins and minerals that exceed the expected value were Sodium, Phosphorus, Copper, Biotin, Vitamin B12, Vitamin A, Iron, Riboflavin, Pantothenic Acid, Vitamin E, Iodine, Niacin, Vitamin B6 and Magnesium. In the other vitamins and minerals in the table, the present values of male students were found lower than the required values.

Table 10. Comparative statistics of students' vitamin and mineral intake by gender

	Female				Male				t-test	
	Intake		DRI		Intake		DRI			
Vitamins and Minerals	**X**	**SD**	**TUBER (17y)**	**TUBER (18y)**	**X**	**SD**	**TUBER (17y)**	**TUBER (18y)**	**t**	**p**
Vit A (mcg)	832.7	512.5	650	650	878.7	421.5	750	750	-0.642	0.522
Vit B6 (mg)	1.0	0.4	1.2	1.2	1.4	0.7	1.3	1.3	-4.512	**<0.001**
Vit B12 (mcg)	3.0	2.8	4.0	4.0	4.8	2.4	4.0	4.0	-4.544	**<0.001**
Vit C (mg)	82.7	45.3	90.0	95.0	82.7	52	100	110	0.001	0.999
Vit E (mg)	10.9	4.5	11.0	11.0	14.7	6.1	13.0	13.0	-4.585	**<0.001**
Vit K (mcg)	86.1	79.0	75.0	75.0	79.9	57.3	75.0	75.0	0.587	0.558
Folate (mcg)	235.7	86.6	330	330	287.7	102	330	330	-3.668	**<0.001**
Niacin (mg/1000kcal)	7.6	3.7	6.7	6.7	7.3	2.8	6.7	6.7	0.762	0.447
Thiamine (mg)	0.8	0.2	1.0	1.0	1.1	0.3	1.2	1.2	-7.56	**<0.001**
Riboflavin (mg)	1.1	0.3	1.0	1.0	1.5	0.4	1.3	1.3	-6.675	**<0.001**
Biotin (mcg)	33.3	12.1	35.0	40.0	45.8	15.5	35.0	40.0	-6.053	**<0.001**
Pantothenic acid (mg)	4.2	1.0	5.0	5.0	5.8	1.4	5.0	5.0	-8.526	**<0.001**
Calsium (mg)	749.8	238.7	1150	1000	897.6	336.1	1150	1000	-3.295	**0.001**
Iron (mg)	9.3	2.9	13.0	11-16	13.1	3.4	11.0	11.0	-7.847	**<0.001**
Copper (mg)	1.4	0.4	1.1	1.3	2.0	0.4	1.3	1.6	-9.597	**<0.001**
Magnesium (mg)	255.7	80.5	250	300	329.5	100.4	300	350	-5.429	**<0.001**
Phosphorus (mg)	997	266.4	640	550	1306.8	278.9	640	550	-7.533	**<0.001**
Sodium (g)	2.8	1.1	1.5	1.5	4.2	1.2	1.5	1.5	-8.293	**<0.001**
Potassium (g)	2.2	0.7	4.7	4.7	2.6	0.9	4.7	4.7	-4.11	**<0.001**
Zinc (mg)	7.4	2.2	11.9	7.5-12.7	11.6	3.1	14.2	9.4-16.3	-10.22	**<0.001**
Iodine (mcg)	117.7	53.1	130	150	157.6	50.6	130	150	-5.066	**<0.001**

$p<0.05$ was accepted as statistically significance

Table 11 shows the comparative statistics of the distribution of the daily energy intake by the students according to gender. Accordingly, the percentage of female students' daily energy intake from carbohydrates was X=49.17, while male students' was X=52.52. This ratio difference was statistically significant (p=0.003). On the other hand, the difference between the percentage of female students' daily energy intake from protein (X=14.70) and the percentage of male students' daily energy intake from protein (X=13.91) were not found to be statistically significant (p>0.05). Finally, the percentage of female students' daily energy intake from fat was X=36.12, while male students' was X=33.51. This ratio difference was found to be statistically significant (p=0.007).

Table 11. Comparative statistics of the distribution of daily energy intake by students according to gender

	Female		**Male**		**Total**		**t-test**	
Energy distribution	**X**	**SD**	**X**	**SD**	**X**	**SD**	**t**	**p**
CHO %	49.17	8.56	52.52	6.33	50.67	7.80	-2.987	**0.003**
Protein %	14.70	4.66	13.91	2.78	14.35	3.94	1.402	0.163
Fat %	36.12	6.99	33.51	5.78	34.95	6.59	2.725	**0.007**

p<0.05 was accepted as statistically significance

4.7. Findings of Healthy Eating Index 2010 (HEI-2010) of Students

Table 12 presents the comparative statistics of the students' total scores and components of Healthy Eating Index-2010 (HEI-2010) by gender. According to these data, the mean total HEI score (X=43.9) of female students was found higher than the mean total HEI score of female students (X=37.6) and this difference was statistically significant (p=0.001). On the other hand, the mean total HEI score of both female and male students was less than 50 points (X=41.1). In this regard, it was understood that the healthy eating index of senior high school students participating in the survey was low in both male and female students.

In terms of the components of the HEI, it was seen that the component scores of the female students were higher in the total fruit, total vegetables, greens and beans, whole grains, dairy and refined grains component scores than the male students and the difference was statistically significant (p=0.019, p<0.001, p<0.001, p=0.001, p=0.02, p<0.001 respectively).

On the other hand, the only component in Table 12 where the male score is high and the score difference is statistically significant was total protein foods. The mean

total HEI score (X=4.21) of male students was higher than the mean score of female students (X=3.4) and the difference was found statistically significant (p=0.006).

There was no statistically significant difference between gender in terms of total fruit, seafood and plant proteins, fatty acids, sodium and empty calories, which are the components of the HEI in Table 12 (p>0.05).

Table 12. Comparative statistics of students' HEI total scores and components by gender

	Female		**Male**		**Total**		**t-test**	
HEI total score and components	**X**	**SD**	**X**	**SD**	**X**	**SD**	**t**	**p**
Total HEI-2010 score (100)	43.9	16	37.6	10	41.1	14	3.24	**0.001**
Total fruit (5)	1.21	1.4	0.78	1	1.02	1.3	2.376	**0.019**
Whole fruit (5)	1.9	2.2	1.47	1.9	1.71	2	1.417	0.158
Total vegetables (5)	1.78	1.2	0.92	0.7	1.4	1.1	5.853	**<0.001**
Greens and Beans (5)	2.07	2	1.04	1.4	1.61	1.8	4.039	**<0.001**
Whole grains (10)	2.5	3.8	0.95	2.4	1.81	3.3	3.316	**0.001**
Dairy (10)	4.03	2.8	2.91	2	3.53	2.5	3.094	**0.002**
Total protein foods (5)	3.4	2.1	4.21	1.8	3.76	2	-2.801	**0.006**
Seafood and plant proteins (5)	1.28	1.9	1.49	2.2	1.37	2	-0.69	0.491
Fatty acids (10)	1.54	2.6	1.14	1.9	1.36	2.3	1.18	0.24
Refined grains (10)	3.62	3.8	1.44	2.8	2.65	3.6	4.398	**<0.001**
Sodium (10)	4.74	4	4.64	3.5	4.69	3.8	0.181	0.857
Empty calories (20)	15.9	4.3	16.7	2.6	16.2	3.6	-1.527	0.129

p<0.05 was accepted as statistically significance

In Table 13, the general characteristics of the students are compared according to the diet quality categories of "poor" and "needs improvement". Those with a total score of 0-50 according to HEI were included in the "poor" diet quality and those with a score of 51-80 were included in the "needs improvement". Since there were no students with good diet quality in the sample group, so there was no good diet quality group in the analyzes.

