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

THE COMPARASION OF DIET QUALITY OF 1. AND 4. GRADE STUDENTS NUTRITION AND DIETETIC DEPARTMENT AND ANOTHER DEPARTMENT STUDENTS IN YEDİTEPE UNIVERSITY

MASTER THESIS

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ONAY

Bu tez Yeditepe Üniversitesi Lisansüstü Eğitim-Öğretim ve Sınav Yönetmeliğinin ilgili maddeleri uyarınca yukarıdaki jüri tarafından uygun görülmüş ve Enstitü Yönetim Kurulu'nun 06/07/2018 tarih ve 2018/12-07 sayılı kararı ile onaylanmıştır.

Prof. Dr. Bayram YILMAZ
Sağlık Bilimleri Enstitüsü Müdürü

ASSERTION

I declare that this dissertation hereby submitted to Yeditepe University for the degree of Master of Nutrition and Dietetics has not previously been submitted by me for a degree at this or any other university. All information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

29/06/2018

Beyzanur YILDIRIM

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LIST OF SYMBOLS AND ABBREVIATIONS

24 HR	24 Hour Dietary Recall
ALA	α-Linolenic acid
BMI	Body Mass Index
DHA	Docasahexaenoic acid
DR	Dietary Record
DRI	Dietary Referance Intake
EPA	Eiosapenaenoic acid
FFQ	Food Frequency Questionairre
Folate	Folic acid
g	gram
HEI	Healthy Eating Index
HEI-2010	Healthy Eatig Index-2010
kcal	Kilocalorie
kg	kilogram
LA	Linoleic acid
mcg	Microgram
MUFAs	Monoansaturated Fatty Acids
NAD-1	Department of Nutrition and Dietetic 1. Grade
NAD-4	Department of Nutrition and Dietetic 4. Grade
NTDs	Neural Tube Defects
PCG-1	Department of Psycological Counselling and Guidance 1. Grade
PCG-4	Department of Psycological Counselling and Guidance 4. Grade
PUFAs	Polyansaturated Fatty Acids
RDA	Recommended Daily Allowence
SFAs	Saturated Fatty Acids
TOBR	Dietary Guidelines for Turkey
TUBER	Turkey Dietary Guidelines
USDA	United States Department of Agriculture
Vitamin B_{12}	Cobalamin

SUMMARY

Yıldırım, B. (2018). The Comparasion of Diet Quality of 1. And 4. Grade Nutrition and Dietetics Department Students and Another Department Students in Yeditepe University. Yeditepe University, Institute of Health Science, Department of Nutrition and Dietetics, Master Thesis, İstanbul.

This study was conducted to evaluate the effect of Nutrition and Dietetics education on the diet quality of university students in the Department of Nutrition and Dietetics 1. (NAD-1) and 4. (NAD-4) grade and Department of Psychological Counselling and Guidance 1. (PCG-1) and 4. (PCG-4) grade students. The Healthy Eating Index-2010 (HEI-2010) was used to assess diet quality. 202 volunteer university students participated in the study at the age of 19-30. While 50.8% of NAD-1 students and 56.1% of NAD-4 students had the needs to be improved diet qualities; 75.52% of the PCG-1 students and 71.4% of the PCG-4 students have poor diet qualities. NAD-1 students had more whole grains, dairy and sodium component scores than PCG-1 students. NAD-4 students were found to have more total fruit, whole fruit, greens and beans, whole grains, dairy and total protein component scores than PCG-4 students. It was found that the diet quality of the students did not change according to the Body Mass Index (BMI) value and the place where they live. Although the diet quality of NAD students was better than that of PCG students, there was no difference in diet quality between NAD-1 and NAD-4 students. From this result, it is reached that Nutrition and Dietetics education did not affect the diet quality of students. It is possible to protect the individual and society from diseases which can emerge by ensuring that, the new nutritional habits which acquired in university life of university students, are within adequate and balanced nutritional boundaries. In order to achieve this, it will be useful to organize various practical trainings and programs for the students.

