T.C.
YEDITEPE UNIVERSITY
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DEPARTMENT OF NUTRITION AND DIETETICS

THE COMPARISION OF THE DIET QUALITY OF STUDENTS IN TWO DIFFERENT DEPARTMENTS OF A UNIVERSITY

MASTER'S THESIS

Tuğba GÜNDOĞDU

İstanbul, 2015

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SUPERVISOR
Prof. Dr. B. Serdar ÖZTEZCAN

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Jüri Başkanı:	Prof. Dr. B. Serdar ÖZTEZCAN (Yeditepe Üniversitesi)	.....
Tez danışmanı:	Prof. Dr. B. Serdar ÖZTEZCAN (Yeditepe Üniversitesi)	.....
Üye:	Prof. Dr. B. Serdar ÖZTEZCAN (Yeditepe Üniversitesi)	.....
Üye:	Yrd. Doç. Dr. A. Binnur OKAN BAKIR (Yeditepe Üniversitesi)	.....
Üye:	Yrd. Doç. Dr. Can ERGÜN (Bahçeşehir Üniversitesi)	.....

ONAY

Bu tez Yeditepe Üniversitesi Lisansüstü Eğitim-Öğretim ve Sınav Yönetmeliğinin ilgili maddeleri uyarınca yukarıdaki jüri tarafından uygun görülmüş ve Enstitü Yönetim Kurulu'nun 16../12../2015 tarih ve 31-4 sayılı kararı ile onaylanmıştır.

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LIST of SYMBOLS and ABBREVIATIONS

BMI	Body Mass Index
DGA	Dietary Guidelines for Americans
DH	Dietary Habits
DP	Dietary Patterns
DQI	Diet Quality Index
DRI	Dietary Reference Intakes
ELT	English Language Teaching
ELTS	English Language Teaching Students
EWCFG	Eating Well with Canada's Food Guide
FFQ	Food Frequency Questionnaire
HDI	Healthy Diet Indicator
HEI	Healthy Eating Index
MDS	Mediterranean Diet Score
M-DQI	Mediterranean Dietary Quality Index
mg	Miligrams
ND	Nutrition and Dietetics
NDS	Nutrition and Dietetics Students
NHANES	National Health and Nutrition Examination Survey
PA	Physical Activity
SFA	Saturated Fatty Acid
THMDP	Traditional Healthy Mediterranean Diet Pyramid
US	United States
USDA	United States Department of Agriculture
24HDR	24 Hour Dietary Recall

ABSTRACT

Gündoğdu T. (2015). The Comparision of the Diet Quality of Students in Two Different Departments of a University. Yeditepe University, Institute of Health Sciences, Department of Nutrition and Dietetics, MSc thesis. İstanbul.

In this study, diet quality of the students in department of Nutrition and Dietetics (ND) was compared with the diet quality of the students in department of English Language Teaching (ELT) by Healthy Eating Index (HEI). This study was conducted on 176 university students; 105 students from department of ND and 71 students from department of ELT. 89,8% of the students were female and only 10,2% were male and mean age was 20,95±2,35 years. 75,6% of the students were normal weight. Only 9,7% were overweight or obese and 14,8% were thin. Dietary intake of students was measured with 24-hour dietary recall (24HDR) method and dietary quality was assessed by means of the HEI. The mean of total HEI score of all students was 60,85±10,88. 14,8% of the students had a 'poor diet', 81,8% had a diet that needs improvement, and 3,4% had a 'good diet'. In general population, the scores of total fat, saturated fat, vegetables and fruits components of the HEI were found low. Highest mean HEI component score was cholesterol. When the diet quality of students in two departments was compared; mean of total HEI score of ND students was significantly higher than mean of total HEI score of ELT students ($p<0,05$). Mean scores for milk and dietary variety component of the HEI were significantly high in ND students ($p<0,05$). In this study, there was a negative correlation between Body Mass Index (BMI) and total HEI score, grain component and dietary variety ($p<0,05$). There was a positive correlation between grain component and dietary variety and total HEI score ($p<0,01$). There was also a positive correlation between dietary variety and total HEI score ($p<0,01$). Consequently, according to the total HEI score, although the diet quality of department of ND students was significantly better than the diet quality of department of ELT students, the overall diet quality of university students need modification and improvement.

Key words: University students, diet quality, healthy eating index, nutrition

ÖZET

Gündoğdu, T. (2015). Bir Üniversitenin İki Farklı Bölümündeki Öğrencilerin Diyet Kalitelerinin Karşılaştırılması. Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik ABD., Master Tezi. İstanbul.

Bu çalışmada, Beslenme ve Diyetetik bölümü öğrencilerinin diyet kalitesi, Sağlıklı Yeme İndeksi'ni (HEI) kullanarak İngilizce Öğretmenliği bölümü öğrencilerinin diyet kalitesi ile karşılaştırılmıştır. Bu çalışma 176 üniversite öğrencisi üzerinde yürütülmüştür; 105 öğrenci Beslenme ve Diyetetik bölümünden ve 71 öğrenci İngilizce Öğretmenliği bölümünden katılmıştır. Öğrencilerin %89,8'i kadın ve %10,2'si erkeklerden oluşmuştur ve ortalama yaş 20,95±2,35 olarak bulunmuştur. Öğrencilerin %75,6'sı normal ağırlıkta bulunmuştur. Sadece %9,7 fazla kilolu veya obez ve %14,8 zayıf bulunmuştur. Besin alımı 24 saatlik geriye dönük hatırlama yöntemi ile ölçülmüştür ve diyet HEI'nın ortalamaları ile değerlendirilmiştir. Öğrencilerin toplam HEI ortalama puanı 60,85±10,88 olarak bulunmuştur. Öğrencilerin %14,8'i 'kötü diyet''e sahipken, %81,8'i düzelmeye ihtiyacı olan diyete, ve %3,4'ü 'iyi diyet''e sahip olarak bulunmuştur. HEI'nın toplam yağ, doymuş yağ, sebze ve meyve bileşen puanları popülasyonun genelinde düşük bulunmuştur. En yüksek puana sahip HEI bileşeni kolesterol olarak bulunmuştur. İki bölüm öğrencilerinin diyet kaliteleri karşılaştırıldığında; Beslenme ve Diyetetik öğrencilerinin ortalama toplam HEI puanı anlamlı derecede İngilizce Öğretmenliği öğrencilerinin ortalama toplam HEI puanından fazla olarak bulunmuştur ($p<0,05$). HEI'nın süt ve besinsel çeşitlilik bileşenlerinin ortalama puanları anlamlı derecede Beslenme ve Diyetetik öğrencilerinde yüksek bulunmuştur ($p<0,05$). Beden Kitle İndeksi ile toplam HEI puanı, tahıl bileşeni ve besinsel çeşitlilik bileşeni arasında negatif bir korelasyon bulunmuştur ($p<0,05$). Tahıl bileşeni ile besinsel çeşitlilik ve toplam HEI puanı arasında pozitif bir korelasyon bulunmuştur ($p<0,01$). Besinsel çeşitlilik ile toplam HEI puanı arasında da pozitif bir korelasyon bulunmuştur ($p<0,01$). Sonuç olarak, toplam HEI puanına göre; Beslenme ve Diyetetik bölümü öğrencilerinin diyet kalitesi anlamlı derecede İngilizce Öğretmenliği bölümü öğrencilerinden daha iyi olsa da, üniversite öğrencilerinin toplam diyet kalitesinin değişikliğe ve düzelmeye ihtiyacı vardır.

Anahtar kelimeler: Üniversite öğrencileri, diyet kalitesi, sağlıklı yeme indeksi, beslenme

1. INTRODUCTION and PURPOSE

Nutrition and health are of great importance throughout life, in particular in adulthood because active population is included among the adults. Therefore, it is essential to assess the quality of the diet (1).

The role of healthy eating in the disease prevention has been well documented. A balanced diet and consumption of food prepared in accordance with good dietary practices are factors that contribute to maintaining a healthy lifestyle (2).

Diet is implicated in the origins of many diseases, sometimes not manifested until much later in life. Because of dietary habits and food choices established in youth remain quite similar in adult years, it is important to monitor dietary quality in young people, namely university students (3).

The different stages of life can produce profound changes in eating habits. The start of university education is an important time in the life of an individual, because it often represents a period of greater responsibility for food choices and health. The most common factors that affect food choices in this young population include changes in living arrangements, costs and financial resources, and the availability of convenience and "fast" meals (2).

Beginning university often leads for the first time to taking responsibility for one's own food choices. Students' dietary habits undergo many changes regarding nutrient intakes, dietary variety, ways of food preparation and portion size. For student population, the importance of nutrition disappears as a perception while convenience emerges. Low fruit and vegetable intakes and high fat and protein consumption are observed in many university students, as well as low iron (especially in females) and folate (3).

Many university students practice unhealthful lifestyles, placing them at risk for developing serious health problems. Unhealthy dietary behavior is one of the six top health risk behaviors identified in university students. When university students leave home and adjust to independent living, good dietary habits decline and poor dietary habits often tend to get worse. Nonetheless, during these transitional years of 18–24 years of age, the establishment of healthful lifestyle behaviors can have a long-lasting impact on the students' health and the health of their future families (4).

Eating behaviors and food choices are determined by an interaction of various factors, including availability and price of food, culture, and biological factors.

Presumably associated to availability and convenience, those who participated in a campus meal plan consumed a larger number of servings from fruit, vegetable, and meat groups. However, compared to current dietary recommendations, university students typically consume a diet that is lacking in fruits, vegetables, and dairy products; moreover, their diet is high in fat, sodium, and sugar. Students often have a diet of limited variety, high snacking, and high consumption of fast foods. In an effort to control weight, a pattern of meal skipping happens. Moreover, alcohol consumption rates have consistently been higher for university students in their 20's and 30's compared to non-university student peers and those in the 40's and 50's. All these practices increase nutritional risk and unwanted weight gain in the university population (4).

Some food-related behaviors developed by young adults consisting irregular meal patterns, such as meal skipping and frequent snacking, and frequent consumption of commercially prepared meals, such as takeaway food, pre-packaged or restaurant meals, are often associated with a poorer diet quality. However, university students undertaking a unit of study in nutrition and dietetics may be more healthy and nutritionally conscious (5).

The specific contribution of nutrition knowledge to the overall dietary quality is considered to be complex and is influenced by the interaction of many demographic and environmental factors. However, greater understanding of the relationship between nutrition knowledge and dietary intake is important because emerging evidence supports a strong link between low health literacy, poor management of chronic disease and increased health costs. Although nutrition knowledge is one component of health literacy, it is a central factor as poor dietary quality is strongly linked to all of the major lifestyle diseases and in industrialised countries, it accounts for the majority of health costs (6).

Knowledge of nutrition facts may not translate through to skill or process knowledge, essentially the ability to choose healthier foods, understand food labels or select healthier options from a range of foods available (6).

The United States Department of Agriculture (USDA) establishes a food guide that converts the foods and nutrients recommended in the Dietary Guidelines for Americans (DGA) and the Dietary Reference Intakes (DRI) into actual food intakes. The food guide formed the basis for the Food Guide Pyramid and more recent guides, which are used to advise Americans on healthy eating (7). The HEI was developed by

the USDA “to provide a single summary of diet quality based on different aspects of a healthy diet”. The USDA has used the HEI to assess diet quality in the general United States (US) population over time. The HEI has also been used to assess the association of diet quality with risk factors for chronic diseases (8).

The HEI developed using data from the 24HDR , is a summary measure of the main components of an individual’s diet. It facilitates the assessment of a diet’s quality, of either populations or groups of individuals (9). The total HEI score provides a picture of overall dietary quality, while the component scores used to calculate the total HEI score offer an opportunity to study important components of dietary intake (10).

As diet is the cornerstone for maintaining health and also for the management and prevention of a wide range of medical conditions, an understanding of the level of nutrition knowledge and its association with dietary quality is paramount. The specific influence of nutrition knowledge on dietary quality may be an important research question (6). Therefore, the primary purpose of this study was to compare the diet quality of Nutrition and Dietetics students with the students of other department which is English Language Teaching by the use of HEI.

2. LITERATURE REVIEW

2.1 Healthy Diet

Diet is the combination of foods consumed and the manner in which the foods are consumed and it provides both energy and nutrients to support growth and maintain tissue health (11). In other words, the type of food that a person eats or drinks is called diet. Everyone follows a diet, whatever they eat. Some people may follow poor diet or a healthy diet. Some people may also follow special diets for specific medical reasons such as diabetes (12).

Healthy diet is essential for development and well-being. A healthful diet can reduce major risk factors for chronic diseases such as obesity, high blood pressure, and high blood cholesterol (13). Malnutrition may appear due to not eating enough food to meet dietary needs, but it is also caused by over-eating which can lead to obesity (12).

A balanced diet provides all the necessary nutrients in the appropriate proportions and quantities to meet a person's needs. One way to follow a balanced diet is to eat a variety of foods which supply a range of nutrients. Dietary needs vary form person to person, depending on age, sex, and level of activity and lifestyle (12).

2.2 Current Dietary Guidelines

The USDA is responsible for critiquing the best available science from human observational studies, clinical trials and animal studies to develop the scientific foundation for dietary guidance. The USDA defines optimal nutrient intakes, the types and amounts of foods necessary to achieve optimal nutrient intakes and the nutrients and nonnutrients to avoid in attempting to prevent chronic disease. The USDA offers three levels of dietary guidance: the DRI, 1 which outline individual nutrient intake recommendations; MyPyramid, 2 which outlines dietary patterns of grains, vegetables, fruits, milk, meat and beans, and oils; and the DGA, 3 which are designed to promote healthy lifestyles and dietary habits. The USDA institutes a review of the DGA every five years to consider new science, changes in the food supply and environmental influences. The USDA's recently released DGA, 2010, published in conjunction with the U.S. Department of Health and Human Services, acknowledges the nation's obesity epidemic, which is associated with both poor food choices and decreased physical activity. Two themes permeate the 2010 guidelines: the need to maintain calorie balance

to support a healthy weight; the need to select nutrient-dense foods and beverages to ensure adequate nutrient intake within energy requirements (11).

According to dietary guidelines of 2010:

Balancing calories to manage weight:

- Prevent and/or reduce overweight and obesity through improved eating and physical activity behaviors.
- Control total calorie intake to manage body weight. For people who are overweight or obese, this will mean consuming fewer calories from foods and beverages.
- Increase physical activity and reduce time spent in sedentary behaviors.
- Maintain appropriate calorie balance during each stage of life—childhood, adolescence, adulthood, pregnancy and breastfeeding, and older age.