Looking at the age groups, 48.5% of the students in the 17 years old had "poor" diet quality, while this ratio was 51.5% in the 18 years old . No significant difference was found between age and HEI categories ($p>0.05$).

While 47.8% of the students with poor diet quality were females, 79% of the females had needs improvement diet quality. While 52.2% of males had poor diet quality, 20.9% of the males had needs improvement diet quality. A statistically significant difference was found between gender and HEI categories ($p<0.001$).

While 48.8% of the students had needs improvement diet quality in public high schools, 51.2% of students in foundation high school. No statistically significant difference was found between studying in public or foundation high school and HEI categories ($p>0.05$).

While 67.9% of the mothers of the students with poor diet quality were high school or university graduates, 86% of the mothers of the students with poor diet quality were high school or university graduates. The educational level of the mothers of the students had a significant effect on their HEI categories ($p=0.023$).

The educational level of the fathers did not have a significant effect on their diet quality ($p>0.05$).

The monthly income of the families of the students with needs improvement diet quality was higher than the monthly income of the families of the students with poor diet quality and having different levels of monthly income had a significant effect on the HEI categories ($p=0.027$).

Table 13. Comparative statistics of the general characteristics of the students according to HEI categories

General characteristics	Poor		Needs improvement		Chi-square	p
	n	%	n	%		
Age						
17	65	48.5	20	46.5	-0.227	0.821
18	69	51.5	23	53.5		
Gender						
Female	64	47.8	34	79.1	4.105	**<0.001**
Male	70	52.2	9	20.9		
School						
Public high school	82	61.2	21	48.8	-1.43	0.155
Foundation high school	52	38.8	22	51.2		
Education level of mother						
Primary	25	18.7	3	7	-2.307	**0.023**
Secondary	18	13.4	3	7		
High school	37	27.6	16	37.2		
Collage/University	54	40.3	21	48.8		
Education level of father						
Primary	15	11.2	3	7	-1.571	0.118
Secondary	13	9.7	3	7		
High school	43	32.1	10	23.3		
Collage/University	63	47	27	62.8		
Mothly income						
Does not know/want to share	22	16.4	5	11.6	-2.224	**0.027**
1500 TL and below	6	4.5	0	0		
1501-3000 TL	40	29.9	8	18.6		
3001-5000 TL	26	19.4	9	20.9		
5001 TL and above	40	29.9	21	48.8		

$p<0.05$ was accepted as statistically significance

Table 14 presents the comparative statistics of the BMI classification of the participants according to the HEI categories. While 56.7% of the students with normal BMI percentile had poor diet quality, this rate was 79.1% for the needs improvement diet quality. While 36.6% of the students with poor diet quality were mildly obese and obese, 13.9% of the students with poor diet quality were mildly obese and obese. As a result of the chi-square test, it was seen that the HEI categories had a significant effect on the students' BMI percentile classification ($p=0.007$).

Table 14. Comparative statistics of the students' BMI percentile classification according to the HEI categories

BMI percentile	Poor		Needs improvement		Chi-square	p
	n	%	n	%		
Weak (<3.p)	1	0.7	1	2.3		
Risk of weakness (3-15.p)	8	6	2	4.7		
Normal (15-85.p)	76	56.7	34	79.1	2.775	**0.007**
Mildly obese (85-97.p)	37	27.6	5	11.6		
Obese (>97.p)	12	9	1	2.3		

p<0.05 was accepted as statistically significance

In Table 15, students' health information (health definition, disease status, and whether they use regular medication) was examined comparatively according to their diet quality. According to these data, the only variable in the table related to diet quality was the definition of health. While 58.2% of the students in the poor diet quality defined their health as good, 83.7% of the students in needs improvement defined their health as good. In this respect, a statistically significant relationship was found between the HEI categories and the self-definition of students (p<0.001).

On the other hand, 14.2% of students with poor diet quality stated that they had a disease and 11.2% stated that they used regular medication, while 7% of students in needs improvement diet quality had a disease and 4.7% stated that they used regular medication. In this regard, it was understood that the students in needs improvement diet quality had fewer diseases and used regular medication less than the students who had poor diet. However, no statistically significant difference was found between disease status and medication use (p>0.05 for both).

Table 15. Comparative statistics of students' health information according to HEI categories

Health Information	Poor		Needs improvement		Chi-square	p
	n	%	n	%		
Definiton of Health						
Bad	5	3.7	0	0	-3.883	**<0.001**
Average	51	38.1	7	16.3		
Good	78	58.2	36	83.7		
Disease status						
Yes	19	14.2	3	7	-1.452	0.15
Not	115	85.8	40	93		
Medication use						
Yes	15	11.2	2	4.7	-1.541	0.126
No	119	88.8	41	95.3		

$p<0.05$ was accepted as statistically significance

In Table 16, students' eating habits (appetite status, healthy eating, number of meals, skipping main meals, and the most frequently skipped meals) were examined according to their diet quality categories. The proportion of students who had poor diet quality with good appetite (67.2%) and those who had needs improvement diet quality with good appetite (62.8%) was close to each other. According to these data, there was no statistically significant difference between appetite and diet quality ($p>0.05$).

The percentage of the students with poor diet quality who think that they do not eat healthy (66.4%) was higher than the rate of the students with "needs improvement" diet quality thinking that they do not eat healthy (34.9%) and this difference was found statistically significant ($p<0.001$).

Daily meals were balanced between both students had poor and needs improvement diet quality and there was no statistically significant difference between the HEI categories and the number of meals ($p>0.05$).

The rate of students skipping main meals among the students with poor diet quality (60.4%) was higher than the proportion of students skipping the main meals among the students with needs improvement diet quality (34.9%) and the difference was statistically significant ($p=0.003$).

Of the 96 students who stated that they skipped main meals, the most skipped meal was breakfast (poor: 56.8%; needs improvement: 46.7%). No statistically significant difference was found between the HEI category and the frequently skipped meals (breakfast, lunch and dinner) ($p>0.05$).

Table 16. Comparative statistics of students' eating habits according to HEI categories

Eating Habits	Poor		Needs improvement		Chi-square	p
	n	%	n	%		
Appetite						
Bad	6	4.5	0	0		
Average	38	28.4	16	37.2	-0.011	0.991
Good	90	67.2	27	62.8		
Thinks s/he eats healthy						
Yes	45	33.6	28	65.1	3.78	**<0.001**
No	89	66.4	15	34.9		
Numbers of meals						
Two	22	16.4	3	7		
Three	64	47.8	33	76.7	1.066	0.289
Four and more	48	35.8	7	16.3		
Skipping main meals						
Yes	81	60.4	15	34.9	-2.984	**0.003**
No	53	39.6	28	65.1		
The most skipped meal						
Breakfast	46	56.8	7	46.7		
Lunch	25	30.9	4	26.7	2.089	0.352
Dinner	10	12.3	4	26.7		

$p<0.05$ was accepted as statistically significance

In Table 17, whether the students do regular physical activity and the frequency of physical activity among those who do regular physical activity are examined comparatively. While 23.1% of students with poor diet quality did exercise regularly, 34.9% of students in needs improvement diet quality. According to these data, no statistically significant difference was found between the poor or needs improvement diet quality of the students and whether they did regular exercise ($p>0.05$).