Key Words: Univesity students, diet quality, Healthy Eating Index-2010

ÖZET

Yıldırım, B. (2018). Yeditepe Üniversitesi Beslenme ve Diyetetik Bölümü 1. ve 4. Sınıf Öğrencilerinin Diyet Kalitesinin Kendi İçinde ve Diğer Bölüm Öğrencileri ile Karşılaştırılması. Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Programı, Yüksek Lisans Tezi, İstanbul.

Bu çalışma, Beslenme ve Diyetetik eğitiminin üniversite öğrencilerinin diyet kalitesine etkisini ölçmek amacıyla Beslenme ve Diyetetik Bölümü 1. (NAD-1) ve 4. (NAD-4) sınıf öğrencileri ile Psikolojik Danışmanlık ve Rehberlik Bölümü 1. (PCG-1) ve 4. (PCG-4) sınıf öğrencileri arasında yürütülmüştür. Diyet kalitesini değerlendirmek için Sağlıklı Yeme İndeksi-2010 (SYİ) kullanılmıştır. Çalışmaya 19-30 yaşlarında 202 gönüllü üniversite öğrencisi katılmıştır. NAD-1 öğrencilerinin %50.8'i, NAD-4 öğrencilerinin %56.1'i geliştirilmesi gereken diyet kalitesine sahipken; PCG-1 öğrencilerinin %75.52i, PCG-4 öğrencilerinin %71.4'ü kötü diyet kalitesine sahip bulunmuştur. NAD-1 öğrencilerinin tam tahıllar, süt ürünleri ve sodyum komponent puanları PCG-1 öğrencilerinden daha fazla bulunmuştur. NAD-4 öğrencilerinin toplam meyve, tam meyve, koyu yeşil yapraklı sebze ve kurubaklagiller, tam tahıllar, süt ürünleri, toplam protein komponent puanları, PCG-4 öğrencilerinden fazla bulunmuştur. Öğrencilerin diyet kalitesinin Beden Kütle İndeksi değeri ve yaşadıkları yere göre değişmediği bulunmuştur. NAD öğrencilerinin diyet kalitesi, PCG öğrencilerinden daha iyi olmasına karşın, NAD-1 ve NAD-4 öğrencileri arasında diyet kalitesi açısından fark bulunmamıştır. Bu sonuçtan yola çıkarak Beslenme ve Diyetetik eğitiminin öğrencilerin diyet kalitesini etkilemediği sonucuna ulaşılmıştır. Üniversite öğrencilerinin, üniversite hayatı boyunca edindiği yeni beslenme alışkanlıklarının yeterli ve dengeli beslenme sınırları içinde olması sağlanarak bireyi ve toplumu ortaya çıkabilecek hastalıklardan korumak mümkündür. Bunu sağlamak için öğrenciler için çeşitli uygulamalı eğitimler düzenlenmesi ve programlar oluşturulması faydalı olacaktır.

Anahtar Kelimeler: Üniversite öğrencileri, diyet kalitesi, Sağlıklı Yeme İndeksi-2010

1. INTRODUCTION and PURPOSE

Human need nutrition to sustain their lives. Nutrition is defined as obtaining and using the nutrients that should be provided in enough amounts of energy and nutrients necessary for long-term growth, development, protection of health in the most economical way without losing the nutritional value and making it unhealthy (1). It has been determined that nearly 50 nutrient elements are needed to sustain life and to preserve health and how much of each of these nutrients should be taken daily by evidence-based research (2). When any of these items are not taken or taken less than necessary, the growth and development is retarted, the health is impaired as it is scientifically revealed (1). Dietary intake of these nutrients in sufficient and balanced amounts is the goal of a healthy nutrition (3).

Nutrition is as important in the treatment of diseases as it is in the protection of health (1). Nowadays it is known that nutrition plays a key role in the prevention of many chronic diseases such as cardiovascular diseases, many types of cancers, obesity, hypertension, diabetes, allergic diseases, osteoporosis and tooth decay. Chronic diseases usually occur during adulthood, but are based on childhood and adolescence (4). Healthy nutrition is an important factor in preventing from non-communicable diseases such as obesity diabetes and cardiovascular diseases. Healthy nutrition should be provided in all age groups. Transition period from adolescence to adulthood is an important period in which eating habits are developed and formed (5). The unique decisions taken during the studentship, which constitutes a significant part of the adulthood period, affect the individual's diet. It is known that throughout the studentship, students have settled in a new atmosphere, changed their lifestyles and nutritional habits (6). New forms of nutritional habits that will emerge will continue after university (1).