Foods and food components to reduce:

- Reduce daily sodium intake to less than 2,300 milligrams (mg) and further reduce intake to 1,500 mg among persons who are 51 and older and those of any age who are African American or have hypertension, diabetes, or chronic kidney disease. The 1,500 mg recommendation applies to about half of the U.S. population, including children, and the majority of adults.
- Consume less than 10 percent of calories from saturated fatty acids by replacing them with monounsaturated and polyunsaturated fatty acids.
- Consume less than 300 mg per day of dietary cholesterol.
- Keep *trans* fatty acid consumption as low as possible by limiting foods that contain synthetic sources of *trans* fats, such as partially hydrogenated oils, and by limiting other solid fats.
- Reduce the intake of calories from solid fats and added sugars.
- Limit the consumption of foods that contain refined grains, especially refined grain foods that contain solid fats, added sugars, and sodium.

- If alcohol is consumed, it should be consumed in moderation—up to one drink per day for women and two drinks per day for men—and only by adults of legal drinking age.

Foods and nutrients to increase:

Individuals should meet the following recommendations as part of a healthy eating pattern while staying within their calorie needs.

- Increase vegetable and fruit intake.
- Eat a variety of vegetables, especially dark-green and red and orange vegetables and beans and peas.
- Consume at least half of all grains as whole grains. Increase whole-grain intake by replacing refined grains with whole grains.
- Increase intake of fat-free or low-fat milk and milk products, such as milk, yogurt, cheese, or fortified soy beverages.
- Choose a variety of protein foods, which include seafood, lean meat and poultry, eggs, beans and peas, soy products, and unsalted nuts and seeds.
- Increase the amount and variety of seafood consumed by choosing seafood in place of some meat and poultry.
- Replace protein foods that are higher in solid fats with choices that are lower in solid fats and calories and/or are sources of oils.
- Use oils to replace solid fats where possible.
- Choose foods that provide more potassium, dietary fiber, calcium, and vitamin D, which are nutrients of concern in American diets. These foods include vegetables, fruits, whole grains, and milk and milk products.

Building healthy eating patterns:

- Select an eating pattern that meets nutrient needs over time at an appropriate calorie level.
- Account for all foods and beverages consumed and assess how they fit within a total healthy eating pattern.

- Follow food safety recommendations when preparing and eating foods to reduce the risk of foodborne illnesses (11).

2.3 Diet Quality

Diet quality has emerged as a term in the scientific literature, most often in nutritional epidemiology, to evaluate the population's dietary habits and the efficacy of dietary interventions. Diet quality has been also thought as a risk assessment tool to predict outcomes such as all-cause mortality, cardiovascular disease, and risk for cancer. Ever since, the understanding of the relationships between food, physiological function, and disease has swiftly progressed. In the literature, diet quality is a term frequently used to describe how well an individual's diet conforms to dietary recommendations. A healthy, balanced, and nutritious diet means that it is adapted to special individual needs to reach optimal health, that is, it supplies optimal levels of food and nutrients to maintain the body in a healthy state without excess, which may lead to increase in body weight or toxicity symptoms from some nutrients. It is widely accepted that a high-quality diet should be safe; hygienic; able to promote optimal growth, development, and prevention of diseases, and health hazards. However, the diet quality is an open-textured notion where no single static definition exists (14).

Diet quality is determined by the food choices that are made. A diet high in quality consists of but not limited to whole grains, lean meats, fresh fruits and vegetables and low-fat milk consumption. Diet quality is also based on frequency of these food items. Those who are more conscious of their food choice are more aware of what types of foods offer more nutrients and may be fewer calories. Some components that can affect the diet quality are: vitamins, minerals, fiber, whole grains, healthy fats, and fruits and vegetables. Those who are less concerned about the foods they are consuming, generally choose foods that are high in fat, sugar, and sodium. These diets are low in nutrient density. When a diet has poor quality, the concern for chronic health conditions rises. Some of these conditions are obesity, type 2 diabetes mellitus, and cardiovascular diseases (15).

Many factors affect diet quality, including variety in the nutrient content of foodsand in the daily intake of individuals (16). It can be measured by comparing dietary intakes and dietary behaviors with existing guidelines or recommendations by the use of dietary quality indexes. Dietary quality indexes give a single numerical value

that represents overall diet quality based on current scientific evidence and dietary guidelines. In most cases, a higher score indicates better diet quality or better adherence to the recommendations. It is widely accepted that poor diet quality contributes to an increased risk of chronic diseases such as cardiovascular diseases, type 2 diabetes and some cancers (5). In recent years, epidemiological studies on diet and chronic diseases have tended to focus on the relationship between diet quality and disease risk in different age groups, including children, adolescents, adults, and elderly people (17).

2.4 Dietary Quality Indexes

Dietary Quality Indexes are algorithms aiming to assess the overall diet and categorize individuals according to the extent to which their eating behaviour is "healthy"(18). They have been developed to evaluate food intake based on population dietary guidelines, considering the number of portions consumed, food variety in the diet and the adequacy of nutrient intake. These indexes help monitoring the diet of individuals and populations, in relation to nutritional recommendations. However, their application depends on adaptations that consider the eating habits of each country (19).

Various indexes and scores based on admittedly healthy dietary patterns or food guides for the general population, or aiming at the prevention of diet-related diseases have been developed to assess diet quality (20). The Healthy Eating Index, the Diet Quality Index (DQI), the Healthy Diet Indicator (HDI) and the Mediterranean Diet Score (MDS) are the four 'original' dietary quality indexes that have been referred to and validated most extensively. Several indexes have been adapted and modified from those originals (18), and the words "adapted", "revised", or "new version I, II or III" added to their names (20).

Primary data source of dietary quality indexes are individual dietary data collection tools, namely 24 HDR, dietary records and food frequency questionnaires (FFQ). Nutrients found in many indexes are total fat, saturated fatty acids or the ratio of monounsaturated fatty acids to saturated fatty acids (SFA) or the latter SFA to polyunsaturated fatty acids. Cholesterol, protein content and quality, complex carbohydrates, mono- and disaccharides, dietary fibre and sodium are also found in various indexes. All dietary quality indexes, except those that only contain nutrients, include the components fruits and vegetables; additional attributes are legumes or pulses, nuts and seeds. Meat and meat products, namely red and processed meat,

poultry, and milk and dairy products are also included in many indexes. Other foods contained in some indexes e.g. MDS are olive oil and fish. (18).

The DQI was formed due to concerns related to the major, diet-related chronic diseases in the US. In 1999, the DQI was revised to reflect then-current dietary recommendations and to promote other important aspects of a healthy diet. It has two variety components overall food group and within food group diversity; eight adequacy components (to increase in diet) i.e. 1) vegetables, 2) fruits, 3) grains, 4) fibre, 5) protein, 6) iron, 7) calcium, and 8) Vitamin C; five moderation components (to decrease in diet) i.e. 1) total fat, 2) saturated fat, 3) cholesterol, 4) sodium, and 5) empty calories (foods with low nutrient density); and two overall balance components i.e. macronutrient ratio and fatty acid ratio. The original DQI was revised to reflect current dietary guidance, to combine improved methods of estimating food servings and to develop and incorporate measures of dietary variety and moderation. The scoring of the original index was reversed in direction and expanded to a 100-point scale to improve interpretability (18).

The HDI was created for the dietary pattern, using the World Health Organisation's guidelines for the prevention of chronic diseases. A dichotomous variable was formed for each food group or nutrient that was included in these guidelines. If a person's intake was within the recommended range this variable was coded as 1; otherwise it was coded as 0. The HDI was the sum of all these dichotomous variables, containing saturated fatty acids, polyunsaturated fatty acids, cholesterol, protein, complex carbohydrates, monosaccharides and disaccharides, dietary fibre, fruits and vegetables, pulses, nuts and seeds (18).

The traditional Mediterranean diet has been defined and scored in terms of eight component characteristics (MDS): high monounsaturated to saturated fat ratio, moderate ethanol consumption, high consumption of legumes, high consumption of cereals (including bread and potatoes), high consumption of fruits, high consumption of vegetables, low consumption of meat and meat products, and low consumption of milk and dairy products. After that, a revised scale indicating the degree of adherence to the traditional Mediterranean diet included fish intake. Therefore, the total Mediterranean diet score ranged from 0 (minimal adherence to the traditional Mediterranean diet) to 9 (maximal adherence) (18).

The HEI was constituted for monitoring dietary intake and nutrition promotion activities for the U.S. population (21). The HEI is an index ranging from zero to 100,

which is based on ten individual components and the individual component scores can vary from zero to ten. It has been shown to correlate positively and significantly with most nutrients in the diet, with the BMI (kg/m²) of study participants and with the individuals "self perception" of their diets (18).

2.5 Healthy Eating Index

Perhaps the most well known dietary index is the HEI, formed by researchers at the USDA in 1995 to measure how well American diets conformed to the recommendations of the *DGA* and the original Food Guide Pyramid. The original HEI has been applied to national data from the 1989-1990 Continuing Survey of Food Intakes by Individuals, the 1994-96 and 1998 Continuing Survey of Food Intakes by Individuals, and the 1999-2000 National Health and Nutrition Examination Survey (NHANES), and has consistently shown that the diet quality of most Americans needs improvement (22). The HEI measures diet quality based on both foods and nutrients consumed by individuals aged 2 years and older, using a 100-point scale (23).

The relationship between HEI and nutrient intake has been validated in 340 women, where a higher HEI score was associated with a higher plasma concentration of alpha-carotene, beta-carotene, beta-cryptoxanthin, lutein, and vitamin C. Other practical HEI applications include healthy eating index and obesity (24), diet quality of preschool children and maternal perceptions/misperceptions: the genesis study (25), using the interactive healthy eating index to assess the quality of college students' diets (26), evaluation of dietary quality of adolescents using healthy eating index (17), diet quality of preschoolers in Greece based on the healthy eating index: the genesis study (27), healthy eating index 2005 and selected macronutrients are correlated with improved lung function in humans (7), characteristics of youth food preparation in low-income, African American homes: associations with healthy eating index scores (28), healthy eating index and abdominal obesity (10), association between quality of the diet and cardiometabolic risk factors in postmenopausal women (9), assessment of diet quality in pregnant women using the healthy eating index (8), and adherence to the 2010 dietary guidelines for Americans and the relationship to adiposity in young women (29).

2.5.1. Components of the Healthy Eating Index

The HEI score is the sum of 10 components as shown in figure 1 (13), each representing different aspects of a healthful diet:

· **Components 1-5** measure the degree to which a person's diet conforms to serving recommendations for the five major food groups of the Food Guide Pyramid: grains (bread, cereal, rice, and pasta), vegetables, fruits, milk (milk, yogurt, and cheese), and meat (meat, poultry, fish, dry beans, eggs, and nuts).

· **Component 6** measures total fat consumption as a percentage of total food energy (calorie) intake.

· **Component 7** measures saturated fat consumption as a percentage of total food energy intake.

· **Component 8** measures total cholesterol intake.

· **Component 9** measures total sodium intake.

· **Component 10** examines variety in a person's diet.

Each component of the index has a maximum score of ten and a minimum score of zero. Intermediate scores were computed proportionately. The maximum overall score for the 10 components combined is 100. High component scores indicate intakes close to recommended ranges or amounts; low component scores indicate less compliance with recommended ranges or amounts. An HEI score over 80 implies a "good" diet, an HEI score between 51 and 80 implies a diet that "needs improvement," and an HEI score less than 51 implies a "poor" diet (13). Higher scores of HEI reflect a closer adherence to dietary recommendations, which would indicate a better diet quality. In addition, higher scores of HEI as well as other dietary indexes have been associated with a risk reduction for cardiovascular disease and diabetes (30).

Food Group Components of the Food Guide Pyramid

The Food Guide Pyramid translates recommendations from the *DGA* into types and amounts of foods people can eat to have a healthful diet. The recommended number of Pyramid servings for the five food groups depends on a person's caloric requirement. Table 1 (13) shows the recommended number of servings for the five groups for different age/gender groups and for caloric levels of 1,600, 2,200, and 2,800 (13).

A maximum score of 10 was assigned to each of the five food group components of the index when a person's diet met or exceeded the recommended number of servings for a food group, as shown in table 2 (13). For example, when a person's diet

met the serving recommendations of the fruits group, that person's diet was rewarded 10 points. For each of the five major food groups, a score of zero was given to the respective components when a person did not consume any item from the food group. Intermediate scores were computed proportionately to the number of servings or partial servings consumed. For example, if the serving recommendation for a food group was eight and a person consumed four servings, the component score was 5 points. Similarly, if six servings were consumed, a score of 7.5 was assigned (13).

Fat and Saturated Fat Components

Total fat intake of less than or equal to 30 percent of total calories in a day was assigned a maximum score of 10 points. Fat intake equal to or greater than 45 percent of total calories in a day was assigned a score of zero, and fat intake between 30 and 45 percent was scored proportionately. Saturated fat intake of less than 10 percent of total calories in a day was assigned a maximum score of 10 points. In the same way, when saturated fat intake was equal to or greater than 15 percent of total calories in a day, a score of zero was assigned, and intake of saturated fat between 10 and 15 percent was scored proportionately (13).

Cholesterol Component

A score of 10 points was given when daily cholesterol intake was 300 mg or less. When daily intake reached a level of 450 mg or more, a score of zero was given, and when intake was between 300 and 450 mg, a proportionate score was assigned (13).

Sodium Component

A score of 10 points was given when daily sodium intake was 2,400 mg or less. A daily intake of 4,800 mg or more received a score of zero, and intake between 2,400 and 4,800 mg received a proportionate score. Sodium scores reflect sodium content of foods reported consumed and do not include salt added at the table.

Variety Component

Dietary variety for the HEI was evaluated by totaling the number of different foods a person ate in a day in amounts sufficient to contribute at least one-half of a serving in a food group. All food ingredients in food mixtures were assigned to their appropriate food category. Foods that differed only by preparation method were

grouped together and counted as one type of food. For instance, baked, fried, or boiled potatoes were counted once. Different types of a food were categorized separately. For example: each type of fish— mackerel, tuna, and trout—was counted as a different food. A maximum variety score of 10 points was assigned when a person consumed at least half a serving each of 8 or more different types of foods in a day. A score of zero was assigned if at least half a serving of 3 or fewer different foods was consumed in a day. Intermediate scores were computed proportionately (13).