The sample group consisted of 46 students who do regular physical activities. While 38.7% of students with poor diet quality did 4 hours or more physical activity per week, this rate was 20% in the group of needs improvement diet quality. There was no statistically significant difference between the frequency of physical activity and the HEI categories ($p>0.05$).

Table 17. Comparative statistics of students' physical activity status according to HEI categories

Physical Activity Status	Poor		Needs improvement		Chi-square	p
	n	%	n	%		
Physical Activity						
Regular	31	23.1	15	34.9	1.431	0.157
No	103	76.9	28	65.1		
Frequency						
Less than one hour a week	4	12.9	1	6.7	2.735	0.423
2 hours a week	7	22.6	6	40		
3 hours a week	8	25.8	5	33.3		
4 hours a week and more	12	38.7	3	20		

Table 18 presents the comparative statistics of the energy and nutrient values of the students according to the HEI categories. According to these data, the mean energy value of the students with poor diet quality (X=2262.06) was higher than the mean energy value of the students with needs improvement diet quality (X=1783.48) and the difference was found to be statistically significant ($p<0.001$).

The mean carbohydrate value of the students with poor diet quality (X=293.74) was higher than the mean carbohydrate value of the students with needs improvement diet quality (X=193.17) and the difference was statistically significant ($p<0.001$).

The difference between the mean protein value of the students with poor diet quality (X=75.14) and the mean protein value of the students with needs improvement diet quality (X=72.08) was not found to be statistically significant ($p>0.05$).

The difference between the mean fat value of the students with poor diet quality (X=85.32) and the mean fat value (X=77.65) of the students with needs improvement diet quality was not found to be statistically significant ($p>0.05$).

The mean saturated fatty acid value of the students with poor diet quality (X=36.76) was higher than the mean saturated fatty acid value of the students with needs improvement diet quality (X=29.35) and the difference was statistically significant ($p<0.001$).

The difference between the mean MUFA value of the students with poor diet quality (X=29.94) and the mean MUFA value of the students with needs improvement diet quality (X=29.71) was not found to be statistically significant ($p>0.05$).

The difference between the mean PUFA value of the students with poor diet quality (X=13.14) and the mean PUFA value of the students with needs improvement diet quality (X=13.69) was not found to be statistically significant (p>0.05).

Finally, the difference between the mean value of dietary fiber (X=19.16) of students with poor dietary quality and the mean value of dietary fiber (X=20.88) of students with needs improvement diet quality (X=19.16) was not found to be statistically significant (p>0.05).

Table 18. Comparative statistics of students' energy and nutrient values according to HEI categories

Energy and Nutrients	Poor		Needs improvement		t-test	
	X	SD	X	SD	t	p
Energy (kcal)	2262.06	559.61	1783.48	416.16	5.999	**<0.001**
Carbohydrate (g)	293.74	85.01	193.17	60.68	8.513	**<0.001**
Protein (g)	75.14	24.38	72.08	22.03	0.733	0.465
Fat (g)	85.32	23.87	77.65	20.18	1.9	0.059
Saturated fatty acid (g)	36.76	10.80	29.35	8.50	4.644	**<0.001**
MUFA (g)	29.94	9.68	29.71	9.08	0.137	0.891
PUFA (g)	13.14	6.24	13.69	6.24	-0.498	0.619
Dietary fiber (g)	19.16	6.75	20.88	7.62	-1.404	0.162

p<0.05 was accepted as statistically significance

Table 19 shows the comparative statistics of the percentages of the nutrients that meet daily energy requirements of the surveyed students according to their diet quality. When the data in Table 19 are analyzed, the students with poor diet quality received an average of 52.66% of their energy needs from carbohydrate, while students with needs improvement diet quality received 44.47% of their energy needs from carbohydrate and this difference was statistically significant (p<0.001).

On the other hand, students with poor diet quality received an average of 13.46% of their energy needs from proteins, while students with needs improvement diet quality received an average of 17.12% of their energy needs from protein, and this difference was statistically significant (p<0.001).

Finally, students with poor diet quality received 33.69% of their energy needs from fats, while students with needs improvement received 38.88% of their energy needs from fats, and this difference was statistically significant (p<0.001).

As a result; while carbohydrates had a higher proportion among the students who had poor diet quality than the students with needs improvement diet quality in

terms of meeting their daily energy needs, proteins and fats had a higher proportion among the students with needs improvement than the ones who had poor diet quality.

Table 19. Comparative statistics of the percentages of the nutrients that meet daily energy requirements of students according to HEI categories

Energy Distribution	Poor		Needs improvement		t-test	
	X	SD	X	SD	t	p
CHO %	52.66	6.68	44.47	7.87	6.69	**<0.001**
Protein %	13.46	2.92	17.12	5.28	-4.33	**<0.001**
Fat %	33.69	6.21	38.88	6.24	-4.76	**<0.001**

p<0.05 was accepted as statistically significance

Table 20 presents the correlation coefficients between the energy, macronutrients, dietary fiber intake values, and the HEI scores of the students and the statistical significance levels of these coefficients. In terms of all students, no correlation was found between the protein and fat values of the students and their healthy eating index scores ($r(175)=0.062$, $p>0.05$; $r(175)=-0.088$, $p>0.05$, respectively).

There was a statistically significant, positive correlation between HEI and dietary fiber values ($r(175)=0.220$, $p=0.003$). In this respect, as the dietary fiber values of the students increased, the total scores of the HEI increased in the same direction.

On the other hand, there was a statistically significant, negative correlation between HEI scores and both energy and carbohydrate values ($r(175) =-0.318$, $p<0.001$; $r(175)=-0.471$, $p<0.001$). In this respect, as the energy and carbohydrate values of the students increased, the total scores of the HEI decreased.

When the relationship between female and male students' HEI values and energy, protein, carbohydrate, fat and dietary fiber values were examined separately, the correlation between HEI and protein, which was found to be statistically insignificant in all students' correlation analysis, had positive in female students and statistically significant ($r(96)=0.291$, $p=0.004$). The relationship between HEI and protein was found to be positive and statistically significant in males ($r(77)=0.224$, $p=0.047$). In this respect, as the protein values of both male and female students increased, the total scores of the HEI showed a positive increase.

On the other hand, there was a statistically significant relationship between HEI and energy (r(175)=-0.318, p<0.001) in the correlation analysis of all students, there was no found statistically significant in male students (r(77)=-0.156, p>0.05).

Finally, in the correlation analysis of all students, the relationship between the HEI and dietary fiber (r=0.220), which was found to be statistically significant, was found to be statistically significant in male students, too. (r(77)=0.442, p<0.001). Compared to the correlation coefficient of female students (r=0.268), the strength of the relationship between male students' HEI values and dietary fiber values is about twice as strong as that of female students.

Table 20. Correlation between energy, macronutrients, dietary fiber values and HEI scores of students

HEI	Females		Males		Total	
	r	p	r	p	r	p
Energy (kcal)	-.274**	**0.006**	-0.156	0.17	-.318**	**0**
Protein (g)	.291**	**0.004**	.224*	**0.047**	0.062	0.411
CHO (g)	-.494**	**0**	-.385**	**0**	-.471**	**0**
Fat (g)	0.037	0.718	0.127	0.267	-0.088	0.246
Dietary fiber (r)	.268**	**0.008**	.442**	**0**	.220**	**0.003**

Pearson Correlation Coefficient test was used for calculations of p values
*0.01<p<0.05
**p<0.01

5. DISCUSSION

Adolescent period is a period in which physiological energy and nutrient requirements increase. Unhealthy eating behaviors such as skipping meals, irregular meals, inadequate and over-eating are frequently seen in this period. Akman et al. (52) reported that 63.8% of the students skipped meals in a study conducted with high school students. In a study conducted by Tanrıverdi et al. (53) in Gaziantep and Türk et al. (54) in Bornova with high school students, reported that respectively 69.5% and 81% of students skipped meals and the most skipped meal was found to be breakfast. The main reason for skipping meals was lack of appetite and time. In this study, the percentage of skipping meals was found to be 54.2% and the most skipped meal was breakfast. Among other reasons, lack of time takes the first place for skipping meals, and students with a poor diet quality skip more meals than students with needs improvement diet quality. In another study conducted with adolescents by Hopkins et al. (55) as the frequency of breakfast skipping increases, it is stated that the quality of diet significantly decreased.