In our country, researches about the nutritional behaviours of young people showed that there are very serious problems related to nutrition in this period (4). Metabolic functions are changing as a consequence of unhealthy nutrition, which in the long term causes significant damage to the body (6). Changing nutritional behaviors may affect the mental and physical state of the university students as well as the school performance indirectly (7). It has been shown in previous studies that this group of students has poor dietary habits such as high fast food consumption, low fruit and vegetable consumption (5).

The complexity of human nutrition has led to the emergence of many different methods of assessing nutrient consumption (8). While the nutritional status of the individuals is evaluated, the dietary components are handled individually, but this components are not consumed in an isolated manner. Diet consists of food and nutrient combinations. Therefore nutritional analysis has emerged as an alternative way to examine the overall quality of the diet. (9)

Diet quality refers to the ability to sustain constant energy and nutrition (10). There are different dietary indixes used to measure total diet quality (11). Dietary quality indixes are used to determine students' nutritional status. Healthy eating index (HEI) is one of these indixes (10).

As a final effort, United States Department of Agriculture (USDA) and Europe have created new methods of measuring diet quality to meet both nutritional requirements and dietary guidlines needs (10). HEI is designed to determine whether individuals' diets meet the USDA food guide pyramid 5 consumption of large groups of nutrients and the recommendations of the United States dietary guidelines (11).

Individual nutritional habits are influenced by their knowledge and attitudes about this behavior (12). It is thought that knowledge about food and nutrition is important to develop healthy nutritional habits (13). Given that one main aim of the universities is increased the knowledge of people in a society, it is important that broaden their knowledge of nutrititional habits and nutrition. Because later on it will lead to a healthier people and a conscious society (14).

This study was conducted with the aim of determining the healthy eating index and determining the dietary qualities by evaluating the effect of nutrition and dietetics education given to university students on the diet pattern.

2. GENERAL INFORMATION

2.1. Nutrition and Health

Human, the most developed of the living beings, continues to live by consuming other living beings in the nature. Plant and animal tissues consumed by humans are defined as nutrients. With nutrition, people take nutrients needed for their growth, development, healthy and productive life and use them in their bodies (15). According to the age, gender and physiological environment of the individual, sufficient intake of the nutrients necessary for continued body function, renewal of the tissues and functioning and appropriate use of the body can be explained as "adequate and balanced nutrition" (16). Adequate and balanced nutrition is essential for the protection of health and disease prevention (3). Nutrition is a process involving the steps of taking nutrients, digesting, absorbing and metabolizing nutrients necessary for the body's work. It is necessary to know what kind, how and how much of food should be consumed, it in order to process and maintain this process in a healthy manner. The foods to be consumed are grouped according to the nutrients contained therein. The amounts to be consumed from these groups are determined according to the characteristics of the persons such as age, gender and physical activity, health status (17).

2.2. Nutrition of University Students and Energy and Nutrient Requirements

It is important that the daily nutritional requirements are met so that the body functions of the individual can function properly and the health of the individual is optimal (18). Nutrition is important for all segments of society, while also has a different significance for the youth in university (7). As a matter of fact, the results of the studies made in Turkey students have not been fed adequately and balancedly (19, 20, 21). Research shows that young people in transition to adulthood have inadequate and unbalanced eating patterns and thus may be a risk group for chronic diseases (20).

Plant and animal tissues that provide nutritive food for life are defined as “food”. Foods are sources of energy and nutrients. Nutrients that are components of foods are necessary for human health (22). The carbohydrates, proteins, fats, vitamins and minerals found in the composition of foods are called “nutrients”. Nearly 50 nutrients that are needed by the body. Those nutrients may be grouped into 5 groups according to their chemical structure and their activity in body work. These are proteins, fats, carbohydrates as macronutrients and minerals, vitamins as micronutrients. It is also true that water should be added to these groups (3).