Table 1. Recommended number of Food Guide Pyramid servings per day, by age/gender categories

Age/gender category	Energy (kilocalories)	Grains	Vegetables	Fruits	Milk	Meat[1]
Children, 2-3[2]	1300	6	3	2	2	2
†	1600	6	3	2	2	2
Children, 4-6	1800	7	3.3	2.3	2	2.1
Females, 51+	1900	7.4	3.5	2.5	2	2.2
Children, 7-10	2000	7.8	3.7	2.7	2	2.3
Females, 11-24	2200	9	4	3	3	2.4
†	2200	9	4	3	2	2.4
Females, 25-50	2200	9	4	3	2	2.4
Males, 51+	2300	9.1	4.2	3.2	2	2.5
Males, 11-14	2500	9.9	4.5	3.5	3	2.6
†	2800	11	5	4	2	2.8
Males, 19-24	2900	11	5	4	3	2.8
Males, 25-50	2900	11	5	4	2	2.8
Males, 15-18	3000	11	5	4	3	2.8

1One serving of meat equals 2.5 ounces of lean meat.

2Portion sizes were reduced to two-thirds of adult servings except for milk for children age 2-3.

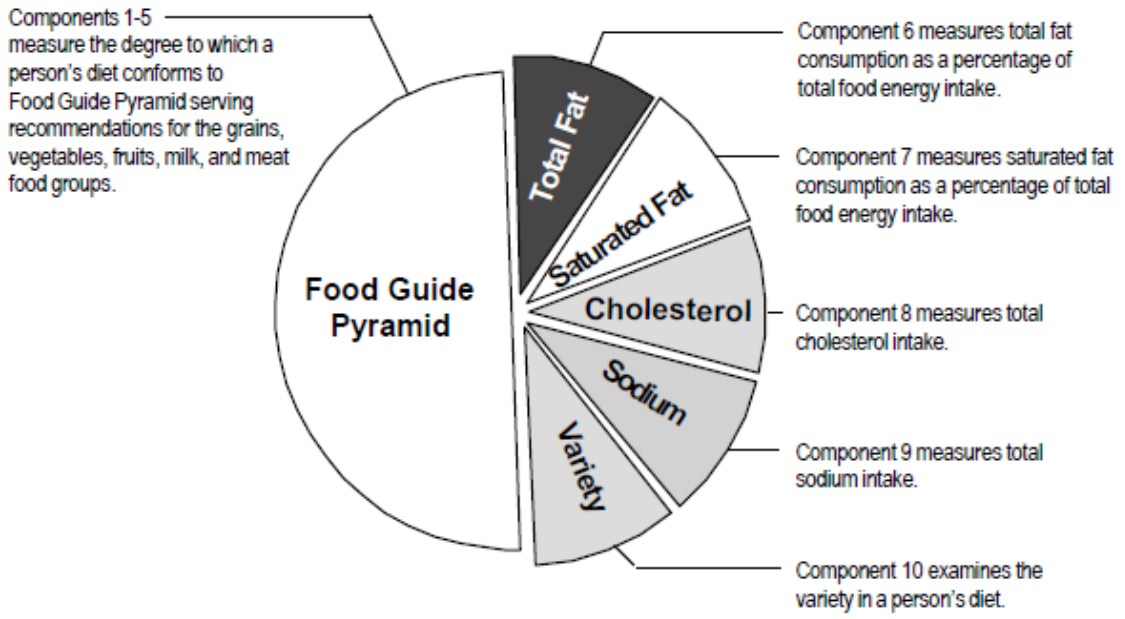

Figure 1. Components of the HEI

Table 2. Components of the HEI and scoring system

	Score ranges[1]	Criteria for maximum score of 10	Criteria for minimum score of 0
Grain consumption	0 to 10	6 - 11 servings[2]	0 servings
Vegetable consumption	0 to 10	3 - 5 servings[2]	0 servings
Fruit consumption	0 to 10	2 - 4 servings[2]	0 servings
Milk consumption	0 to 10	2 - 3 servings[2]	0 servings
Meat consumption	0 to 10	2 - 3 servings[2]	0 servings
Total fat intake	0 to 10	30% or less energy from fat	45% or more energy from fat
Saturated fat intake	0 to 10	Less than 10% energy from saturated fat	15% or more energy from saturated fat
Cholesterol intake	0 to 10	300 mg or less	450 mg or more
Sodium intake	0 to 10	2400 mg or less	4800 mg or more
Variety	0 to 10	8 or more different items in a day	3 or fewer different items in a day

[1]People with consumption or intakes between the maximum and minimum ranges or amounts were assigned scores proportionately.
[2]Number of servings depends on Recommended Energy Allowance

2.6 Body Mass Index

Body Mass Index is a number calculated using a persons height and weight to represent body fatness and to screen for weight categories which may lead to health problems (31). There are BMI categories as thin (<18,5), normal (18,50-24,99),

overweight (25,00-29,99), and obese (≥30) (32). An excess total energy intake compared to total amount of energy expended will lead to weight gain resulting in a higher BMI. Research has shown that there is a relationship between higher BMI, excess weight gain and increased risk factors for disease. Poor nutritional intake can lead to increased weight gain and inadequate intake of necessary vitamins and minerals which will also lead to increased health risks. Obese individuals are at an increased risk of cardiovascular disease, type 2 diabetes and certain cancers (31).

While BMI is not the most accurate measure of accumulated body fat, it is a convenient and widely adopted measure (33). The BMI has a good correlation with fat mass and the simplicity of measurement in the best tool to perform population studies, but has several limitations: first, does not provide information on the 14 distribution of body fat, increases lean body mass or stands, muscle or bone, which explains why, especially in subjects with high muscle mass, can give false positives (34).

2.7 Diet Quality and Body Mass Index

A higher intake of fruits, vegetables and whole grains is associated with lower BMI (30). A diet with a high intake of red meat, processed meat, and refined products has been associated with higher cardiovascular risk compared to a diet with high intake of fruits, vegetables, and whole grains. In addition, a higher intake of fruits, vegetables, and whole grains was recently confirmed to be asscociated with smaller gains in BMI and waist circumference, and dietary ‘meat’pattern was positively associated with BMI in a multiethnic group of women (24).

2.8 Healthy Eating Index and Body Mass Index

Lower HEI scores have been associated with a higher BMI. A study suggests that HEI, which is used primarily as a measure of overall diet quality, may also be used as a predictor of obesity. That study used information gathered from 10,930 individuals who participated in the NHANES III. Diet quality was assessed using data collected from a 24 hour recall and an interactive interview. HEI scores and BMI’s were calculated for each individual based on the data collected. The results showed that the HEI scores are significantly lower among obese subjects when compared to those of normal weight (24).

2.9 Eating Patterns of University Students

Dietary habits are established in early life and may have a considerable effect on the health of individuals in the longterm. Beginning university is an important time point in an individual's life, because it often represents a period of increased responsibility regarding food choices and healthy lifestyle practices, while at the same time, young adults often lack the experience of food shopping, preparation and planning meals. The most common reasons suggested to affect food choices in this young population contain changes in living arrangements, cost and financial resources, as well as increased availability of convenience and fast foods. Other reasons for dietary choices among this population include life experiences (e.g. social settings, cultural criteria), psychological and physiological traits, preferences, beliefs and expectations regarding food choices (35). University students, who are likely to be living away from home for the first time in their lives, are more likely to eat ''outside'' meals consisting of food that is higher in calories and fat content, and lower in dietary fiber (36).

The transition from high school to university poses many challenges for university students. Their newfound independence coupled with the social and physical environmental changes that occur may expose them to undesirable eating habits, resulting in poor nutrition (36). As a result of nonproper nutrient inputs, metabolic processes are changing and if this situation continues for a longer period, it may cause illness or condition which substantially depletes the body. This is initially manifested in functional, and later in organic disorders of the cells, tissues and organs. Unbalanced diet with vitamin and mineral deficiencies may cause the appearance of the state of malnutrition or obesity, which can also damage, especially the young students bodies, and prevention of these conditions is one of the priority tasks in the area of nutrition improvement. Research on the health significance of food deficits have shown that they negatively affect the physical growth and development, immune status of the organism, physical fitness and the ability to work, mental fitness and learning ability, that is of significant importance for every student (37).

University students may have inappropriate eating habits (38). Undesirable eating habits such as skipping breakfast, the number of daily meals, irregular meals, smoking, alcohol consumption, insufficient fluid intake, low physical activity can have a significant impact on mental and physical health of the student population. Another risk factor is the lack of representation of food groups such as milk and dairy products,

fruits and vegetables or increased consumption of so-called “fast food” (37). Moreover, they take high-energy intake with high fat and sodium but low calcium and iron (38).

Universities provide many opportunities to positively influence physical activity, nutrition, and weight management behaviors of large numbers of older adolescents and young adults in an educational setting. Ideally, if university students make positive changes in exercise and dietary practices, these changes may persist into adult years and create a healthy future generation (38).

2.10 Factors that Affect Students’ Diet Quality

2.10.1 Gender

Particularly, male students engage in less-healthful eating habits when compared with the female students. They are more likely to eat fast food, whereas they are less likely to read food labels, have breakfast, and prepare their own food. Regarding nutrient intakes, most studies show that male students consume more high-fat food. However, the sex differences in fruit and vegetable consumption appear less consistent. In national studies, although females reported having fruits and vegetables more times per day than males, males consumed a greater amount of fiber and more servings of fruits and vegetables than females. These nutrients have been identified as key outcomes for health promotion; hence, promotion messages may need to be tailored to different sex groups (36).

2.10.2 Age

Although diet quality generally increases with age, a decline is often observed during the transition period from adolescence to adulthood. Alarmingly, some food-related behaviours developed by young adults including irregular meal patterns, such as meal skipping and frequent snacking, and frequent consumption of commercially prepared meals, such as takeaway food, pre-packaged or restaurant meals, are often associated with a poorer diet quality. A concern is that these potentially negative behaviors developed in earlier life, having a lasting impact on the long-term health of individuals (5).

2.10.3 Nutrition Education

Dietitians are advisors and practitioners concerning eating habits, nutritional status and lifestyle in the prevention and treatment of lifestyle-related diseases. They have a broad knowledge of nutrition and dietetics and are active in all health-care settings. In their professional role, they demonstrate high-level skills in the application of nutritional knowledge and in advising individuals how a specific dietetic approach will affect eating behaviour. Moreover, dietitians act as a role model for personal conduct when dealing with individuals (39).

The specific contribution of nutrition knowledge to the overall quality of food intake is considered to be complex and is influenced by the interaction of many demographic and environmental factors (40). When being educated to become a dietitian, knowledge on nutrition improves during education in ND students. However, it is unknown whether this knowledge results in a (more) healthy diet during education and thus contributes to a healthy lifestyle (39). It might be thought that the greater the students' knowledge of nutrition and dietetics, the better their dietary habits. However, even if this population is informed and has a basic knowledge about healthy diet, such knowledge does not always result in the actual consumption of food items which are part of a balanced diet (41). Knowledge of nutrition facts, or declarative knowledge may not translate through to skill or process knowledge, essentially the ability to choose healthier foods, understand food labels or select healthier options from a range of foods available (40). Nutrition knowledge must also be converted into positive attitudes that promote the recommended behavior. As shown by a meta-analysis of 138 studies, the intention to practice healthier behaviors is more strongly determined by attitudes than by knowledge (41).

2.10.4 Living Area

One of the most common factors affecting food choices in university students population include changes in living arrangements. Students living at home get more physical exercise and consume higher quantities of cooked vegetables, fish, meat products, chips, bread/cereals, pulses, cooked meals and sandwiches. During the academic term, the students are forced to spend many hours away from home and inevitably to change their eating habits. This leads to more frequent consumption of foods in restaurants and canteens, as well as an increased reliance on quick- or easy-to-prepare meals. Students living away from their families show a trend towards lower

consumption of home-cooked meals and more frequent use of quick- and easy-to-prepare meals such as ready meals, raw/cold meals and frozen meals. This information supports that assumption of primary responsibility for food shopping and preparation can lead to unhealthy dietary habits among university students living away from home. In contrast, the choice, purchase and preparation of food for students living at home is performed by other family members, who provide support for healthier food habits. Moreover, students living outside the family home have higher consumption of coffee/teas and alcoholic beverages, probably as a result of spending more time in bars, pubs and discotheques (2).

2.10.5 Physical Activity

The university years are a time of transition from adolescence to adulthood and in development of lifelong health habits, such as physcal activity (PA) and dietary habits (DH), which significantly influence an individual's health. Lack of adequate PA and poor DH has contributed to the overweight and obesity epidemic among adults over the last decade. Established PA and healthy eating recommendations promote optimum health in all individuals. A minimum of 150 minutes of moderate intensity or 75 minutes of vigorous activity weekly has many health benefits for adults. Majority of university students' PA and DH were less than recommended according to established guidelines. Male university students were more likely to exercise more vigorously than females. Social support was an important determinant for both male and female university students participating in PA (42).

There is a variety of facilitating and hindering factors for PA and DH. Factors identified as facilitators were self-efficacy, perceived benefits of PA, and physical appearance. Alternately, a study reported lack of time and emotions as perceived barriers. It also found that females were more likely to snack for emotional reasons, whereas males identified partying as a common reason for snacking. More studies are needed to assess PA and DH because they are synergistic determinants of optimum health outcomes (42).

3. MATERIALS and METHODS

3.1 Thesis Objective

The aim of this study was to compare the diet quality of students in two different departments of a university. The objectives of the study were to:

1) describe the diet quality of all students in the study

2) compare the diet quality and BMI scores of Nutrition and Dietetics students and English Language Teaching students.

3) compare the differences in total HEI scores and HEI groups of dietetic students who were in the first and last class to evaluate the impact of nutrition education.

4) compare the differences in total HEI scores and HEI groups of English Language Teaching students who were in the first and last class to evaluate the impact of class level.

3.2 Sample Selection

This study contained all first and last class ND students and all first and last class ELT students in a foundation university, in Istanbul. Department of ELT was selected by using the random method of statistics among departments of Faculty of Education. Faculty of Education was selected because it was consisted of mainly female students like department of ND. Universe mainly consisted of female.