In a study conducted in Izmit, the number of meals of the students was examined, while 53.3% of male students had 3 meals a day, 50.6% of female students had 3 meals a day (56). Acar Tek et al. (57) reported that 74.4% of adolescents had regular meals (breakfast, lunch, dinner). In this study, the rate of male students who had 3 meals a day was 58.2% and the rate of female students was 50.6%.

In the studies conducted in our country, it was observed that the daily energy intake by adolescents was below the recommendations (17). Kılınç and Çağdaş (58) in a study conducted with adolescents found that the energy intake of female students was 1927 kcal. Turkey Nutrition and Health Survey (TBSA-2010) states that the daily energy intake for females at 15-18 age group is 1701 kcal/day and for males 2288 kcal/day (59). In this study, daily energy intake was 1753.4±362.7 kcal/day for females students and 2632.6±354.5 kcal/day for male students.

According to TBSA-2010 data; 15-18 age group female and male adolescents received 221 g, 300 g CHO respectively and the contribution of CHO to daily energy was found to vary between 53.6% and 54.7% (59). In this study, similar results were found with TBSA-2010 in daily CHO intake and contribution to energy. According to this, daily CHO intake of female and male students was 213±65.1 g, 338.6±66.9 g

respectively and the percentage of contribution of CHO to energy was 49.17±8.56, 52.52±6.33, respectively.

In studies conducted on the nutritional status of adolescents, it is determined that protein is usually sufficient and even slightly above the recommended level (23). According to TBSA-2010 data, it was observed that female and male adolescents received 48.8 g and 68 g protein daily in the 15-18 age group, and the percentage of protein contribution to daily energy ranged between 12.1% and 12.5% (59). In this study, it was found that the daily protein intake of male and female students was slightly above the recommended. Protein intake for female and male students was 61.6±17.9 g, 90.3±20.5 g, respectively and the percent of the contribution of protein to energy was 14.7±4.66, 13.91±2.78, respectively.

The contribution of fat to daily energy according to TBSA-2010 for female and male adolescents in the 15-18 age group ranged between 32.7% and 34.8%, respectively (59). In this study, the percentage of fat contribution to daily energy was found to be 36.12±6.99, 33.51±5.78 in female and male students, respectively.

The type of fat consumed in healthy nutrition is important. While saturated fat consumption is associated with the risk of cardiovascular disease and certain types of cancer, it is reported that unsaturated fatty acids such as omega-3 and olive oil reduce this risk (60). In this study, more saturated fat consumption was found in students with poor diet quality. No significant difference was found between MUFA and PUFA intake and diet quality categories ($p>0.05$).

Dietary fiber has a significant place in the prevention of obesity, cardiovascular disease, constipation and diabetes (61). Farvid et al. (62) examined the relationship between breast cancer and fiber intake during adolescence and early adulthood, and reported that breast cancer risk was lower in women fed with fiber-rich in foods. In a study conducted in the United States between 2001 and 2010, it was reported that adolescents consumed 13.2 g of dietary fiber per day in their diet, which was not sufficient for normal body functions (63). According to TBSA-2010 data, dietary fiber intake in males aged 15-18 is 23.2 g and in females is 18.9 g (59). In this study, dietary fiber intake of males was found to be 22.1±7.4 g and 17.5±6.0 g for female students.

Iron is a micronutrient necessary for the maintenance and functioning of vital functions that have important functions in the body. In the studies, it was observed that the daily iron intake of male students was high and the female students were insufficient. Iron malnutrition during adolescence, due to menstrual losses for girls may

lead to iron deficiency or iron deficiency anemia (64). The prevalence of anemia in adolescents in our country varies by region between 30-78% (65). According to TBSA-2010, daily iron intake was found to be 12.1 mg in males and 9.7 mg in females aged 15-18 (59). In this study, similar results were obtained with TBSA-2010; daily iron intake was 13.1±3.4 mg for males and 9.3±2.9 mg for female students.

Acar Tek et al. (57) in a study evaluating the diet quality by HEI of adolescents found a total score of 51.5±9.07. Koç and Yardimci (66) in a study with adolescents found a total score of 50.2±9.4. No gender differences were observed in either study. In this study, the total HEI score was found to be 41.1±14 and the females' HEI score (43.9±16) was higher than that of the males' HEI score (37.6±10), and the difference was statistically significant (p=0.001).

Acar Tek et al. (57) evaluated the diet quality of adolescents in a study the ones having poor and needs improvement categories. Energy intake showed similar results for both categories, and protein intake was found to be higher in needs improvement diet quality. In the same study, more fiber intake was found in individuals with needs improvement diet quality compared to poor diet quality. In this study, energy and carbohydrate intake were higher in the poor diet quality compared to needs improvement diet quality. Protein intake and dietary fiber were similar in both diet quality categories.

In a study conducted by Tande et al. (67) with the data obtained from NHANES III in order to determine the relationship between HEI and abdominal obesity, HEI component scores were found to be associated with abdominal obesity. In the present study, the proportion of students in the poor diet quality who are mildly obese and obese was higher compared to needs improvement diet quality.

In low socioeconomic families who have less income, prices of foods are one of the determining factors in food selection (68). In a study by Singh and Kogan (69), the prevalence of obesity was found to be 2.7 times higher in children of low-income families compared to children of high-income families. In this study, the monthly income of the families of the students in poor diet quality was found to be low compared to needs improvement diet quality.

Inadequate consumption of dairy products may cause nutrients such as calcium, protein and B12 not to reach the recommended levels. In the last TBSA-2010 report, dairy products consumption was found to be low in all age groups. According to TBSA-2010, it is reported that consumption of dairy products is 176.2 g for females and 130.8

g for males in 15-18 age group (59). In a study by Rodrigues et al. (70), one of the lowest diet quality components was found to be the dairy. In this study, the total component score of the dairy (3.53±2.5) was found to be low, similar to the results of other studies.

Inadequate consumption of vegetables and fruits has a very high prevalence in various age groups in Europe and America. Especially in adolescents, it is reported that daily vegetable-fruit consumption is low and they consume less than 1 serving of fruit and vegetable daily (71). According to TUBER-2015, daily vegetable consumption should be 3.5-4 servings for males and 3.5 servings for female adolescents in 15-18 age group. Daily fruit consumption should be 2.5-3 servings in males and 2.5 servings in female students in 15-18 age group (17). In this study, daily fruit and vegetable consumption was not sufficient. When the frequency of food consumption is examined, daily green leafy vegetable consumption was 39.8% for females and 27.8% for males; other vegetable consumption was 20.4% for females and 21.5% for males; fresh fruit consumption was 42.9% for females and 36.7% for males. According to HEI components, total fruit score was found to be 1.02±1.3, whole fruit score was 1.71±2 and total vegetable score was 1.4±1.1.