2.2.1. Energy Requirements

The ability of body organs to function and sustain normal heat is possible with the energy provided by the nutrients in the body. After the food taken in the body is digested, it is separated into nutrients and transported to the cells by blood circulation. Nutrients are converted into energy as oxidited with the oxygen carried in the blood circulation in the cells. This energy is spent for the work of the body. When the necessary nutrients for energy synthesis is not provided, the body uses its own tissues for a while and eventually loses its vitality. Metabolism is defined as the energy generation and expenditure from the nutrients in the cells. All foods that can be digested in the digestive system and absorbed into the blood supply energy to the body. But the amount of energy provided by each nutrients is not the same (23); By each grams of fat, protein, carbohydrate and fiber, 9; 4; 3.75; and 2-3 kilocalories (kcal) are provided respectively (24).

The energy expenditure of the body is examined in three steps. These are known as basal metabolic rate, physical activity status, and the thermal effect of nutrients. The daily energy requirement depends on age, gender, physical activity level, physical condition, genetic structure and environmental factors (2).

The amount of energy and nutrients to be taken into the body was indicated in Dietary Guidelines for Turkey (TOBR) and Turkey Dietary Guidelines (TUBER) which is update version of TOBR. According to TOBR, while the energy requirement for a healthy woman between 19-30 years of age was determined as 2180 kcal; for healthy men aged between 19-30 it was determined as 2850 kcal. But these amounts should be reduced to 10 kcal/day for males and 7 kcal/day for females for 19 years and over in each year (3).

2.2.2. Protein Requirements

Proteins have many crucial functions in the body, such as cell growth and differentiation, transmittion nerve impulses and protection of the immune system (25). The protein requirement for individuals aged 19-30 years is 0.8-1 kg/day (3). Protein requirement can be defined as: establishing a balance between energy intake and physical activity status of the people, to compensate losses of nitrogen in the body and so is the acceptable level of protein intake to maintain the protein mass (26). In order to get maximum benefit from the protein, energy intake should be provided sufficiently. When the energy intake is insufficient, proteins are used for energy, which leads to the unnecessary work of metabolism and the increase of protein breakdown products that burden the kidney (17).

2.2.3. Carbohydrate Requirements

The most important task of carbohydrates in the body is to provide energy to the cells, primarily to the brain (27). Carbohydrates are the least found in animal-derived products such as meat, milk, eggs, and most commonly found in all plant-derived foods (17). They are involved in the regulation of blood sugar and in meeting emergency energy needs (2). They are found in various forms in foods such as monosaccharide, disaccharide, oligosaccharide and polysaccharides. The dietary intake of carbohydrates rich in polysaccharides should be preferred in terms of the formation of a satiety feeling and blood sugar regulation (17).

Carbohydrates are the most economical and fastest available energy source for the body. It is recommended that 45-60% of daily energy intake should be obtained from carbohydrates. An adult individual who needs to take 2000 calories a day needs to get 250-300 g of carbohydrates per day (2).

The carbohydrates in the polysaccharide structure that the human body can not digest and can not be absorbed into the bloodstream are called fibre. Fibre can not turn into energy like other carbohydrates and is thrown away body without use. The presence of fibre in the diet affects nutrient absorption, sterol metabolism, carbohydrate and fat metabolism, fecundity and weight, cecum/colon fermentation, intestinal structure, barrier function and immunological function. It delays gastric emptying, reduces portion sizes of consumed food, reduces the absorption of simple carbohydrates by increasing viscosity in the small intestine (28). Epidemiologic studies have shown that high dietary fibre intake, reduces the risk of diseases such as cardiovascular diseases, type 2 diabetes and cancer (29). For men aged 19-30, the amount of recommended dietary fibre is 29 g/day, while for women it is 25 g/day (3).

2.2.4. Fat Requirements

The fats suplied by foods consist of fatty acids containing a straight chain and a single carboxyl atom. Fatty acids are used as a source of energy in the body and are necessary for the metabolic and structural activities of the body. Dietary fatty acids are divided into three groups as saturated, monounsaturated and polyunsaturated. omega-3 and omega-6 families fatty acids are polyunsaturated fatty acids that most affect human health and nutritional status. Linoleic acid (LA) is the precursor fatty acid of the omega-6 family and α-linolenic acid (ALA) is the precursor fatty acid of the omega-3 family. Eiocosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are the most important omega-3 fatty acids in human nutrition. Fatty fish such as mackerel, salmon, sardines and herring are rich in EPA and DHA fatty acids. (30). Dietary increase in omega-3 fatty acids consumption is effective in preventing from coronary heart disease. These fatty acids are also necessary for brain development and health (17).