3.3 Ethical Consent and Data Collection

Data were collected from ND and ELT students in a foundation university campus between March to May 2015, in Istanbul, Turkey. The study protocol and survey instrument were approved by an ethical committee of a university (appendix 7.1) in Istanbul and permission for the study was obtained before collection of data. Reaching to participants were dependent on obtaining instructors permission to attend their classes. The participants were informed about study objective and they were also informed about the procedures of the study. Participants were assured of the confidentiality of their responses. Participation of the students to study was voluntary.

The researcher explained to the participants how the questionnaire should be completed and answered any questions arising during its administration. The

participants completed the short questionnaire which enabled researchers to collect demographic, health and nutritional information.

24 hour recall was applied to the same students.

3.4 Measurements

3.4.1 Demographics

The demographics that this study focused on are age, gender, students' department, class level, grade point average, living area, education level of parents. These data were collected with the questionnaires from the students at the end of lectures in the university campus.

3.4.2 Physical Activity

PA questions were asked with the questionnaires to the participants. Participants were asked if they exercised which was a simple yes or no answer. Those who answered yes were asked to learn that they exercised less than 3 times a week or more than 3 times a week. They were also asked to identify the type and duration of exercise they participated in.

3.4.3 Health Indicators

Health indicators included BMI and questionize of presence of any systemic disease. Participants gave self reports of height and weight for BMI calculations to adress body weight status. BMI was calculated using the standard equation of: Weight in kilograms divided by height in meters squared (Weight (kg)/Height (m^2)). The questionnaire also asked participants to self-report whether they had a systemic disease conditions which require special diets.

3.4.4 Twenty Four Hour Dietary Recall

The 24HDR asks the participants to report everything that they have consumed in the 24 hours prior to the survey. This allows for a detailed look at the diet, which can be broken down and analysed at the level of the macro and micronutrient content of everything that was eaten. When conducting 24 hour recalls, a multiple pass technique should be used in order to help ensure the information given is accurate. There are

generally four stages which include: first, obtain a complete list of all foods and beverages consumed in the last 24 hours; second, describe foods in as much detail as possible such as cooking methods and sauces added; thirdly, determine portion sizes using visual aids and prompts; and fourthly, review the recall to make sure all foods were recorded properly (43).

For the purpose of this study, the 24 hour recalls were used to determine the HEI score as well as determine the number of servings. The data from the 24 hour recalls were analyzed using Nutrition Information System (BeBiS) program. This software was used to calculate total energy, macro- and micro-nutrient intakes.

3.4.5 Dietary Intake and Scoring System

Energy and nutrient intake were calculated by using the BeBiS program.

The HEI-1999-2000 was chosen as a validated tool for overall diet quality assessment. We used the recommended HEI criteria to define the diet quality as ‘good’ (a score of 80 and more), ‘needs improvement’ (a score between 51 and 80), and ‘poor’ (a score of 51 or less) (13).

In addition to the HEI, the HEI components as well as total energy intake and protein intake, and some other selected nutrients such as folic acid, fiber, iron, and calcium, were used to further assess university students’ diet quality.

3.5 Data Analysis

The data was analyzed using SPSS software package version 16.0. Convenient of data to normal distribution was assessed by Kolmogorov-Smirnov test. Explanatory statistics were demonstrated as mean ± standart deviation for constant variables and they were demonstrated as frequency and percentage for categorical variables. Independent samples t-test was used for comparision of independent two groups’ data that were convenient to normal distribution. Chi-squared test was used to analyze the difference between categoric variables. Moreover, coefficient of pearson correlation was used to explore the relation of two variables. Differences were considered statistically significant at $p < 0,05$.

4. RESULTS

4.1 Sample Characteristics

One hundred seventy six students completed the questionnaires, 24HDR and anthropometric data collection in the university campus in Istanbul. Eighteen students were male and the other one hundred fifty-eight were female. Gender distribution in the population could be seen in figure 2 and the distribution of students among departments and classes could be seen in figure 3. The minimum, maximum and mean of age ,weight, height and grade point average were calculated as shown in Table 3. Some other sample characteristics such as living area, parental education level were shown in table 4.

Table 3. Sample characteristics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	176	17	38	20,95	2,35
Weight (kg)	176	40	110	59,15	10,56
Height (cm)	176	150	190	167,55	7,78
Grade Point Average	95	2,20	4	3,17	0,47

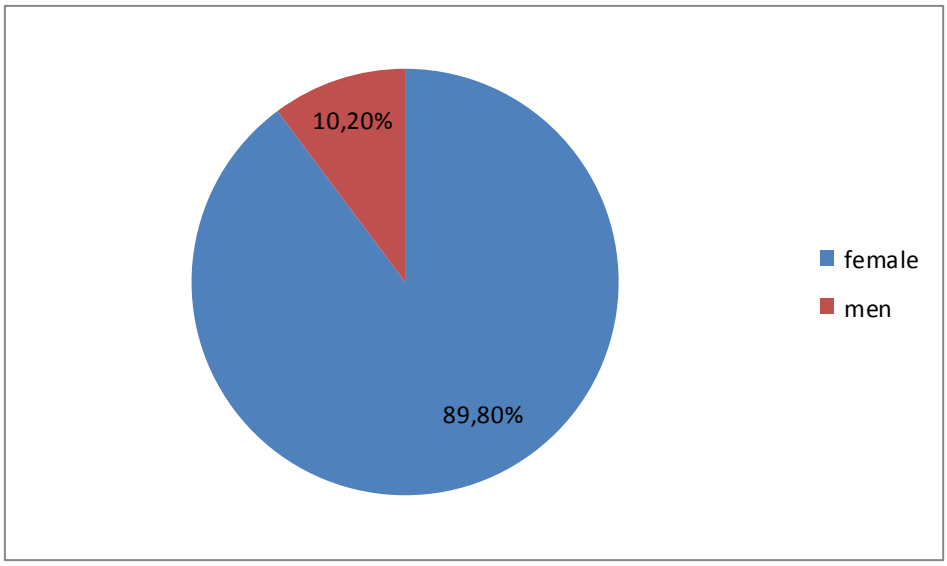

Figure 2. Gender distribution in the population

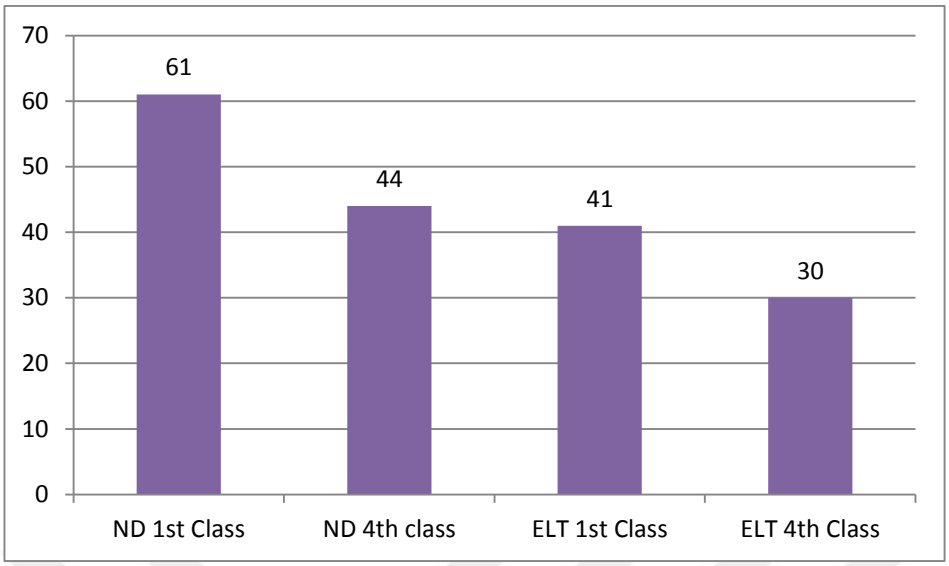

Figure 3. The distribution of students among departments and classes

Table 4. Other sample characteristics

			n	%
Living area	Home	With family	82	46,6
		With friends	33	18,8
		Alone	21	11,9
	Dormitory		40	22,7
Education level of mother	Secondary education and below		29	16,5
	Highschool and upper		145	82,4
	Missing		2	1,1
Education level of father	Secondary education and below		17	9,7
	Highschool and upper		156	88,6
	Missing		3	1,7

4.2 Diet Quality

Total HEI score was calculated for each of the 176 students. The mean of total HEI score and mean scores for each of the food categories were calculated. Mean of total HEI score and mean scores for each of the food category can be found in Table 5 and figure 4. HEI groups of all students were also found in this study. The number of students whose HEI scores were below 51 was 26. Then, the number of students whose HEI scores were between 51 and 80 was 144. Finally, the number of students whose

HEI scores were above 80 was 6. Distribution of the HEI groups in the population could be seen in figure 5.

Table 5. Total HEI mean score and mean scores for components of the HEI

	N	Minimum	Maximum	Mean	Std. Deviation
Grains	176	0	10	7,94	2,70
Vegetables	176	0	10	4,16	3,44
Fruits	176	0	10	2,89	3,67
Milk	176	0	10	6,66	3,13
Meat	176	0	10	7,78	3,49
Cholesterol	176	0	10	8,61	3,07
Sodium	176	0	10	7,95	3,07
Total Fat	176	0	10	4,55	3,76
Saturated fat	176	0	10	1,77	3,60
Dietary Variety	176	0	10	8,57	2,71
Total HEI Score	176	28,4	89,7	60,85	10,88

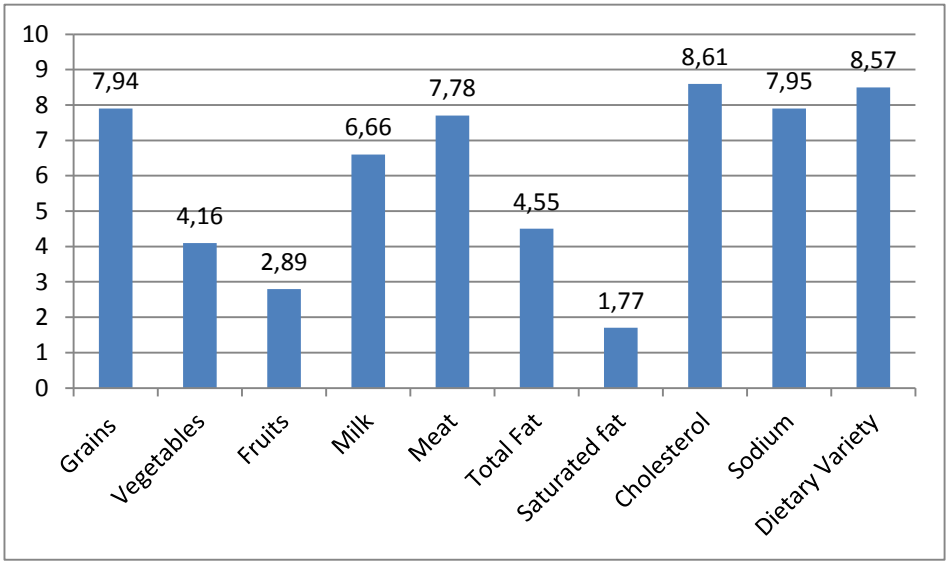

Figure 4. HEI: Component mean scores

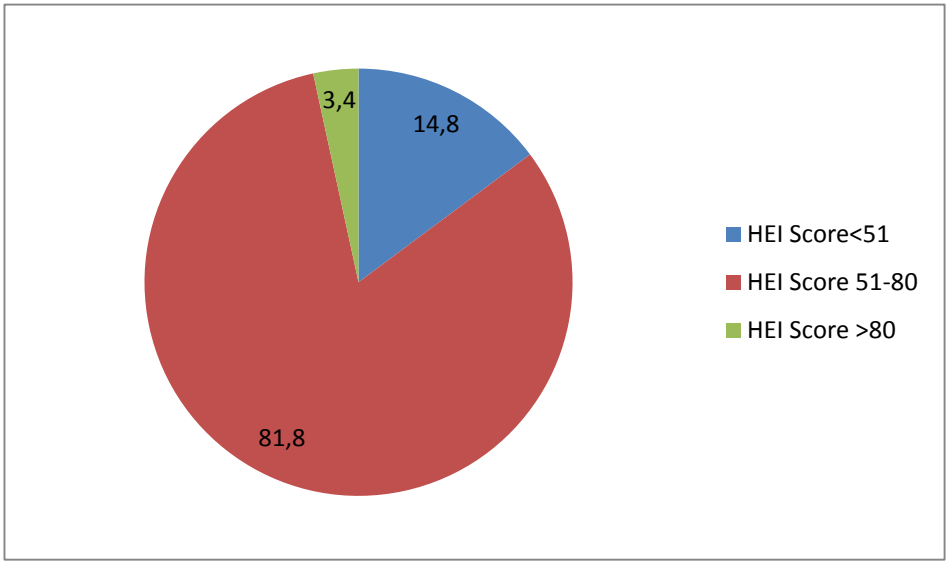

Figure 5. Distribution of HEI Groups

In addition to the HEI and the HEI components; total energy and protein intake, and some other selected nutrients such as folic acid, fiber, iron, and calcium, were assessed in this study. The intakes of those nutrients according to gender can be seen in table 6 and table 7.

Table 6. Total energy, protein and some other selected nutrients intake in females

	N	Minimum	Maximum	Mean	Std. Deviation
Energy (kcal)	158	308,8	3210,2	1342,3	482,55
Protein (%)	158	6	29	15,9	4,56
Folic acid (µg)	158	13,5	364,2	171,48	72,18
Fiber (g)	158	3,1	43,5	14,39	6,96
Calcium (mg)	158	59,6	1531,9	551,55	276,2
Iron (mg)	158	1	16,6	7,64	2,94
Valid N	158				

Table 7. Total energy, protein and some other selected nutrients intake in males

	N	Minimum	Maximum	Mean	Std. Deviation
Energy (kcal)	18	113,8	4035,1	1574,3	1128,99
Protein (%)	18	7	44	25,67	12,76
Folic acid (µg)	18	10	585,5	241,75	173,09
Fiber (g)	18	1,3	50,5	17,7	14,05
Calcium (mg)	18	34	1709,1	565,5	508,81
Iron (mg)	18	0,4	27,5	10,29	7,09
Valid N	18				

4.3 Health Indicators

Participants reported their weights and heights. Their BMI values were calculated. The BMI was ranged from 15– 32,8. The mean BMI of the participants was 20,9 which would indicate that this student population is classified as being normal. 26 of the students were found as low weight. 133 of the students were found as normal. 14 of the students were found as overweight and 3 of the students were found as obese. Distribution of the BMI categories in the population can be seen in figure 6.