Cereals are the main nutrient group of the society and because they contain many nutrients, they are an important part of healthy nutrition. Whole grains are rich in B-group vitamins other than B12, and whole grain products should be consumed in a healthy diet (72). According to TUBER-2015, daily bread and cereal consumption is 7-8 servings for males and 4-5 servings for females in the 15-18 age group (17). Bruening et al. (73) in a study conducted with 2043 adolescents found that daily whole grain consumption is less than 1 serving. In a study conducted by Koç and Yardimci (66), daily whole grain consumption in adolescents was found to be 30.3±63.1 g for females and 22.4±52.8 g for males. In this study, the rate of female students consuming brown bread every day was 19.4%, while the rate of male students was 13.9%. According to HEI components, whole grains component scores were also lower in both female and male students (F=2.5±3.8; M=0.95±2.4).

Today, the Mediterranean diet model, which is shown as an example of healthy nutrition, is an ideal form of nutrition. Mediterranean diet, rich in unsaturated fatty acids like fish, olives, olive oil and antioxidant-rich in vegetables & fruits and legumes and whole grain products are available (74). In a study by Koç and Yardimci (66), it was found that intake of seafood and plant protein among adolescents was similar for female

and male adolescents and stated that consumption of seafood was well below the recommended amounts. In this study, seafood and plant proteins' component scores were found to be low (F=1.28±1.9; M=2.2±1.37).

Some salt is needed for body health. According to WHO, daily salt intake should be less than 5 grams with the amount of salt added to foods (75). For adolescents, 4 grams salt and 1.5 gram of Na are recommended daily (17,18). In the study conducted by Koç and Yardimci (66), sodium consumption was found to be 3.7±2.1 g for female and 3.6±1.7 g for male adolescents. In this study, sodium consumption was found to be 2.8±1.1 g in female and 4.2±1.2 g in male students. Adolescents' pizza, hamburger, salami, sausage, processed meats, chips, biscuits, popcorn with salt, processed foods and sauces are known to be consuming more than necessary salt. This consumption on the one hand increases the burden on the kidney, on the other hand poses a risk factor for hypertension that may develop in the future (76).

Sugar added beverages generally include fruit flavored drinks, sports and energy drinks, 100% fruit juices, carbonated soft drinks and tea/coffee. Such beverages cause the total sugar consumption to be exceeded in adolescent nutrition (77). In 2011, the Ministry of Education prohibited the sale of high-energy, low-nutrient soft carbonated drinks in school canteens (78). High consumption of beverages with high sugar content is associated with obesity, metabolic syndrome and type-2 diabetes with increased energy intake (79). According to TBSA-2010 data, daily carbonated soft drinks consumption was reported to be 560 ml in male and 453.4 ml in female adolescents in the 15-18 age group (59). In this study, the rate of males consuming carbonated soft drinks was 17.7% and 7.1% in female students. In addition, 51.9% of males added sugar to tea, while the percentage was 34.7% for female students

The World Health Organization recommends at least 60 minutes of moderate to vigorous intensity physical activity daily for children and adolescents aged 5-17 (80). Decrease in physical activity habit with age in adolescence shows that adolescents continue to live as sedentary adults (81). In a study by Akman et al. (52) in which physical activity status of adolescents was examined, it was found that the rate of males performing regular physical activity was higher than female adolescents. According to TBSA-2010, it was found that 72.5% and 69.8% of adolescents in aged 15-18 did not exercise at all. Similar results were obtained in this study. According to this study, 79.6% of females and 67.1% of male students did not do physical activity.

6. CONCLUSION

6.1. Results

The following results were obtained in this study conducted to determine the nutritional status and healthy eating indices of the senior students of a foundation and a public high school in the city center of Antalya.

1. There was no statistically significant difference between gender and age groups ($p>0.05$).
2. There was no statistically significant difference between gender and students attending foundation or public high schools ($p>0.05$).
3. There was no statistically significant difference between gender and educational status of mothers ($p>0.05$).
4. There was no statistically significant difference between gender and educational status of fathers ($p>0.05$).
5. There was no statistically significant difference between gender and income ($p>0.05$).
6. Male students' height (cm), weight (kg) and BMI (kg/m^2) mean values were higher than female students ($p<0.001$ for all three).
7. The proportion of female students who entered normal BMI percentile classification was higher than male students ($p=0.001$).
8. There was no statistically significant difference between gender and health status ($p>0.05$).
9. The number of female students diagnosed with a disease by the doctor was higher than the male students ($p=0.027$).
10. There was no statistically significant difference between gender and regular medication use ($p>0.05$).
11. No statistically significant difference was found between gender and appetite ($p>0.05$).
12. There was no statistically significant difference between gender and those who thought they were healthy or unhealthy ($p>0.05$).
13. No statistically significant difference was found between gender and number of meals ($p>0.05$).
14. There was no statistically significant difference between gender and the most frequently skipped main meals ($p>0.05$).

15. No statistically significant difference was found between gender and the reasons for skipping meals ($p>0.05$).

16. The preference of male students for snacks such as biscuits, crackers and wafers between meals was higher than that of female students ($p=0.001$).

17. While male students preferred soft carbonated drinks between meals more often than female students, tea/coffee consumption of female students was higher than male students ($p=0.001$).

18. Daily water consumption of male students was higher than female students ($p=0.01$).

19. There was no statistically significant difference between gender and physical activity status ($p>0.05$).

20. There was no statistically significant difference between gender and frequency of physical activity ($p>0.05$).

21. The proportion of students consuming pasteurized/UHT milk every day was 20% for both male and female students. While 24.5% of female students never consumed pasteurized/UHT milk, this rate was 19% for male students. The majority of students never consumed raw milk (M=68.4%; F=73.5%).

22. Yoghurt (38.8%), full-fat cheese (33.7%) and pasteurized/UHT milk (21.4%) were the most consumed products by female students in dairy products. In male students, the most consumed dairy products were full-fat cheese (34.2%), yoghurt (22.8%), pasteurized/UHT milk (19%) and kashar cheese (19%). Kefir (79.6%), raw milk (73.5%) and semi-skimmed milk (67.3%) were never consumed by female students in dairy products. In male students, dairy products that were never consumed were kefir (78.5%), raw milk (68.4%) and semi-skimmed milk (67.1%).

23. In the meat-egg-legumes-oilseed group, the most consumed products by female students each day were oil seeds (33.7%) and eggs (25.5%). In male students, the most consumed products were eggs (35.4%), oilseeds (19%) and red meat (8.9%). The products that were never consumed by female students in meat-egg-leguminous-oilseed products were other poultry (69.4%), offal (66.3%) and salami/sausage (21.4%). In male students, meat-egg-legumes-oilseed products which were never consumed were other poultry (57%), offal (44.3%) and salami/sausage (7.6%).

24. In vegetable and fruit products the most consumed products by female students each day were fresh fruits (42.9%), green leafy vegetables (39.8%) and dried fruits (21.4%). The most consumed vegetables and fruit products in male students each day were fresh

fruits (36.7%), green leafy vegetables (27.8%) and other vegetables (21.5%). While 12.2% of female students stated that they never consume dried fruits, this rate was 20.3% for male students.

25. Among bread and cereal products, white bread was the most consumed product for both male and female students (72.2% and 51%, respectively). While 13.9% of males stated that they consume brown bread every day, this rate was higher in females (19.4%). 38% of males and 34.7% of females never consumed breakfast cereals. The proportion of female students who never consumed white bread (24.5%) was about 3 times higher than that of males who never consumed white bread (7.6%).