In a healthy adult, up to 30% of energy should be provided from fats. 7% of the total daily energy should be sourced from saturated fats; 12-15% from monounsaturated fats; 7-10% should be provided from polyunsaturated fats (2). Dietary intake of n-3 fatty acids are needed in men aged 19 to 30 1.6 g/day, while women with 1.1 g/day. Trans fat is the source that should be avoided to consume and should be <1% of the total daily energy (3).

2.2.5. Vitamin Requirements

Vitamins are found in the human body in very small quantities, but their task in the body is quite excessive (3). Vitamins are divided into two groups as water soluble and fat soluble. Fat soluble vitamins are vitamin A, D, E and K. Water soluble vitamins are vitamin C and vitamin B group (31).

Vitamin A is necessary for vision, reproduction, bone development and the immune system. Good sources of vitamin A include beef livers, carrot, spinach, apricots, milk, egg yolks and broccoli (32). For vitamin A, the recommended daily intake for individuals aged 19-30 years is 900 mcg for men; and 700 mcg for women (3-32).

The function of the vitamin D in the body is to ensure that sufficient levels of calcium and phosphorus are present for the cellular processes to take place. Recently it has been shown that vitamin D is necessary for the development and differentiation of hematopoietic and immune cells. Very few food contains vitamin D and the sunlight is main source of it. But fatty fish like salmon, tuna and mackerel include vitamin D (33). Daily intake of vitamin D in individuals aged 19-30 years is reported to be 10 mcg/day regardless to gender (3) .

Vitamin E is a plant-derived antioxidant needed for human health and it is found as naturally in nuts, oils and seeds. studies have shown that vitamin E plays a critical role in protecting neurological health and functions such as learning, memory, and emotional response (34). The amount of Vitamin E in found in sufficient amounts in Daily consumed foods so deficiency is rare (17). The most common result of vitamin E deficiency is cerebral dysfunction (34).

Vitamin K plays a central role in the synthesis of the functionally active form of many coagulation factors in the liver. It is found in green leafy vegetables such as spinach and kale, broccoli and some fruits (35).

Vitamin C is a powerful antioxidant and is effective in building connective tissue, strong capillaries, protecting the body from infections and bacterial toxins. The richest sources are citrus fruits, green leafy vegetables, kiwi, tomatoes, berries (17).

Vitamin B group is composed of thiamine (B_1), riboflavin (B_2), niacin (B_3), vitamin B_6, pantothenate, biotin, folic acid (folate) and cobalamin (B_{12}). These vitamins are especially important for nerve, digestive system and skin health (17). Carbohydrates, fat and energy from proteins taken with foods helps regulate metabolic and biochemical events related to the formation (3).

Cobalamin is a critical vitamins essential for DNA synthesis, normal erythrocyte development and neurological functions. Main clinical indication of cobalamin deficiency is the neurological, neuropsychiatric and hematologic (36). Sources of cobalamin are meat, eggs, liver, yoghurt and fish (37). The amount of cobalamin that should be taken daily for people aged 19-30 years, regardless of gender, is 2.4 mcg (3).

Folic acid is used for the novo synthesis of thymine, adenine and guanine in body cells, as well as functioning in repairment, synthesis of the DNA and acting as a cofactor in various biological reactions in the human body. Sources of folic acid are foods such as green leafy vegetables, brussel sprouts, turnip greens, potatoes, yeast, dried beans, legumes, oranges and organ foods such as liver (38). Folic acid that should be taken daily for people aged 19-30 years, regardless of gender, is 400 mcg (3).

2.2.6. Mineral Requirements

Approximately 6% of the adult human body is composed of minerals (3). When calcium, iron, iodine and fluorine nutrients are adequately met, it is accepted as all macro and micro minerals are also met (17).