The participants with a disease reported their disease situation. Table 8 shows the diseases of those participants.

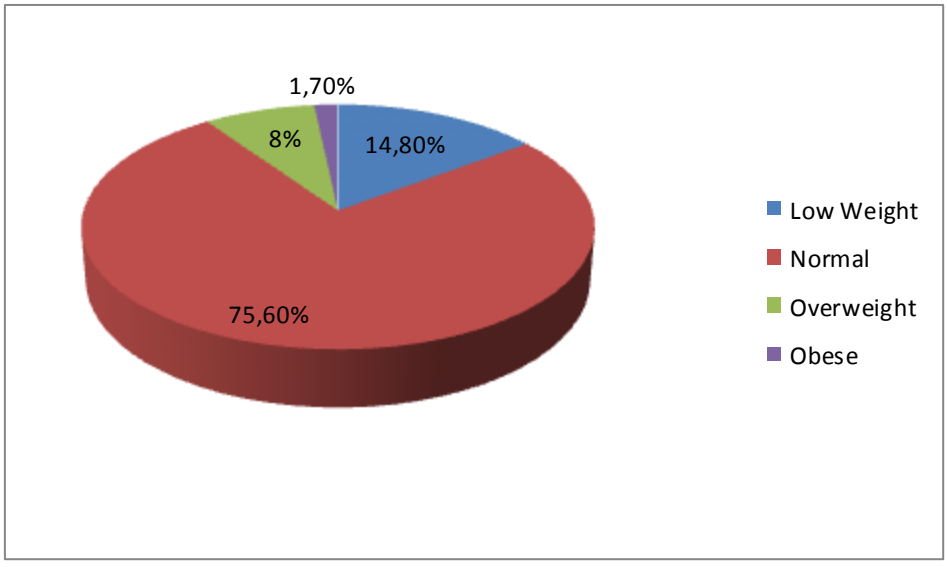

Figure 6. Distribution of the BMI categories in the population

Table 8. Diseases in the population

		n	%
Valid	No	169	96,6
	Anemia	1	0,6
	İnguinal hernia	1	0,6
	Rheumatism	1	0,6
	Migraine	1	0,6
	Sinusitis	1	0,6
	Asthma	1	0,6
	Total	175	100

4.4 Physical Activity

Physical activity questions were asked to the 176 students. 108 of them reported that they did not exercise and 68 of them reported that they exercised. Type of exercises could be seen in table 9. Students exercised between 15 and 240 minutes.

Table 9. Type of exercises

		n	%
Valid	Fitness	25	37,9
	Swimming	4	6,1
	Walking	22	33,3
	Pilates	4	6,1
	Running	4	6,1
	Table Tennis	1	1,5
	Sit-up	1	1,5
	American football	1	1,5
	Volleyball	1	1,5
	Basketball	1	1,5
	Yoga	1	1,5
	Dancing	1	1,5
	Total	66	100

4.5 Comparisions with Body Mass Index

The BMI scores of ND students were compared with the BMI scores of ELT students and the result was not found to be statistically significant as shown in table 10. In addition, the BMI categories of ND students were also compared with the BMI categories of ELT students but this result was not also statistically significant as shown in table 11.

Table 10. Comparision of BMI scores by departments

	Department	N	Mean	Std. Deviation	Std. Error Mean	t	p
BMI	Nutrition and Dietetics	105	20,65	2,45	0,24	-1,837	0,068
	English Language Teaching	71	21,48	3,58	0,42		

Table 11. Comparision of BMI categories by departments

		BMI Category					x^2	p
		Thin	Normal	Overweight	Obese	Total		
Department	Nutrition and Dietetics	14	85	6	0	105	7,442	0,059
	English Language Teaching	12	48	8	3	71		
Total		26	133	14	3	176		

4.6 Comparisions with Healthy Eating Index Scores

There were made comparisions between ND and ELT students about grain component score, vegetable component score, fruit component score, milk component score, meat component score, cholesterol component score, fat component score, saturated fat component score, sodium component score, dietary variety component score and total HEI score. Comparisions in milk component score, dietary variety component score and total HEI score were found to be statistically significant ($p<0,05$)

and these differences can be seen in figure 7, figure 8 and figure 9. No comparisions were found to be statistically significant at grain component score, vegetable component score, fruit component score, meat component score, cholesterol component score, fat component score, saturated fat component score, sodium component score. The results of these analyses could be seen in table 12.

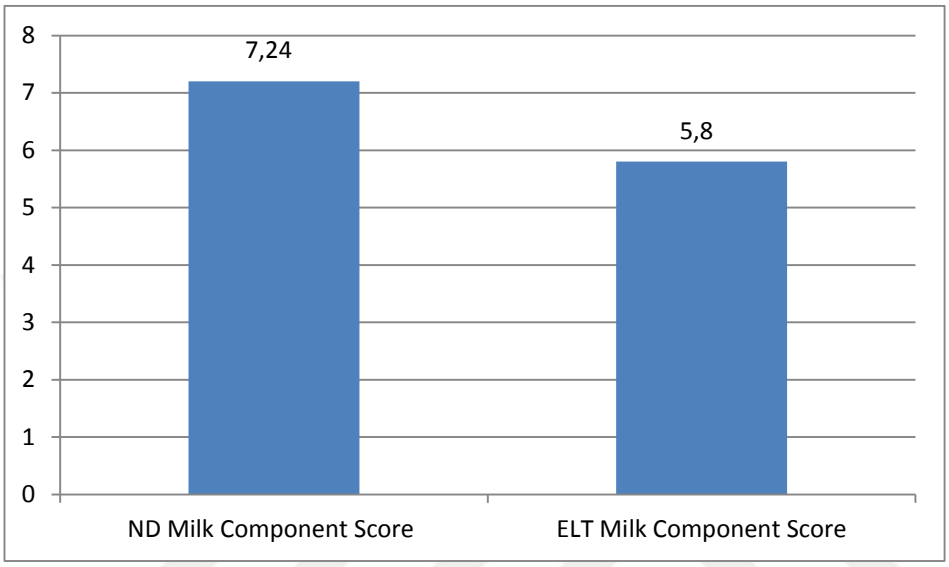

Figure 7. Comparision of mean score of milk component of the HEI by departments

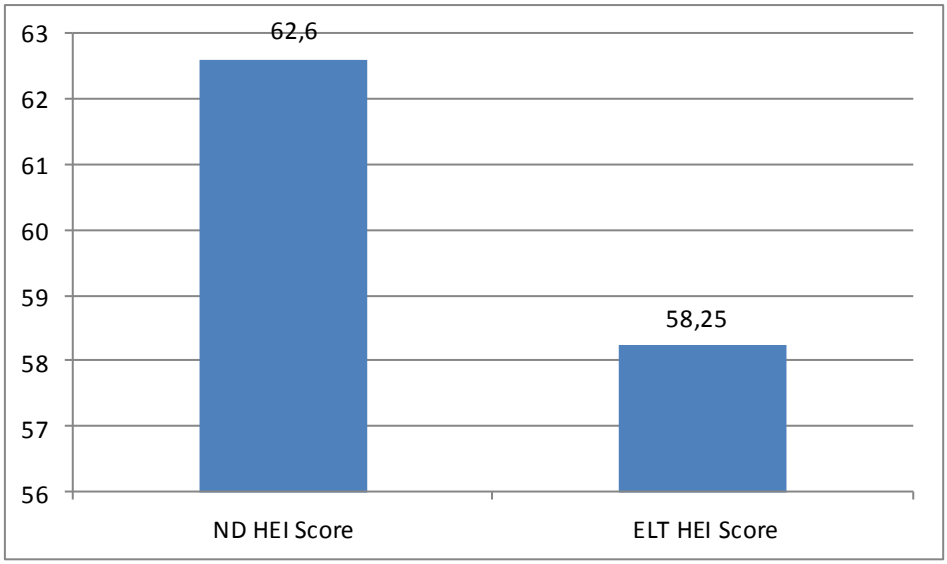

Figure 8. Comparision of mean of total HEI score by departments

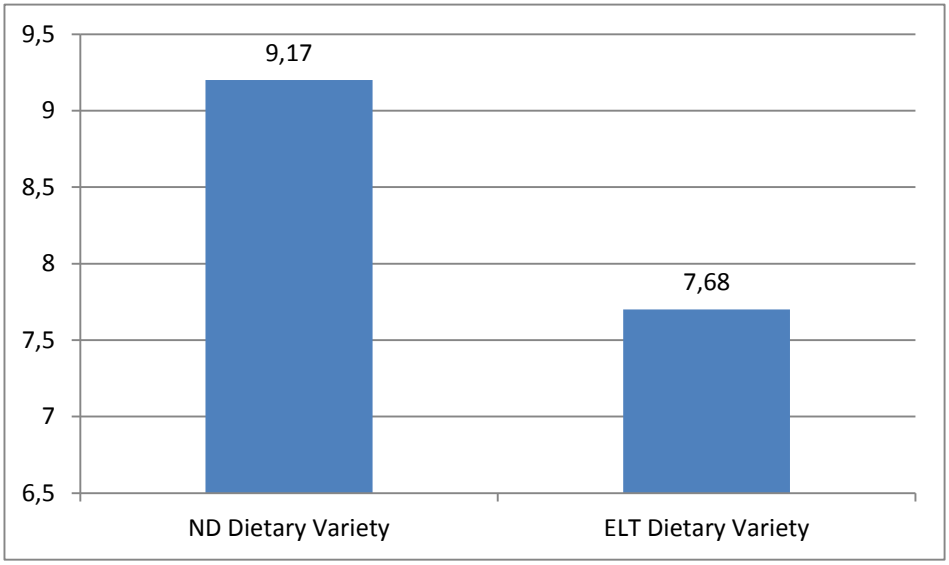

Figure 9. Comparision of mean score of dietary variety component of the HEI by departments

Table12. Comparision of total HEI and component scores by department

	Department	N	Mean	Std. Deviation	Std. Error Mean	t	p
Grain Component Score	Nutrition and Dietetics	105	8,17	2,48	0,24	1,344	0,181
	English Language Teaching	71	7,61	2,98	0,35		
Vegetable Component Score	Nutrition and Dietetics	105	4,56	3,40	0,33	1,866	0,064
	English Language Teaching	71	3,58	3,45	0,41		
Fruit Component Score	Nutrition and Dietetics	105	3,34	3,40	0,37	1,957	0,052
	English Language Teaching	71	2,24	3,40	0,40		
Milk Component Score	Nutrition and Dietetics	105	7,24	2,78	0,27	2,958	0,004*
	English Language Teaching	71	5,80	3,43	0,41		

Meat Component Score	Nutrition and Dietetics	105	8,04	3,19	0,31	1,184	0,238
	English Language Teaching	71	7,40	3,88	0,46		
Cholesterol Component Score	Nutrition and Dietetics	105	8,56	3,08	0,30	-0,293	0,770
	English Language Teaching	71	8,70	3,08	0,37		
Sodium Component Score	Nutrition and Dietetics	105	7,73	3,10	0,30	-1,143	0,255
	English Language Teaching	71	8,27	3,03	0,36		
Fat Component Score	Nutrition and Dietetics	105	4,30	3,72	0,36	-1,076	0,283
	English Language Teaching	71	4,92	3,81	0,45		
Saturated Fat Component Score	Nutrition and Dietetics	105	1,50	3,43	0,33	-1,249	0,213
	English Language Teaching	71	2,19	3,83	0,45		
Dietary Variety Component Score	Nutrition and Dietetics	105	9,17	2,03	0,20	3,408	0,001*
	English Language Teaching	71	7,68	3,30	0,39		
Total HEI Score	Nutrition and Dietetics	105	62,60	10,50	1,02	2,647	0,009*
	English Language Teaching	71	58,25	10,98	1,30		

* means that the result is significant at the 0,05 level.

There was made a comparision between ND first and last class students about total HEI scores. The result was not found to be statistically significant as shown in table 13.

Table 13. Comparision of total HEI score of ND first and last class students

	Class Level	N	Mean	Std. Deviation	Std. Error Mean	t	p
HEI Score	1	61	63,04	11,35	1,45	0,502	0,616
	4	44	61,99	9,29	1,40		

There was also made a comparision between ELT first and last class students about total HEI scores and the result was not also found to be statistically significant as shown in table 14.

Table 14. Comparision of total HEI score of ELT first and last class students

	Class Level	N	Mean	Std. Deviation	Std. Error Mean	t	p
HEI Score	1	41	57,14	12,28	1,92	-1,044	0,300
	4	30	59,76	8,88	1,62		

There was made another analysis whether a difference in HEI scores of students who exercised and students who did not exercise. This result was not found to be statistically significant as shown in table 15.

Table 15. Comparision of total HEI score of the students according to exercise

	Exercise	N	Mean	Std. Deviation	Std. Error Mean	t	p
HEI Score	No	108	60,07	11,54	1,11	-1,191	0,235
	Yes	68	62,08	9,69	1,17		

Some analyses were also made to see the effect of living area on total HEI scores of the students. The results were not found statistically significant as shown in table 16, table 17 and table 18.

Table 16. Comparision of total HEI score of students according to living area

	Living Area	N	Mean	Std. Deviation	Std. Error Mean	t	p
HEI Score	Home	136	61,19	10,90	0,94	0,780	0,437
	Dormitory	40	59,66	10,83	1,71		

Table 17. Comparision of total HEI score of students living at home with family and living at home without family

	Living Area	N	Mean	Std. Deviation	Std. Error Mean	t	p
HEI Score	Home with family	82	61,31	11,18	1,24	0,157	0,876
	Home without family	54	61,01	10,58	1,44		

Table 18. Comparision of total HEI score of students living at home with family and living at home without family or living in a dormitory

	Living Area	N	Mean	Std. Deviation	Std. Error Mean	t	p
HEI Score	Home with family	82	61,31	11,18	1,24	0,530	0,597
	Dormitory/Home without family	94	60,44	10,65	1,10		

Some analyses were also made to see the effect of parental education level on total HEI scores of the students and the results were not statistically significant as shown in table 19 and table 20.