26. Sugar and sweet products, 54.1% of the female students and 32.9% of the male students never added any sugar in tea. The most preferred sugary products for female students were chocolate/wafer (37.8%), biscuits (30.6%) and honey (14.3%). Chocolate/wafer (25.3%), biscuit (25.3%) and honey (13.9%) were the most preferred sugary products for males. 38.8% of the female students never consumed molasses and candies. In males, this rate was 26.6% and 16.5%, respectively.

27. Among the fats and oils, olive oil was the most consumed type of oil for both female and male students every day (F=54.1%, M=49.4%). The highest non-consumption fat was margarine for both female and male students (F=53.1%, M=32.9%).

28. For both female and male students, the two most consumed drinks per day were tea and coffee (M=65.8% and 54.4%; F=61.2% and 59.2%). While 35.7% of females never consumed soft drink beverages, this rate was 17.7% for males.

29. Proportion of female students who never consumed burgers, pita / lahmacun and French fries (9.2%, 11.2%, 10.2%, respectively); it was higher than that of males who never consumed these products (5.1%, 2.5% and 3.8%, respectively).

30. Male students' energy and nutrient intake (carbohydrate, protein, fat, saturated fatty acid, MUFA, PUFA, dietary fiber) were higher than female students ($p<0.001$ for all).

31. There was no statistically significant difference between gender and vitamin A, vitamin C, vitamin K and Niacin intake ($p>0.05$).

32. Male students' intake of Vitamin B6, Vitamin B12, Vitamin E, Folate, Thiamine, Riboflavin, Biotin, Pantothenic Acid, Calcium, Iron, Copper, Magnesium, Phosphorus, Sodium, Potassium, Zinc and Iodine were higher than female students ($p<0.001$).

33. The percentage of male students' daily energy intake from carbohydrates was higher than female students ($p=0.03$).

34. No statistically significant difference was found between gender and percentage of daily energy intake from protein ($p>0.05$).

35. The percentage of female students' daily energy intake from fat was higher than that of male students ($p=0.007$).

36. Total female HEI-2010 score was higher than male students ($p=0.001$).

37. Female students' total fruit, total vegetable, greens and beans, whole grains, dairy, refined grains component scores were higher than male students (respectively; $p=0.019$, $p<0.001$, $p<0.001$, $p=0.001$, $p=0.002$, $p<0.001$).

38. The total protein food component score of male students was higher than female students ($p=0.006$).

39. No statistically significant difference was found between gender and component scores of whole fruit, seafood and plant proteins, fatty acids, sodium and empty calories ($p>0.05$).

40. No statistically significant difference was found between age and HEI categories ($p>0.05$).

41. The proportion of female students in the needs improvement diet quality was higher than that of male students ($p<0.001$).

42. There was no statistically significant difference between public or foundation high school students and HEI categories ($p>0.05$).

43. The education level of the mothers of the students in needs improvement diet quality was higher than the students in the poor diet quality ($p=0.023$).

44. There was no statistically significant difference between fathers' education levels and HEI categories ($p>0.05$).

45. The monthly income of the families of the students in needs improvement diet quality was higher than that of the poor diet quality group ($p=0.027$).

46. The percentage distribution of students with normal BMI percentages in needs improvement diet quality was higher than those with normal BMI percentiles in poor diet quality ($p=0.007$).

47. The percentage of those who define their health status "good" among the students in needs improvement diet quality was higher than that of the poor dietary quality that define their health "good" ($p<0.001$).

48. No statistically significant difference was found between disease status, medicine use and HEI categories ($p>0.05$).

49. No statistically significant difference was found between appetite status and HEI categories ($p>0.05$).

50. The proportion of students with poor diet quality who do not think that they eat healthy was higher than the students in needs improvement diet quality ($p<0.001$).

51. No statistically significant difference was found between the number of meals and HEI categories ($p>0.05$).

52. The rate of skipping the main meals among the students with poor diet quality was higher than students with needs improvement ($p=0.003$).

53. There was no statistically significant difference between the frequently skipped meals and HEI categories ($p>0.05$).

54. No statistically significant difference was found between the status of regular physical activity and HEI categories ($p>0.05$).

55. No statistically significant difference was found between the frequency of physical activity and HEI categories ($p>0.05$).

56. The mean energy value of students with poor diet quality was higher than students in needs improvement diet quality ($p<0.001$).

57. The mean carbohydrate value of the students with poor diet quality was higher than students in needs improvement diet quality ($p<0.001$).

58. No statistically significant difference was found between the mean protein value and the HEI categories ($p>0.05$).

59. No statistically significant difference was found between the mean fat value and HEI categories ($p>0.05$).

60. The saturated fatty acid mean value of the students with poor diet quality was higher than students in needs improvement diet quality ($p<0.001$).

61. There was no statistically significant difference between the mean values of MUFA,PUFA and HEI categories ($p>0.05$).

62. No statistically significant difference was found between the mean values of dietary fiber and HEI categories ($p>0.05$).

63. The percentage of daily energy needs from carbohydrates from students with poor diet quality was higher than students in needs improvement diet quality ($p<0.001$).

64. The percentage of daily energy needs from proteins for students in needs imrovement diet quality was higher than students in poor diet quality ($p<0.001$).

65. The percentage of the daily energy needs from the fats for students in needs improvement diet quality was higher than students in poor diet quality ($p<0.001$).

66. There was no correlation between the mean protein and fat values of the students and their HEI scores ($r(175)=0.062$, $p>0.05$; $r=(175)=-0.088$, $p>0.05$, respectively).

67. There was a statistically significant, positive correlation between HEI scores and dietary fiber values. As the dietary fiber values of the students increased, HEI scores increased in the same direction ($r(175)=0.220$, $p=0.003$).

68. There was a statistically significant, negative correlation between the HEI scores and both energy and carbohydrate (CHO) values. In this respect, as the energy and carbohydrate values of the students increased, their HEI scores decreased ($r(175)=0.318$, $p<0.001$; $r(175)=-0.471$, $p<0.001$, respectively).

69. The relationship between HEI and protein was found to be positive and statistically significant in females ($r(96)=0.291$, $p=0.004$). The relationship between HEI and protein was found to be positive and statistically significant in males, too ($r(77)=0.224$, $p=0.047$). In this respect, as the protein values of both male and female students increased, the total scores of the HEI showed a positive increase.

70. In the correlation analysis of all students, there was a statistically significant relationship between HEI and energy ($r(175)=-0.318$, $p<0.001$), and it was found to be statistically insignificant with males ($r(77)=-0.156$, $p>0.05$).

71. In the correlation analysis of all students, the relationship between the HEI and dietary fiber ($r=0.220$) was found to be statistically significant in males ($r(77)=0.442$, $p<0.001$). Compared to the correlation coefficient of females ($r=0.268$), the strength of the relationship between male students' HEI total scores and dietary fiber values was approximately twice as high as that of female students.

6.2. Suggestions

No students were found with good diet quality in the study, so students can be trained about gaining adequate and balanced nutrition habits and their sustainability.

In order to monitor the change of nutrition over time and evaluate the quality of diet, indices specific to our country such as Healthy Eating Index can be developed. Such indices will guide the formation and development of nutritional policies.

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8. APPENDICES

8.1. Ethical Approval

T.C.
AKDENİZ ÜNİVERSİTESİ
Sağlık Bilimleri Bilimsel Araştırma ve Yayın Etiği Kurulu

Tarih : 19/12/2017
Sayı : 02

Akdeniz Üniversitesi Sağlık Bilimleri Bilimsel Araştırma ve Yayın Etiği Kurulu **02/1** sayılı gündem ile 19/12/2017 tarihinde toplanmış ve aşağıdaki kararlar alınmıştır.