Calcium is found in bone and teeth, is involved in blood clotting, is necessary for muscle function and nerve transmission. The best sources of calcium are milk and dairy products. They are followed by molasses, oil seeds, green leafy vegetables, legumes and dried fruits (39).

Iodine, in the human body, plays a role in the synthesis of thyroid hormones in the thyroid gland (40). The best source of iodine is seafoods (17).

Iron is involved on many vitals such as oxygen transport, cellular respiration, immunological function, nitric acid metabolism and DNA synthesis (41). Iron is mostly found in meat, poultry and fish (42). The daily amount of iron recommended for the indivudials aged 19-30 for women is 18 mg and 10 mg for men (3).

2.3. Nutritional Behaviors of University Students

Nutrition is an important factor for the health of the individual and the community. The primary aim for the individuals and the community is to prevent health and productivity. Human health is influenced by nutrition, inheritance and environmental factors. Nutrition is the most important of these factors (43).

Healthy nutritional habits are part of a healthy lifestyle. Healthy nutritional habits is an important factor to protect young people from health problems such as vitamin deficiencies, iron deficiency anemia, excessive body weight (44). It is widely known that poor nutritional habits increase the risk of developing cardiovascular diseases, type 2 diabetes and some cancer diseases. Transition period from adolescence to university, young adulthood, is an important period of life to create healthy nutritional habits (45). In this period, as independence increases, students are constantly faced with making healthy food choices (46).

Many studies showed that university students have poor nutrition habits (47, 48, 49). Past reports indicate that fast food, snacks and meat consumption are increased in university students, while consumption of vegetables, fruits and whole grains is reduced (50).

Environmental factors also affect eating habits. The prevalence of shopping malls, convience stores, vending machines, fast-food sales points lead to unhealthy eating habits of university students (51). Also the vast majority of university students have limited healthy food choices in university dining halls which in turn affects the eating habits of the students (18).

Changing eating habits affect the mental and physical state of university students as well as indirectly affect school performance. For this reason, it is very important for university students to identify nutrition knowledge and habits and to develop appropriate precautions for the situation. Determination of the nutritional status helps to understand the formation of eating habits and the consequences that are contributing significantly (1).

2.4. Assessment of Diet Quality

Despite what is known about the benefits of balanced nutrition in order to prevent from noncommunicable diseases, the prevalences of these diseases are increasing. Non-communicable diseases are associated with high consumption of processed, high-energy, low-nutrient foods. The relationship between diet and health is complex and not linked to a single dietary component (52).

Many epidemiological studies focus on single nutrient, food or food group while examining diet and chronic disease association (53). It is generally accepted that individuals do not consumed only nutrients or foods but consumed complex nutrient combinations containing several nutrients and non-nutrients. Interacting nutrients can affect the bioavailability or absorption of each other. As long as the total energy intake of the individuals remains constant, increased consumption of a food may be associated with decreased consumption of other foods. All of the above mentioned increases the difficulty of attributing specific nutrients or foods only. Therefore, alternative approaches have been proposed recently to examine diet and health outcomes (54)

Recently has been shown the link between diet and noncommunicable diseases but this relationship is quite complicated because the nutrients and foods are not consumed separately. Therefore, indexes have been developed to measure the general characteristics of the diet according to recommendations for the prevention of noncommunicable diseases (55).

Indexes are composite instruments aimed measuring the various clinical situations, behaviors, attitudes and beliefs that are difficult and quantitative to measure accurately. Many indices are used from the literature. Most of these indexes measure the dietary quality of adults. Generally, indexes for measuring dietary quality are based on nutrition guidelines or nutritional recommendations (54).

One way to assess diet quality is to use indixes that can identify both the quality and diversity of a complex diet (56). These indixes allow the entire diet in relationship to select food intake, compliance with dietary recommendations, and chronic illnesses risk (57). HEI, diet quality index, healthy diet indicator, and mediterranean diet score are the four original diet indexes that are approved and most commonly used dietary quality scores (58).

2.5. Determination of Diet Quality

Since early times, people have attributed a functional role to nutrition in health and well-being. In the last two decades, diet quality term has emerged in the scientific literature to assess the nutritional habits of the population and the effectiveness of dietary interventions. Numerous diet quality indexes have been developed, tested and approved to reflect diverse aspects of diet quality (59).