Table 19. Comparision of total HEI score according to mother education level

	Mother Education Level	N	Mean	Std. Deviation	Std. Error Mean	t	p
HEI Score	Secondary education and below	29	63,84	11,69	2,17	1,695	0,092
	Highschool and upper	145	60,12	10,60	0,88		

Table 20. Comparision of total HEI score according to father education level

	Father Education Level	N	Mean	Std. Deviation	Std. Error Mean	t	p
HEI Score	Secondary education and below	17	58,69	12,46	3,02	-0,886	0,377
	Highschool and upper	156	61,16	10,78	0,86		

4.7 Comparisions with Healthy Eating Index Groups

HEI groups of ND and ELT students were compared and the analysis was not found to be statistically significant (p>0,05). Table 21 shows the number of students who were in the each HEI groups and it also shows the result of this analysis.

Table 21. Comparision of HEI groups by department

		HEI Group				x^2	p
		<51	51-80	>80	Total		
Department	Nutrition and Dietetics	14	87	4	105	0,522	0,770
	English Language Teaching	12	57	2	71		
Total		26	144	6	176		

Some analyses were also made to see the effect of parental education level on HEI groups of all the students but the results were not found to be statistically significant. Table 22 shows the results of these analyses.

Table 22. Comparision of HEI groups by parental education level

		HEI Group			Total	x^2	p
		<51	51-80	>80			
Mother Education Level	Secondary education and below	4	23	2	29	1,253	0,534
	Highschool and upper	22	119	4	145		
Total		26	142	6	174		
Father Education Level	Secondary education and below	5	12	0	17	3,877	0,144
	Highschool and upper	20	130	6	156		
Total		25	142	6	173		

Some analyses were also made to see the effect of living area on HEI groups. The results were not found to be statistically significant as shown in the table 23, table 24 and table 25.

Table 23. Comparision of HEI groups by living area

		HEI Group			Total	x^2	p
		<51	51-80	>80			
Living Area	Home	17	114	5	136	2,512	0,285
	Dormitory	9	30	1	40		
Total		26	144	6	176		

Table 24. Comparision of HEI groups of students living at home with family and living at home without family

		Living Area			x²	p
		Home with family	Home without family	Total		
HEI Group	<51	9	8	17		
	51-80	69	45	114	1,198	0,549
	>80	4	1	5		
Total		82	54	136		

Table 25. Comparision of HEI groups of students living at home with family and living at home without family or living in a dormitory

		Living Area			x²	p
		Home with family	Dormitory/Home without family	Total		
HEI Group	<51	9	17	26		
	51-80	69	75	144	2,572	0,276
	>80	4	2	6		
Total		82	94	176		

HEI groups of first and last class ND students were compared and the result showed that there was not statistically significant difference between HEI groups of first and last class ND students. Table 26 shows the results of this analysis.

Table 26. Comparision of HEI groups of ND first and last class students

		Class			x^2	p
		1	4	Total		
HEI Group	<51	7	7	14		
	51-80	50	37	87	3,276	0,194
	>80	4	0	4		
Total		61	44	105		

HEI groups of first class ELT students were compared with the HEI groups of last class ELT students and the result was not found to be statistically significant. Table 27 shows the result of this analysis.

Table 27. Comparision of HEI groups of ELT first and last class students

		Class		Total	x^2	p
		1	4			
HEI Group	<51	9	3	12	3,539	0,170
	51-80	30	27	57		
	>80	2	0	2		
Total		41	30	71		

4.8 Correlations

There were made correlations between BMI values, grain component scores, dietary variety scores and total HEI scores. Negative correlation of BMI values and grain component scores was found to be statistically significant at the 0,05 level (2-tailed). Negative correlation of BMI values and dietary variety scores was also found to be statistically significant at the 0,05 level. Then, the negative correlation of BMI values and total HEI scores was found to be statistically significant at the 0,05 level. Moreover, the positive correlation of grain component scores and dietary variety scores of the population was found to be statistically significant at the 0,01 level (2-tailed). Furthermore, grain component scores and total HEI scores of the population were positively associated and it was found to be statistically significant at the 0,01 level. Finally, dietary variety scores and total HEI scores of the population were also positively associated and they were found to be statistically significant at the 0,01 level. Table 28 shows the correlations of BMI, grain component scores, dietary variety scores and total HEI scores.

Table 28. The correlations between BMI, grain component score, dietary variety score and HEI score

		BMI	Grain Component Score	Dietary Variety Score	Total HEI Score
BMI	Pearson Correlation		-0,157*	-0,151*	-0,174*
	Sig. (2-tailed)		0,037	0,045	0,021
Grain Component Score	Pearson Correlation			0,611**	0,465**
	Sig. (2-tailed)			0,000	0,000
Dietary Variety Score	Pearson Correlation				0,583**
	Sig. (2-tailed)				0,000
Total HEI Score	Pearson Correlation				
	Sig. (2-tailed)				

*. Correlation is significant at the 0,05 level (2-tailed).

**. Correlation is significant at the 0,01 level (2-tailed).

There was made a correlation analysis between daily exercise duration and the total HEI score. The result was not found to be statistically significant (p>0,05).

5. DISCUSSION and CONCLUSION

The study results demonstrate that most of the subjects (75,6%) are of normal weight. Only 9,7% were overweight or obese and 14,8% were thin. Although the number of students enrolled in the present study is not large enough , our results are consistent with previous studies in the same set up and age group population, thus, confirming a reduction in the incidence of excessive weight and obesity. This may be due to increased awareness of young population regarding hazards of obesity and associated morbidity and motility (38). Results of a study with 428 students in a university (60,98% female, 39,02% men) indicated that the population fall into the category of normal weight (37). The results of another study with 184 university students showed that 80% of the student population was normal weight (44). However, a study results showed that approximately 34% of the students had BMI that was over 25 kg/m², a slightly higher percentage than our study (4).

The HEI has been proposed by the USDA's Center for Nutrition Policy and Promotion as a useful tool assess the dietary status of Americans. The total score can be used to rank individuals by their diet quality, whereas individual components scores of HEI can be used to determine adequacy or inadequacy for dietary intake of specific food groups and nutrients (27). 14,8% of the our study population had HEI score below 51 and this means that they had a 'poor diet'. 81,8% of the our population had HEI score between 51 and 80 and this means that they had a diet that 'needs improvement'. Only 3,4% of the our population had HEI score above 80 and this means that they had a 'good diet'. Mean of total HEI score of the study population was 60,85. It means that our population had a diet that 'needs improvement'. A study assessed the dietary quality of 3550 students in a university with the use of HEI and the results showed that scores of students were 80,2% in the "unhealthy"category, 19,7% in "needs change" and 0,1% in"healthy" (45).

It is remarkable that the scores of HEI components measuring total and saturated fat intakes were low in our study population. In particular, the score was 4,55 for total fat and 1,77 for saturated fat component. This indicates that the vast majority of students consumed high quantities of total and saturated fat. The low consumption of vegetables (mean component score: 4,16) and fruits (mean component score: 2,89) observed in our study may contribute to the overall diet quality of university students. Highest mean HEI component score was cholesterol averaging 8,61 on a scale of 10.

Other mean HEI component scores for this study population were between 6,66 and 8,57.

The main aim of this study was to compare the diet quality of nutrition students from those attending department of ELT courses. According to our results, ND students' overall diet quality was significantly better than ELT students' diet quality because mean of total HEI score of ND students was 62,6 and mean of total HEI score of ELT students was 58,25.

In this study, ND students had significantly higher score on milk component and dietary variety component of the HEI: an average of 7,24 on the milk and 9,17 on the variety component, compared with 5,8 and 7,68, respectively, for ELT students.

Comparisions of the other component scores of the HEI between two groups were not found to be statistically significant but there were found some differences. Compared with ND students, ELT students scored lower on the grain, vegetable, fruit, and meat components of the HEI: an average of 7,61 on the grain, 3,58 on the vegetable, 2,24 on the fruit, and 7,4 on the meat components, compared with 8,17, 4,56, 3,34, and 8,04, respectively, for ND students. Compared with ND students, ELT students scored higher on the fat, saturated fat, cholesterol and sodium components of the HEI: an average of 4,92 on the fat, 2,19 on the saturated fat, 8,7 on the cholesterol, and 8.27 on the sodium, compared with 4,3, 1,5, 8,56, and 7,73, respectively, for ND students.

Comparision of mean of total HEI score of first and last class ND students was not found to be statistically significant that means the diet quality of ND last class students was not better than the diet quality of ND first class students. The expectation result was that ND last class students' diet quality would be better than ND first class students because last class ND students had more nutrition courses than first class students and their dietary intake would be better than first class students. Although there was no statistically differences between these two classes, mean of total HEI score of ND first class students was found higher than last class students, averaging 63,04 and 61,99, respectively.

Comparision of total HEI mean scores of ELT first and last class students was not found to be statistically significant that means that the diet quality of ELT last class students was not better than the diet quality of ELT first class students. The expectation result of this analysis was that ELT last class students' diet quality would be better than the diet quality of ELT first class students due to the effect of age and class level on diet

quality. Although the result was not statistically significant, mean of total HEI score of ELT last class students was higher than mean of total HEI score of ELT first class student, 59,76 and 57,14, respectively.

Some comparisions were made with the use of HEI groups which were <51, 51-80 and >80. There were no significant results in comparisions made between ND and ELT students, between ND first and last class students, between ELT first and last class students. These results showed that there were no differences in the diet quality of those populations according to their HEI groups.

Our results showed that the diet quality as assessed by the HEI did not varied according to sociodemographic factors such as grade point average, living area, parental education level as well as lifestyle factors such as physical activity.

Students living independently or out of their family home may have poorer diet quality (5). In the current study, 77,3% of the sample lived at home and living arrangements were not associated with the diet quality. A study found that students living at home did not show major changes in their eating habits since beginning university. Although students living away from the family home had made some positive changes, they decreased their weekly consumption of fresh fruit, cooked and raw vegetables, oily fish, seafood, pulses and olive oil, and increased their sugar, wine, alcohol and fast food intake. Between group comparisions of dietary changes showed that since beginning university, students living away from home had developed more unfavourable eating habits than students living at the family home. These findings suggest that moving away from the family home and assuming responsibility for food preparation and purchasing for the first time affect dietary habits of students (35).

Lack of physical activity is currently categorized as one of the major public health problems worldwide (38). In our study population 61,4% did not exercise regularly and 38,6% of the population currently exercised. Mean duration of pyhsical activity was found 41 minutes. Although the mean of total HEI score of students exercising regularly was higher than the mean of total HEI score of students who did not exercise, the difference between these two groups was not found to be statistically significant. This means that the diet quality of the students exercising regularly was not better than the diet quality of the students who did not exercise.

Dietary variety has been an important part of dietary recommendations (10). An important aspect of diet quality is variety. Consuming many different foods from within each food group increases the likelihood of meeting current dietary recommendations

(4). Results of the present study indicate that higher dietary variety was associated with lower BMI values. In addition, dietary variety component of the HEI was also positively associated with total HEI score that means when dietary variety of the population increases, total HEI score of the population also increases.

Grain component of the HEI was positively associated with dietary variety component of the HEI and total HEI score. That means when grain component score of the population increases, dietary variety and total HEI score of this population also increase. Grain is a staple food of the Turkish people. A major percentage of energy comes from bread and other cereals (58%), and grain is mainly consumed as bread, macaroni rice, and bulgur (cracked wheat), which is a cereal and crushed wheat grain (17). In this study, grain component of the HEI and BMI were negatively associated that means when the grain component scores of the study population increase, the BMI values of them decrease. In our study, we did not estimate the whole grain consumption due to the self-report of participants because only some participants described the grain consumed by them as refined or whole grain and other participants would not care it. In general, whole grain consumption was negatively associated with BMI in other studies in the literature (46, 47). For instance, a study used 1999-2004 NHANES data and this study results showed that higher consumption of whole grains was inversely associated with BMI in US adults (46). According to cross-sectional studies, all studies show that high whole grain intake is associated with significantly lower BMI and waist circumference in both men and women. Four studies were performed in adult women, three in a group of healthy women and one in a group of women with diabetes, two in healthy adult men, five in healthy adults of both genders and one in healthy adolescents of both genders. On the other hand, results from prospective studies consistently suggest that whole grain intake has beneficial effects on body weight regulation; however, only results of randomized controlled intervention studies can provide the evidence of a cause/effect relationship between whole grain intake and body weight (47). Moreover, a study which was conducted on a nutrition student population showed that whole-grain intake was significantly higher in normal weight students than in overweight and obese students (based on BMI) (48).

In this study, HEI scores of the population were associated negatively with BMI values of them that means when HEI scores of the population increase, the BMI values of this population decrease.

In our study, energy and protein intake were also assessed in males and females seperately. Mean energy for both males and females showed that this population take calories below the recommendations. For males, mean 25,7% of energy came from proteins but for females, mean 15,9% of energy came from proteins. This showed that male students consumed more protein foods than females students in our study.

Micronutrients have a primary function in human metabolism and physiology; in the maintenance, optimization of health and in the prevention of disease (49). Our population included mostly females at childbearing age so we assessed some micronutrients such as iron, folic acid, calcium and fiber. Although the DRI of iron for females at 19-30 years is 18 mg (50) and for males at 19-30 years is 8 mg (50), in our study, mean iron consumption of females was found 7,64 mg which was too below the recommendation. On the other hand, mean iron consumption of males in our study was found 10,29 mg that was above the recommendation. In addition, although the DRI of calcium for females and males at 19-30 years is 1000 mg (50), in our study, mean calcium intakes of both gender were found below the recommendation: 551,55 mg in females and 565,5 mg in males. Moreover, although the DRI of folic acid both males and females at 19-30 years is 400 μg (51), in our study, folic acid intakes of both genders were below the recommendation: 171,48 μg in females and 241,75 μg in males. Furthermore, although the DRI of fiber for females at 19-30 years is 25 g and males at 19-30 years is 38 g (52), in our study, mean fiber intakes of both genders were found below the recommendations: 14,39 g in females and 17,7 g in males. There are similar results from the other studies about micronutrient intake of students. For instance, according to a study results, folate, iron, calcium and fiber intake were found lower than the DRI amounts among 289 female medical sciences students (53). In another study which was conducted on 663 students, the results showed that the recommended intake was achieved for most micronutrients including calcium, but that study showed lower iron and folate intake than recommended intake among female students (3). Moreover, the results of a study also showed that micronutreint intake of 100 female students was lower than the recommendations (54). A study was also carried out to assess the adequacy of dietary fiber intake of 12 male and 12 female university students. Food consumption survey was by the direct weighing method for three days. That study showed that the dietary fiber intake of the students was adequate. Dietary fiber intake of female students was 40,5±8,5g/day and dietary fiber intake of the male students was 54,2±13,7g/day (55).