KARAR 1:

Yürütücülüğünü Yeditepe Üniversitesi Beslenme ve Diyetetik Bölümü öğretim üyesi **Yrd. Doç. Dr. Hülya DEMİR**'in üstlendiği, *"Lise Son Sınıf Öğrencilerinin Beslenme Durumu ve Sağlıklı Yeme İndekslerinin Belirlenmesi"* başlıklı tez projesinin anketinin uygulanmasının, Üniversitemiz Sağlık Bilimleri Bilimsel Araştırma ve Yayın Etiği Kurulu tarafından, **etik olarak uygun olduğuna katılanların oy birliği** ile karar verilmiştir.

Prof. Dr. Ercan MIHÇI
Başkan

Prof. Dr. Sebahat GÖZÜM
Başkan Yrd.

Prof. Dr. Nigar KELEŞ ÇELİK
Raportör

Prof. Dr. Yusuf AKAR
Üye
(bulunmadı)

Prof. Dr. Ahmet Yılmaz ÇOBAN
Üye

Prof. Dr. Veli YAZISIZ
Üye

Prof. Dr. Okan ERDOĞAN
Üye
(bulunmadı)

8.2. Permit for Provincial Directorate of National Education

T.C.
ANTALYA VALİLİĞİ
İl Milli Eğitim Müdürlüğü

Sayı : 98057890-605.01-E.2449080 05.02.2018
Konu: Anket Uygulaması

Sayın: Betül KAÇAR
Yeşilbayır Mah.4634.Sok.No:14
Döşemealtı/ANTALYA

İlgi :02/01/2018 tarihli dilekçeniz.

Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü Beslenme ve Diyetetik Anabilim Dalı Yüksek Lisans Programı Öğrencisi Betül KAÇAR'ın **"Lise Son Sınıf Öğrencilerinin Beslenme Durumu ve Sağlıklı Yeme İndekslerinin Belirlenmesi "** adlı araştırmasını, İlimiz İstek Antalya Yeditepe Koleji, Aldemir Atilla Konuk Anadolu Lisesinde uygulama isteği ile ilgili 02/01/2018 tarihli dilekçeniz, İl Milli Eğitim Müdürlüğü Araştırma Değerlendirme ve İnceleme komisyonumuz tarafından, 15/01/2018 tarihinde incelenerek **"Milli Eğitim Bakanlığına Bağlı Okul ve Kurumlarda Yapılacak Araştırma, Yarışma ve Sosyal Etkinlik İzinlerine Yönelik İzin ve Uygulama Genelgesi"** gereğince uygun görülmüş olup, Müdürlüğümüzün 18/01/2018 tarihli ve 1277353 sayılı onayı ve uygulanacak veri toplama araçları onaylanarak ekte gönderilmiştir.

Araştırmanın bitiminde, sonuç raporunun bir örneğinin CD ortamında (başvuru sahibinin ekte örneği bulunan dilekçe ile) Müdürlüğümüz Ar-Ge bürosuna gönderilmesi hususunda;

Gereğini rica ederim.

Mehmet KARAKAŞ
Müdür Yardımcısı

EKLER:
1- Onay ve ekleri (7 sayfa)
2-Dilekçe Örneği(1 sayfa)

GÜVENLİ ELEKTRONİK İMZALI
ASLI İLE AYNIDIR
06 Şubat 2018
Murat KOYUN
Memur

Antalya İl Milli Eğitim Müdürlüğü
Soğuksu Mah. Hamidiye Cad. MERKEZ/ANTALYA
E-posta: projeler07@meb.gov.tr

Ayrıntılı bilgi için: Mehmet KARAKAŞ Md. Yrd.
Tel: (0 242) 238 60 00
Faks: (0 242) 238 61 11

T.C.
ANTALYA VALİLİĞİ
İl Milli Eğitim Müdürlüğü

Sayı : 98057890-20-E.1277353 18.01.2018
Konu : Anket Uygulaması

İL MİLLİ EĞİTİM MÜDÜRLÜĞÜNE
ANTALYA

Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü Beslenme ve Diyetetik Anabilim Dalı Yüksek Lisans Programı Öğrencisi Betül KAÇAR'ın **"Lise Son Sınıf Öğrencilerinin Beslenme Durumu ve Sağlıklı Yeme İndekslerinin Belirlenmesi "** adlı araştırmasını, İlimiz İstek Antalya Yeditepe Koleji, Aldemir Atilla Konuk Anadolu Lisesinde uygulama isteği ile ilgili 02/01/2018 tarihli dilekçesi, İl Milli Eğitim Müdürlüğü Araştırma Değerlendirme ve İnceleme komisyonumuz tarafından, 15/01/2018 tarihinde incelenerek **"Milli Eğitim Bakanlığına Bağlı Okul ve Kurumlarda Yapılacak Araştırma, Yarışma ve Sosyal Etkinlik İzinlerine Yönelik İzin ve Uygulama Genelgesi"** esaslarına uygun olduğu tespit edilmiştir.

Komisyonumuzca, **"Lise Son Sınıf Öğrencilerinin Beslenme Durumu ve Sağlıklı Yeme İndekslerinin Belirlenmesi"** isimli araştırmasını, İlimiz İstek Antalya Yeditepe Koleji, Aldemir Atilla Konuk Anadolu Lisesinde öğrenim gören son sınıf öğrencilerine , bahse konu Genelge ve çalışma takvimi doğrultusunda, eğitim-öğretim faaliyetlerini aksatmaksızın yapılması,

Söz konusu araştırmanın bitimine müteakip; sonuç raporunun bir örneğinin CD ortamında Müdürlüğümüz Ar-Ge bürosuna gönderilmesi kaydıyla uygulanması, Komisyonca uygun görülmüştür.

Makamlarınızca da uygun görüldüğü takdirde, Valilik Makamının 23/02/2015 tarih ve 5347 sayılı yetki devrine göre olurlarınıza arz ederim.

Mehmet KARAKAŞ
Müdür a.
Müdür Yardımcısı

OLUR
18.01.2018

Yüksel ARSLAN
Vali a.
İl Milli Eğitim Müdürü

Antalya İl Milli Eğitim Müdürlüğü
Soğuksu Mah. Hamidiye Cad. MERKEZ/ANTALYA
E-posta: projeler07@meb.gov.tr

Ayrıntılı bilgi için: Mehmet KARAKAŞ Md. Yrd.
Tel: (0 242) 238 60 00
Faks: (0 242) 238 61 11

8.3. Questionnaire

ANKET FORMU

Değerli öğrenciler;

Bu anket, lise son sınıf öğrencilerinin beslenme durumu ve sağlıklı yeme indekslerinin belirlenmesi amacıyla yapılmaktadır. Bu konuda hazırlamış olduğum sorulara vereceğiniz samimi cevaplar araştırmanın sağlıklı bir şekilde yürütülmesine katkı sağlayacaktır. Elde edilen bilgiler yalnızca araştırmacı tarafından akademik amaçlı kullanılacaktır.

Katkılarınızdan dolayı teşekkür ederim.