Currently, there are many diet quality indexes available. A several of which have been modified to reflect dietary needs of different populations. One of these is the HEI (60).

Subjective and objective methods are used to determine the dietary intake. Subjective assessment is carried out using 24 hour dietary recall (24HR), dietary record (DR) method and food frequency questionairre (FFQ) methods (61).

24HR includes an interview that questions the individual's food intake over the last 24 hours. The amount of food consumed by the interviewer can be expressed using the average values or the portion sizes in the food photographs (62). The advantage of 24HR is that there is minimal burden to interviewers than other methods (61). The frequent weakness in this method is not remembering the type and amount of food consumed correctly, previous day maybe different than usual food consumption or participants may not tell the truth of because embarrassment or hesitation (63).

The DR is dietary assessment method that the individual records the food and drink has consumed in a certain period of time. The record must be kept for a minimum of three days in order to obtain a reliable detection. For the purpose of the study, it is frequently requested to record information such as food preparation methods, ingredients, recipes. The quantities of food consumed are weighed and determined using home-sized containers, food models, food photographs. The advantage of this method is that the individual simultaneously records the food while consuming it. It is a limitation of this method that the registration reflects a process which does not reflect general food consumption, it is complex to register for individuals, cause changes in diet behaviors, and is not pratic for large populations (64).

FFQ is a dietary assessment methods that assesses food consumption by questioning how often and how much consumed from food and food groups are consumed (65). Is a reliable and valid method for determining the relationship between diet and risk of diseases. Limiting aspects of this method are the inability to identify many of the nutrient intakes and the rough determination of consumption quantities (63).

3. MATERIALS AND METHODS

3.1. Participants and Data Collection

The research ethics committee was granted permission from the Ethics Committee of the Institute of Clinical Investigations, Yeditepe University, dated 23/11/2017 and numbered 748 (Appendix 1). Written consent obstained from the individuals before participaiting in the study (Appendix 2).

The sample of this research is composed of healthy individuals between the ages of 18 and 30 who are educated at the first and fourth levels of the Department of Nutrition and Dietetics of the Yeditepe University and the Department of Psychological Counselling and Guidance. Total number of NAD-1 and NAD-4 students were 97 and 68 and 62.9% (61) and 83.8% (57) of them participated respectively. Total number of PCG-1 and PCG-4 were 48 and 65 and 100% (48) and 53.8% (35) of them participated respectively. Data was collected between December 2017 and February 2018 via face-to-face interview method. Participants were asked to fill out general questionnaire and 24HR in research. Height and weight measurements were taken based on the decleration. BMI classification of the World Health Organization was used to determine that participants were underweight, normal-weight, overweight or obese. BMI classification were given as follows: underweight <18,5 kg/m2, normal weight 18,5-24.99 kg/m2, overweight 25.0 to 29.99 kg/m2, obese ≥30.0 kg/m2 (66).

3.2. Measures

General questionnaire and 24HR were used. General questionnaire was prepared by the researcher. 24HR was designed by the researcher (Appendix 3).

3.2.1. General Questionnaire

General questionnaire included nine questions in total, questioning the height and weight, residence status, smoking-alcohol consumption, health status, nutritional supplementation of the participants.

3.2.2. 24 Hour Dietary Recall

24-hour food records were collected by recording food and baverages consumed by individuals in the last twenty four hour using household measures (e.g., bowls, cups, and glasses). Before filling in the records, the researcher described the standard portion size to the participants. Participants was able to ask additional information or assistance from researcher with regard to the completion dietary record at any time during participation. Analyzes of nutrient content of the 24HR were made with BEBIS 7.2 student version. Adequacy of daily intake of energy and nutrients was interpreted according to the dietary reference intake (DRI) levels in TOBR and TUBER.

3.3. Healthy Eating Index-2010 (HEI-2010)

HEI-2010 was developed in the mid-1990s to ensure that measured of the overall diet quality of the diet. HEI led to the assessment of the quality of the diet at the time indicated, as well as the change in diet pattern over time (67). HEI can be used in many areas such as observing populations and food environment, epidemiological studies, food assistance packages, nutritional interventions, monitoring the relationship between diet cost and quality (68).