There was a similar study to our study but that study used FFQ and Mediterranean Diet Quality Index (M-DQI). The aim of that study was to determine if nutrition students had a dietary pattern similar to that recommended in Eating Well with Canada's Food Guide (EWCFG) or by the Traditional Healthy Mediterranean Diet Pyramid (THMDP). It included 36 female students. According to results of that study, no student consumed the THMDP minimum number of portions of legumes, seeds, and nuts, of olive oil, or of whole grains. The majority did not meet the minimum EWCFG recommendations for any food group. The results of this study suggest that nutrition education alone may be insufficient to ensure optimal dietary patterns among female university students (56).

Another study evaluated the diet quality of 663 university students with the M-DQI. That study collected dietary data with the FFQ. In this study, the BMI did not correlate with the M-DQI. Students had a lower diet quality evaluated with the M-DQI (57).

Another study assessed the diet quality and examined the association between diet quality and overweight and obesity in a group of university students. That study consisted of 749 volunteer students (68% females and 32% males). Dietary intake data were obtained from FFQ and it was validated using a 24 hour recall technique. Dietary intake was evaluated with DQI. According to the results of that study, prevalence of overweight and obesity for the total sample was 17,5% (25% in males and 13,9% in females). The mean DQI was significantly lower among obese and overweight subjects compared to the normal weight individuals in total sample and in men. This study suggest that diet quality is associated with overweight and obesity in this population, and that this association varied across sex groups and groups according to alcohol consumption (58).

The other study evaluated the dietary intake of 1865 university students. Over 60% of the men and women participating in the study had a low calorie intake. 50% of the students had high protein intake and one-third had low or very low protein intake. Six out of 10 students had low and very low fat intake and 7 out of 10 had low carbohydrate intake. Iron and calcium intake was inadequate in more than 50% of the sample and vitamin A intake was inadequate in nearly 80% of the students (59).

A study which was conducted on 80 university students used to MDS2 to assess the diet quality of the students. According to results of that study, more than 91% of the students need "diet changes" in order to acquire healthier dietary patterns (60).

Another study evaluated the dietary patterns (DP) of 275 university students and the association of these patterns with socio-demographic characteristics and perceived academic stress. That study used the DQI. Most of the participating students were female and had healthy weights. Most had diets that were below the dietary recommendations for grains, fruits, vegetables, dairy products, and protein, whereas fat consumption was adequate. Overall, most had inadequate DPs (62%). DP was significantly associated with age ($p < 0,05$); older students had better DPs than did younger students. In terms of the different schools ($p < 0,05$), those students from the School of Medicine and those from the School of Public Health had better DPs than did the students from the other schools. DP was not associated with income, gender, BMI, stress level, or course load (61).

Finally, in our study, the finding that diet quality of ND students is better than the students of the ELT, but their diet do not yet meet all nutritional requirements, and this may be explained by some specific barriers for students. Students' barriers to a healthy diet are lack of time to purchase food products and prepare meals and financial limits. Another important barrier is that friends/roommates may not like healthy food. Thus, even for students a challenge remains to cope with these barriers, to meet nutritional requirements (39).

There were some limitations in this study. Firstly, the all data of this study relied on self-report, thus the extent to which participants were inclined to provide socially desirable responses is not fully known. Under-reporting of food intake by some overweight and obese individuals would be. Honest responses were an expectation of the study.

However, it is known that dietitians estimate their energy intake more accurately than non-dietitians, suggesting that familiarity with and interest in keeping food records may lead to more reliable estimates of energy intake. It is also known that nutrition students tend to restrict their food intake to control their weight more than other students (39). Therefore we expect that under-reporting and underestimation were low in ND student population in our study.

Also, although the 24HDR method is widely used for dietary assessments, the intake of a single day does not represent the daily intake of an individual. However, it has been considered to be most appropriate and feasible tool regarding both, the purpose of this study and the study population.

Some participants did not filled 24HDR part of the questionnaire in properly. Some explanations were made by researcher to participants about portion sizes but some participants did not stated the portion sizes and they did not specified their foods. Therefore, calori calculation by BeBIS program of some participants may not reflect their real calori intake.

Despite the limitations, the findings may be used to provide foundational knowledge to develop further research interventions to improve diet quality among university students , with implications for practice and policy.

This study involved only one 24HDR rather than traditional 3-d dietary recalls. It was reported that HEI scores calculated from a 1-d dietary recall were lower than those calculated from a 3-d dietary recall, but not significantly so. The 1990-2000 NHANES used only 1 d of dietary intakes (16).

In conclusion, while the prevelance of overweight and obesity is low in this study population, there are imbalances in students' diet, noting that consumption of total fat, saturated fat, vegetables and fruits intake is located away from the recommendations, and that there are deficiencies in the intake of micronutrients such as iron, calcium, folic acid and fiber. This study results showed that the diet quality of both ND students and ELT students needs improvement. However, when ND students were compared ELT students, the diet quality of ND students was found to be significantly slighty higher than the diet quality of ELT students according to their total HEI score. Therefore, our results suggest that studying at Nutrition and Dietetics may affect dietary habits and could have important consequences for the diet quality of the students.

To conclude, habits formed during young adulthood will likely be continued into older adulthood. A cure for lifestyle-related disorders is unlikely in the near future; therefore, the preeminent solution continues to be encouraging positive lifestyle changes associated with PA and DH. The time that students spend in university is important for development of lifelong habits. Therefore, health care providers need to be intentional in evaluating health behaviors in this age group and in providing appropriate education to improve health behaviors for optimum health outcomes and wellness (42).

6. REFERENCES

1. Burriel1 F. C, Urrea R. S, Daouas T, Amalia Delicado Soria A. D, Meseguer M. J. G. Food habits and nutritional assessment in a tunisian universty. *Nutr Hosp.* 2014; 30(6): 1350-1358.

2. Bagordo F, Grassi T, Serio F, Idolo A, Donno A. Dietary habits and health among university students living at or away from home in southern Italy. *Journal of Food and Nutrition Research.* 2013; 52(3): 164–171.

3. Atalic´ Z. S, Baric´ I. C, Keser I. Diet quality in Croatian university students: Energy, macronutrient and micronutrient intakes according to gender. *International Journal of Food Sciences and Nutrition*. 2007; 58(5): 398-410.

4. Brunt A. R, Rhee Y. S. Obesity and lifestyle in U.S. college students related to living arrangemeents. *Appetite*. 2008; 51: 615–621.

5. Maree G. T, Kestin M, Riddell L. J, Keast R. SJ, McNaughton S. A. Diet quality in young adults and its association with food-related behaviours. *Public Health Nutrition*. 2013; 17(8): 1767-1775.

6. Spronk I, Kullen C, Burdon C, O'Connor H. Relationship between nutrition knowledge and dietary intake. *British Journal of Nutrition*. 2014; 111: 1713–1726.

7. Root M. M, Houser S. M, Anderson J. J. B, Dawson H. R. Healthy Eating Index 2005 and selected macronutrients are correlated with improved lung function in humans. *Nutrition Research*. 2014; 34: 277-284.

8. Pick M. E, Edwards M, Moreau D, Ryan E. A. Assessment of Diet Quality in Pregnant Women Using the Healthy Eating Index. *Journal of the American Dietetic Association*. 2005; 105: 240-246.

9. Almeida Ventura D, Matos Fonseca V, Ramos E. G, Marinheiro L. P. F, Souza et al. Association between quality of the diet and cardiometabolic risk factors in postmenopausal women. *Nutrition Journal*. 2014; 13: 121.

10. Tande D. L, Magel R, Strand B. N. Healthy Eating Index and abdominal obesity. *Public Health Nutrition.* 2009; 13(2): 208-214.

11. Marshall T. A. Dietary Guidelines for Americans, 2010. *Clinical Practice Nutrition*. 2011; 142(6): 654-656.

12. Ridgwell J. Examining Food & Nutrition. Edinburgh: Heinemann; 2008.

13. Basiotis P. P, Carlson A, Gerrior S. A, Juan W. Y, Lino M. The Healthy Eating Index: 1999-2000. *U.S. Department of Agriculture, Center for Nutrition Policy and Promotion*. 2002; CNPP 12: 1-20 .

14. Alkerwi A. Diet quality concept. *Nutrition*. 2014; 30: 613-618

15. Ireland A. N. *Overall diet quality of collegiate athletes.* Lexington, University of Kentucky; 2013.

16. McCabe-Sellers B. J, Bowman S, Stuff J. E, Champagne C. M, Simpson P. M, Bogle M. L. Assessment of the diet quality of US adults in the Lower Mississippi Delta. *Am J Clin Nutr.* 2007; 86: 697-706.

17. Tek N. A, Yildiran H, Akbulut G, Bilici S, et al. Evaluation of dietary quality of adolescents using Healthy Eating Index. *Nutr Res Pract*. 2011; 5(4): 322-328.

18. Gil A, Victoria E. M, Olza J. Indicators for the evaluation of diet quality. *Nutr Hosp.* 2015; 31(3): 128-144.

19. Souza Fernandes D. P, Ribeiro A. Q, Duarte M. S. L, Carmo Castro Franceschini S. Systematic review of healthy eating indexes in adults and elderly: applicability and validity. *Nutr Hosp*. 2015; 32(2): 510-516.

20. Carvalho K. M. B. de, Dutra E. S, Pizato N, Gruezo N. D, Ito M. K. Diet quality assessment indexes. *Revista de Nutricao*. 2014; 27 (5): 605–617.

21. Kim S, Haines P. S, Siega-Riz A. M, Popkin B. M. The Diet Quality Index International (DQI-I) Provides an Effective Tool for Cross-National Comparison of Diet Quality as Illustrated by China and the United States. *Community and International Nutrition.* 2000; 3476-3483

22. Dixon L. B. Updating the Healthy Eating Index to Reflect Current Dietary Guidance. *Journal of the American Dietetic Association.* 2008; 108(11): 1837-1842.

23. Larowe T. L, Moeller S. M, Adams A. K. Beverage Patterns, Diet Quality, and Body Mass Index of US preschool and School-Aged Children. *Journal of the American Dietetic Association.* 2007; 107: 1124-1133.

24. Guo X, Warden B. A, Paeratakul S, Bray G. A. Healthy Eating Index and obesity. *European Journal of Clinical Nutrition*. 2004; 58: 1580-1586.

25. Kourlaba G, Kondaki K, Grammatikaki E, Roma-Giannikou E, Manios Y. Diet quality of preschool children and maternal perceptions/misperceptions: The GENESIS study. *Public Health*. 2009; 123: 738-742.

26. Hiza H, Gerrior S. A. Using the Interactive Healthy Eating Index to Assess the Quality of College Students' Diets. *Family Economics and Nutrition Review*. 2002; 14(1): 3-12

27. Manios Y, Kourlaba G, Kondaki K, et al. Diet Quality of Preschoolers in Greece Based on the Healthy Eating Index: The GENESIS Study. *Journal of the American Dietetic Association*. 2009; 109: 616- 623.

28. Sattler M, Hopkins L, Steeves E. A, et al. Characteristics of Youth Food Preparation in Low-Income, African American Homes: Associations with Healthy Eating Index Scores. *Ecology of Food and Nutrition*. 2015; 54:380–396.

29. Bailey B. W, Perkins A, Tucker L. A, LeCheminant J. D, Tucker J. M, Moncur B. Adherence to 2010 Dietary Guidelines for Americans and the Relationship to Adiposity in Young Women. Journal of Nutrition Education and Behaviour. 2015; 47(1): 86-93.

30. Drenowatz C, Shook R. P, Hand G. A, Hébert J. R, Blair S. N. The independent association between diet quality and body composition. *Scientific Reports*. 2014; 4: 1-6. doi: 10.1038/srep04928.

31. Beyatte R. A. *The characterization and calculation of diet quality for a low-income population Quito, Ecuador.* Lexington. University of Kentucky; 2010.

32. Karakaya K, Baran E, Tüzün H, et al. Türkiye Beden Ağırlığı Algısı Araştırması. *Ministry of Health (Turkey)*. 2012; 894: 1-61.

33. Park , Seo J, Yi J, Park H. Structural and Functional Brain Connectivity of People with Obesity and Prediction of Body Mass Index Using Connectivity. *Multi-Modal Brain Connectivity and Body Mass Index.* 2015; 10(11): 1-14. doi:10.1371/journal.pone.0141376.

34. Laviano P. *Study of obesity prevalence, body mass index, energy consumption measured by accelerometer and pollution related health effects in children attending primary school in Milan.* Siena, University of Siena; 2010-2011.

35. Papadaki A, Hondros G, Scott J. A, Kapsokefalou M. Eating habits of University students living at , or away from home in Greece. *Appetite*. 2007; 49: 169-176.

36. Li K, Concepcion R. Y, Lee H, et al. An Examination of Sex Differences in Relation to the Eating Habits and Nutrient Intakes of University Students. *Journal of Nutrition Education and Behaviour*. 2012; 44(3): 246-250.

37. Alibabić V, Mujić I, Rudić Dušan, et al. Assessment of Diet Quality and Nutritional Risks Representation of University of Bihać. *Procedia-Social and Behavioral Sciences.* 2014; 116: 2137-2140.

38. Majeed F. Association of BMI with diet and physical activity of female medical students at the University of Dammam, Kingdom of Saudi Arabia. *Journal of Taibah University Medical Sciences.* 2015; 10(2): 188-196.

39. Kruk J. J, Jager-Wittenaar H, Nieweg R. MB, Schans C. P. Do Dutch nutrition and dietetics students meet nutritional requirements during education?. *Public Health Nutrition*. 2013; 17(6): 1237–1244.

40. Spronk I, Kullen C, Burdon C. A,O'Connor H. T. Relationship between nutrition knowledge and dietary intake. *British Journal of Nutrition*. 2014; 111: 1713–1726.