Dyt. Betül Kaçar
Yeditepe Üniversitesi
Sağlık Bilimleri Enstitüsü
Beslenme ve Diyetetik ABD

A. BİREYE VE AİLEYE İLİŞKİN BİLGİLER

1. Yaşınız:

2. Cinsiyetiniz:

3. Boy uzunluğunuz:

4. Kilonuz:

5. Anne-Babanızın eğitim durumu:

	Anne	Baba
Okuryazar değil	( )	( )
İlkokul mezunu	( )	( )
Ortaokul mezunu	( )	( )
Lise ve dengi mezunu	( )	( )
Yüksekokul/Üniversite mezunu	( )	( )

6. Ailenizin aylık geliri: ..... TL

B. SAĞLIK BİLGİLERİ

7. Sağlığınızı nasıl tanımlarsınız?

( ) İyi ( ) Orta ( ) Kötü

8. Doktor tarafından teşhisi konmuş bir hastalığınız var mı?

( ) Evet (Belirtiniz) .....

( ) Hayır

9. Sürekli kullandığınız bir ilaç var mı?

( ) Evet (Belirtiniz) .....

( ) Hayır

C. BESLENME ALIŞKANLIKLARI İLE İLGİLİ BİLGİLER

10. Genelde iştah durumunuz nasıldır?

( ) İyi ( ) Orta ( ) Kötü

11. Sağlıklı bir şekilde beslendiğinizi düşünüyor musunuz?

( ) Evet ( ) Hayır

12. Günde kaç öğün besleniyorsunuz?

( ) Bir ( ) İki

( ) Üç ( ) Dört ve daha fazla

13. Ana öğün atlıyor musunuz?

( ) Evet ( ) Hayır

** Cevabınız 'Evet' ise;

14. En çok atladığınız ana öğün hangisi?

( ) Sabah kahvaltısı ( ) Öğle yemeği ( ) Akşam yemeği

15. Öğün atlıyorsanız sebebi nedir?

( ) İştahım yok ( ) Zamanım olmadığı için

( ) Zayıflamak için ( ) Hazırlayan olmadığı için

( ) Alışkanlığım olmadığı için ( ) Ekonomik yetersizlik

16. Öğünler arasında sıklıkla tükettiğiniz yiyecekler nelerdir?

( ) Simit, poğaça, tost
( ) Bisküvi, kraker, gofret
( ) Çikolata, şekerleme
( ) Cips
( ) Meyve, kuru meyve
( ) Kuruyemiş
( ) Diğer (Belirtiniz) .....

17. Öğünler arasında sıklıkla tükettiğiniz içecekler nelerdir?

( ) Süt, ayran
( ) Kola ve gazlı içecekler
( ) Çay, kahve
( ) Meyve suları
( ) Diğer (Belirtiniz) .....

18. Günde kaç lt su tüketirsiniz? .....

D. FİZİKSEL AKTİVİTE İLE İLGİLİ BİLGİLER

19. Düzenli fiziksel aktivite yapıyor musunuz?

( ) Evet
( ) Hayır

20. Düzenli fiziksel aktivite yapıyorsanız ne sıklıkta yapıyorsunuz?

( ) Haftada 1 saatten az
( ) Haftada 2 saat
( ) Haftada 3 saat
( ) Haftada 4 saat ve daha fazla

E. BESİN TÜKETİM SIKLIĞI SAPTAMA FORMU

BESİNLER	BESİNLERİN TÜKETİM SIKLIĞI					
	HER GÜN	HAFTADA 2-3 KEZ	HAFTADA BİR	15 GÜNDE BİR	AYDA BİR	TÜKETMİYORUM
Süt ve Süt Ürünleri						
Tam süt (pastörize/UHT)						
Tam süt (sokak sütü)						
Yarım yağlı süt						
Yoğurt						
Ayran						
Kefir						
Tam yağlı peynir						
Yarım yağlı peynir						
Kaşar peynir						
Krem peynir						
Et-Yumurta-Kurubaklagil-Yağlı tohum						
Kırmızı et						
Tavuk						
Balık						
Sakatat (ciğer, böbrek vb.)						
Sucuk/salam/sosis						
Diğer kümes hayvanları						
Yumurta						
Kurubaklagiller (yeşil mercimek, nohut, kuru fasulye vb.)						
Yağlı tohumlar (fındık, badem, ceviz vb.)						
Sebze ve Meyveler						
Yeşil yapraklı sebzeler						
Diğer sebzeler						
Patates						
Taze meyveler						
Kuru meyveler						

BESİNLER	BESİNLERİN TÜKETİM SIKLIĞI					
	HER GÜN	HAFTADA 2-3 KEZ	HAFTADA BİR	15 GÜNDE BİR	AYDA BİR	TÜKETMİYORUM
Ekmek ve Tahıllar						
Ekmek (beyaz)						
Ekmek (esmer) (kepekli/çavdar/ yulaf/tam buğday)						
Makarna, erişte						
Pirinç						
Bulgur						
Kahvaltılık tahıl ürünleri						
Şeker ve Tatlılar						
Şeker (çayda)						
Şeker (kahvede)						
Bal						
Reçel						
Pekmez						
Şekerleme, lokum						
Çikolata, gofret						
Bisküvi (tatlı/tuzlu)						
Sütlü tatlılar						
Meyveli tatlılar						
Hamur tatlıları						
Yağ						
Margarin						
Tereyağ						
Sıvıyağ						
Zeytinyağı						
İçecekler						
Çay						
Kahve						
Hazır meyve suları						
Taze meyve suları						
Kola ve gazlı içecekler						
Soda (sade)						
Soda (meyve aromalı)						
Diğer						
Hamburger, pizza vb.						
Pide, lahmacun vb.						
Patates kızartması						

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F. 24 SAATLİK GERİYE DÖNÜK BESİN TÜKETİM KAYDI

Aşağıdaki çizelge besin tüketim durumunuzu tespit etmek amacıyla hazırlanmıştır. Lütfen gün içerisinde tükettiğiniz bütün besinleri belirtilen ölçülere uygun olarak doldurunuz.

ÖĞÜNLER	YİYECEK ADI, MİKTARI VE İÇİNDEKİLER	ÖLÇÜLER:
KAHVALTI		**Çay bardağı/ Su bardağı:** süt, yoğurt, çay, meyve suyu vb. **Yemek kaşığı:** pilav, makarna vb. **Çay kaşığı/ Tatlı kaşığı:** reçel, bal, çikolata, toz şeker vb. **Kepçe/ Kase:** çorba, sulu yemek vb. **Kibrit kutusu büyüklüğü:** peynir **Köfte büyüklüğü:** et ürünleri **Küçük/ Orta/ Büyük:** meyve **Adet:** yumurta, zeytin, küp şeker, dolma, baklava vb. **Cins/ Gram veya Adet:** çikolata, gofret, bisküvi vb. **25 gr (dilimlenmiş tost ekmek büyüklüğü):** 1 ince dilim ekmek
KUŞLUK		
ÖĞLE		
İKİNDİ		
AKŞAM		
GECE		

9. CIRRUCULUM VITAE

Personal Informatıon

Name	Betül	**Surname**	Kaçar
Place of Birth	ANTALYA	**Date of Birth**	26.04.1993
Nationality	T.C.	**ID no**	30058043384
E-Mail	dytbetulkcr@gmail.com	**Tel**	0532 628 2910

Education

Degree	Department	Name of the Schools	Year of Graduation
Master	Nutrition and Dietetics	Yeditepe University	-
Licence Degree	Nutrition and Dietetics	Yeditepe University	2016
High School		Antalya Hacı Malike Mehmet Bileydi Anatolian High School	2011

Computer Knowledge

Computer Skills	Skill
Office Programs	Good
SPSS	Moderate
BEBIS	Good