41. Alves D. A, Regidor N. H, BarañoN, Pablo A. M. R, Izaga M. A. Body satisfaction and diet quality in female university students from the Basque Country. *Endocrinol Nutr.* 2010; 59(4): 239-245.

42. Downes L. Physical Activity and Dietary Habits of College Students. *The Journal for Nurse Practitioners.* 2015; 11(2): 192-198.

43. Chard M. *Investigating the Impact of "other foods" on Aboriginal Children's Dietary Intake Using the Healthy Eating Index – Canada (HEI-C).* Waterloo, University of Waterloo; 2010.

44. Rizo-Baeza M. M, González-Brauer N. G, Cortés E. Quality of the diet and lifestyles in Health Sciences students. *Nutr Hosp.* 2014; 29(1): 153-157.

45. Munoz-Cano J. M, Cordova-Hernandez J. A, Valle-Leveaga D. The healthy eating index of new students at an university of Mexico. *Nutr Hosp*. 2015; 31(4): 1582-1588.

46. O'Neil C. E, Zanovec M, Cho S. S, Nicklas T. A. Whole grain and fiber consumption are associated with lower body weight measures in US adults: National Health and Nutrition Examination Survey 1999-2004. *Nutrition Research.* 2010; 30: 815–822.

47. Giacco R, Pepa G. D, Luongo D, Riccardi G. Whole grain intake in relation to body weight: From epidemiological evidence to clinical trials. *Nutrition, Metabolism & Cardiovascular Diseases*. 2011; 21: 901-908.

48. Rose N, Hosig K, Davy B, Serrano E, Davis L. Whole-Grain Intake is Associated with Body Mass Index in College Students. *J Nutr Educ Behav.* 2007; 39: 90-94.

49. Shergill-Bonner R. Micronutrients. *Paediatrics and Child Health*. 2013; 23(8): 331-336.

50. Dietary Reference Intakes (DRIs): Elements. *Food and Nutrition Board, Institute of Medicine, National Academies.* 2001.

51. Dietary Reference Intakes (DRIs): Vitamins. *Food and Nutrition Board, Institute of Medicine, National Academies.* 1998.

52. Slavin J. L. Position of the American Dietetic Association: health implications of dietary fiber. *Journal of the American Dietetic Association*. 2008; 108(10): 1716-1731.

53. Azadbakht L, Esmaillzadeh A. Macro and Micro-Nutrients Intake, Food Groups Consumption and Dietary Habits among Female Students in Isfahan University of Medical Sciences. *Iran Red Crescent Med J* . 2012; 14(4): 204-209.

54. Mirzaeian S, Ghiasvand R, Sadeghian F, et al. Assessing the micronutrient and macronutrient intakes in female students and comparing them with the set standard values. *J Educ Health Promot.* 2013; 2: 1-13. doi :10.4103/2277-9531.106636.

55. Adegoke O.A, Fadupin G. T, Ketiku A.O. An Assessment of the Dietary Fiber Intake of Selected Students in the University of Ibadan, Ibadan, Nigeria. *African Journal of Biomedical Research.* 2006; 9; 157 – 162.

56. Strawson C, Bell R, Downs S, Farmer A, Olstad D, Willows N. Dietary patterns of female university students with nutrition education. *Can J Diet Pract Res.* 2013; 74(3): 138-42.

57. Satalić Z, Barić I. C, Keser I, Marić B. Evaluation of diet quality with the mediterranean dietary quality index in university students. *Int J Food Sci Nutr*. 2004; 55(8): 589-97.

58. Arroyo Izaga M, Rocandio Pablo A. M, Ansotegui Alday L, Pascual Apalauza E, Salces Beti I, Rebato Ochoa E. Diet quality, overweight and obesity in university students. *Nutr Hosp*. 2006; 21(6): 673-9.

59. Vargas-Zárate M, Becerra-Bulla F, Prieto-Suárez E. Evaluating university students' dietary intake in Bogotá, Colombia. *Rev Salud Publica (Bogota)*. 2010; 12(1): 116-25.

60. Cervera Burriel F, Serrano Urrea R, Vico García C, Milla Tobarra M, García Meseguer MJ. Food habits and nutritional assessment in a university population. *Nutr Hosp*. 2013; 28(2): 438-46.

61. Fabián C, Pagán I, Ríos JL, et al. Dietary patterns and their association with sociodemographic characteristics and perceived academic stress of college students in Puerto Rico. *P R Health Sci J.* 2013; 32(1): 36-43.

7. APPENDICES

7.1 Ethical Approval

T.C.
İSTANBUL MEDİPOL ÜNİVERSİTESİ
GİRİŞİMSEL OLMAYAN KLİNİK ARAŞTIRMALAR ETİK KURULU

Sayı : 108400987-111
Konu: Etik Kurulu Kararı

03/03/2015

Sayın Tuğba EROL

Üniversitemiz Girişimsel Olmayan Klinik Araştırmalar Etik Kuruluna yapmış olduğunuz "Bir Üniversitenin İlki Farklı Bölümündeki Öğrencilerin Diyet Kalitelerinin Karşılaştırılması" isimli başvurunuz incelenmiş olup, etik kurulu kararı ekte sunulmuştur.

Bilgilerinize rica ederim.

Doç. Dr. Hanefi ÖZBEK
Girişimsel Olmayan Klinik Araştırmalar
Etik Kurulu Başkanı

EK:
-Karar Formu (2 sayfa)

Tel: (0216)681 51 37
Faks:(0212)531 75 55
E-mail:ilknurfil@medipol.edu.tr

Adres: Kavacık Mah.Ekinciler Cad.No:19,34810
Kavacık/BEYKOZ

BAŞVURU BİLGİLERİ	ARAŞTIRMANIN AÇIK ADI	Bir Üniversitenin İki Farklı Bölümündeki Öğrencilerin Diyet Kalitelerinin Karşılaştırılması			
	KOORDİNATÖR/SORUMLU ARAŞTIRMACI UNVANI/ADI/SOYADI	Tuğba EROL			
	KOORDİNATÖR/SORUMLU ARAŞTIRMACININ UZMANLIK ALANI	Sağlık Bilimleri Fakültesi			
	KOORDİNATÖR/SORUMLU ARAŞTIRMACININ BULUNDUĞU MERKEZ	İstanbul			
	DESTEKLEYİCİ	-			
	ARAŞTIRMAYA KATILAN MERKEZLER	TEK MERKEZ ☒	ÇOK MERKEZLİ ☐	ULUSAL ☒	ULUSLARARASI ☐

İSTANBUL MEDİPOL ÜNİVERSİTESİ GİRİŞİMSEL OLMAYAN KLİNİK ARAŞTIRMALAR ETİK KURULU KARAR FORMU

	Belge Adı	Tarihi	Versiyon Numarası	Dili
Değerlendirilen Belgeler	ARAŞTIRMA PROTOKOLÜ/PLANI	10.02.2015		Türkçe ☒ İngilizce ☐ Diğer ☐
	BİLGİLENDİRİLMİŞ GÖNÜLLÜ OLUR FORMU	10.02.2015		Türkçe ☒ İngilizce ☐ Diğer ☐
Karar Bilgileri	**Karar No: 100**	**Tarih: 03.03.2015**		
	Yukarıda bilgileri verilen Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu başvuru dosyası ile ilgili belgeler araştırmanın gerekçe, amaç, yaklaşım ve yöntemleri dikkate alınarak incelenmiş ve araştırmanın etik ve bilimsel yönden uygun olduğuna **"oybirliği"** ile karar verilmiştir.			

İSTANBUL MEDİPOL ÜNİVERSİTESİ GİRİŞİMSEL OLMAYAN KLİNİK ARAŞTIRMALAR ETİK KURULU	
BAŞKANIN UNVANI / ADI / SOYADI	Doç. Dr. Hanefi ÖZBEK

Unvanı/Adı/Soyadı	Uzmanlık Alanı	Kurumu	Cinsiyet		Araştırma ile ilişki		Katılım *		İmza
Prof. Dr. Şeref DEMİRAYAK	Eczacılık	İstanbul Medipol Üniversitesi	E ☒	K ☐	E ☐	H ☒	E ☒	H ☐	
Prof. Dr. Tangül MÜDOK	Histoloji ve Embriyoloji	İstanbul Medipol Üniversitesi	E ☐	K ☒	E ☐	H ☒	E ☐	H ☒	
Doç. Dr. Hanefi ÖZBEK	Farmakoloji	İstanbul Medipol Üniversitesi	E ☒	K ☐	E ☐	H ☒	E ☒	H ☐	
Yrd. Doç. Dr. Sibel DOĞAN	Psiko-onkoloji	İstanbul Medipol Üniversitesi	E ☐	K ☒	E ☐	H ☒	E ☒	H ☐	
Yrd. Doç. Dr. Hüseyin Emir YÜZBAŞIOĞLU	Protetik Diş Tedavisi	İstanbul Medipol Üniversitesi	E ☒	K ☐	E ☐	H ☒	E ☒	H ☐	
Yrd. Doç. Dr. İlknur KESKİN	Histoloji ve Embriyoloji	İstanbul Medipol Üniversitesi	E ☐	K ☒	E ☐	H ☒	E ☒	H ☐	
Yrd. Doç. Dr. Muhammed Fatih EVCİMİK	Kulak-Burun Boğaz	Özel Nisa Hastanesi	E ☒	K ☐	E ☐	H ☒	E ☐	H ☒	

* :Toplantıda Bulunma

7.2 Questionnaire

GÖNÜLLÜ OLUR FORMU

Bu anket Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Anabilim Dalı, Tuğba EROL'un 'Bir Üniversitenin İki Farklı Bölümündeki Öğrencilerin Diyet Kalitelerinin Karşılaştırılması" adlı tez çalışması kapsamında yapılmaktadır. Araştırmada yapılan değerlendirmelerin sonuçları yalnızca araştırma kapsamındaki çalışmalarda kullanılacaktır. Kişisel bilgileriniz herhangi bir amaçla, kurum yöneticileri veya üçüncü kişilerle kesinlikle paylaşılmayacaktır. Katılımınız için teşekkür ederiz.

Danışman Öğretim Üyesi: Prof. Dr. B. Serdar ÖZTEZCAN

'Bir Üniversitenin İki Farklı Bölümündeki Öğrencilerin Diyet Kalitelerinin Karşılaştırılması'nı içeren bu çalışmaya hiçbir baskı ve zorlama olmaksızın kendi rızamla katılmayı kabul ediyorum.

Gönüllünün Adı / Soyadı / İmzası / Tarih

Açıklamaları Yapan Kişinin Adı / Soyadı / İmzası / Tarih

T.C YEDİTEPE ÜNİVERSİTESİ
SAĞLIK BİLİMLERİ ENSTİTÜSÜ
BESLENME VE DİYETETİK ANABİLİM DALI

Cinsiyet: Kadın ☐ Erkek ☐

Yaş: **Kilo:** **Boy:**

Kayıtlı Olduğunuz Bölüm:

Sınıf: 1. sınıf ☐ 2. sınıf ☐ 3. sınıf ☐ 4. Sınıf ☐

Akademik Ortalamanız:_____

Şu an nerede yaşıyorsunuz?
Ev ☐ Yurt ☐ Diğer_____

Evde yaşıyorsanız:

Aile ile birlikte ☐ Arkadaş veya arkadaşlarla birlikte ☐ Yalnız ☐

Annenizin Eğitim Düzeyi:

☐ Okur-yazar değil
☐ İlköğretim
☐ Ortaöğretim
☐ Lise
☐ Lisans
☐ Lisansüstü

Babanızın Eğitim Düzeyi:

☐
☐
☐
☐
☐
☐

Düzenli egzersiz yapıyor musunuz?
Hayır ☐

Evet → Haftada 3 kereden az ☐
Haftada 3 kereden fazla ☐

Fiziksel aktivite yapıyorsanız;

Aktivite türü:_____
Dakika:_____

Sürekli diyet yapmanızı gerektiren sistemik bir hastalığınız var mı?
Hayır ☐
Evet_____

24 SAATLİK BESİN TÜKETİM KAYDI

Lütfen aşağıdaki bölüme son 24 saat içinde tükettiğiniz yiyecek ve içecekleri miktarları ile beraber yazınız.

8. CIRRUCULUM VITAE

Kişisel Bilgiler

Adı	Tuğba	**Soyadı**	GÜNDOĞDU
Doğum Yeri	Serik	**Doğum Tarihi**	15.01.1990
Uyruğu	T.C.	**Tel**	05063116237
E-mail	tugbaerolll@hotmail.com		

Öğrenim Durumu

Derece	**Alan**	**Mezun olduğu Kurumun Adı**	**Mezuniyet yılı**
Doktora	-	-	-
Yüksek Lisans	Beslenme ve Diyetetik	Yeditepe Üniversitesi	2015
Lisans	Beslenme ve Diyetetik	Yeditepe Üniversitesi	2013
Lise	Fen	Serik Anadolu Lisesi	2007

Bildiği Yabancı Dilleri	**Yabancı Dil Sınav Notu**
İngilizce	YDS: 65

İş Deneyimi

Görevi	**Kurum**	**Süre (Yıl-Yıl)**
Araştırma Görevlisi	Yeditepe Üniversitesi	2013-2015
Diyetisyen	Pendik Yaşam Tıp Merkezi	2014-2014
Diyetisyen	Özel Hekimler Cerrahi Tıp Merkezi	2014-2015

Bilgisayar Bilgisi

Program	**Kullanma Becerisi**
Microsoft Office Word-excel-power point-outlook	Çok iyi
BEBİS- Beslenme Bilgi Sistemi	Orta
SPSS	Orta

Diğer (Görev Aldığı Projeler/Sertifikaları/Ödülleri)

1) İspanyolca 4 Kuru Başarı ile Tamamlama Belgesi (2010-2013 Güz/Bahar Dönemi, Yabancı Diller Yüksekokulu, Yeditepe Üniversitesi)

2) Ulusal Sağlıklı Yaşam Sempozyumu, Kardiyovasküler Hastalıkların Önlenmesi ve Tedavisinde Beslenme, Kardiyoloji Diyetisyenliği Kursu, Kardiyoloji Diyetisyenliği Sertifikası (28-30 Mart, 2013, ANKARA)
3) Acıbadem Sağlıklı Yaşam Günleri, Sporcu Diyetisyenliği Sertifikası (20-23 Şubat, 2014, İSTANBUL