HEI has been updated to reflect the dietary guidelines of USDA published in 2005 and has been named HEI-2005. In HEI-2005, food and nutrient intake was expressed on the basis of intensity, that is as amounts per 1000 calories of intake, to characterize the quality of the diet while controlling the quantity of the diet (69). This difference in HEI- 2005 addresses the premise that a person consuming too much food meet less nutrient needs than a person who consumes fewer nutrients (60).

HEI- 2010 is an updated version of the HEI-2005 that reflects the dietary guidelines of the USDA published in 2010. HEI-2010 includes 12 components; 9 of these are used to measure dietary adequacy, including 1) total fruit; 2) whole fruit; 3) total vegetables; 4) greens and beans; 5) whole grains; 6) dairy; 7) total protein foods; 8) seafood and plant proteins and 9) Fatty Acids (FAs). The remaining three contain (refined grains, sodium, and empty calories) dietary components that should be moderately consumed (68).

Higher scores for all components in the HEI reflect better diet quality (68). Component scores range from 0-5, 0-10 or 0-20, with a score of 100% in total, meaning that the recommended amount is met or passed (70). When the diet qualities of the individuals are categorized according to the total HEI-2010 score, defined 50 and below 50 as a poor diet guality, 51 to 80 as that needs to be improved diet quality, and better than 80 is defined as good diet quality (67).

3.3.1. Total Fruit

While the total score of the total vegetables component is calculated, the maximum score on the basis is at least 189.2 gr of fruit and fruit juice consumption per 1000 calories of the energy received. If there is no consumption, the component score is given 0 (68).

3.3.2. Whole Fruit

While the total score of the total vegetables component is calculated, the maximum score on the basis is at least 94.6 gr fresh, canned, frozen and dried fruit consumption per 1000 calories of the energy received. All forms of juices are left out of this group. If there is no consumption, the component score is given 0 (68).

3.3.3. Total Vegetables

While the total score of the total vegetables component is calculated, the maximum score on the basis is at least 260.2 gr of vegetable consumption per 1000 calories of the energy received. If there is no consumption, the component score is given 0 (68).

3.3.4. Greens and Beans

While the total score of the dark green vegetables and beans and peas component is calculated, the maximum score on the basis is at least 47.3 gr of consumption per 1000 calories of the energy received. If there is no consumption, the component score is given 0. However, when the standard of total protein food or plant proteins are not met; beans and peas (called legumes in HEI-2005) will be counted as these groups first and will be counted as greens and beas if these group are not needed (68).

3.3.5. Whole Grains

While the total score of the whole grains component is calculated, the maximum score on the basis is at least 42.5 gr of consumption per 1000 calories of the energy received. If there is no consumption, the component score is given 0 (68).

3.3.6. Dairy

While the total score of the whole grains component is calculated, the maximum score on the basis is at least 307.5 gr of consumption per 1000 calories of the energy received. If there is no consumption, the component score is given 0. This step includes all milk products like milk, yoğurt, cheese, soy beverages (68).

3.3.7. Total Protein Foods

While the total score of the whole grains component is calculated, the maximum score on the basis is at least 70.87 gr of consumption per 1000 calories of the energy received. If there is no consumption, the component score is given 0. Beans and peas are included this component when the total protein food standart is otherwise not meet (68).

3.3.8. Seafood and Plant Proteins

While the total score of the Seafood and Plant Proteins component is calculated, the maximum score on the basis is at least 22.67 gr of consumption per 1000 calories of the energy received. If there is no consumption, the component score is given 0. Includes seafood, nuts, seeds, soy pruducts as well as beans and peas counted as total protein foods (68).

3.3.9. Fatty Acids

Fatty acids component score are calculated based on the (PUFA + MUFA) / Saturated Fatty acids ratio at least 2.5 as the maximum score standard. If this ratio is at most 1.2, the component score is given 0 (68).

3.3.10. Refined Grains

When refined grains component score are calculated, the maximum score standard based on consumption of up to 51 g per 1000 calories of energy received. If the consumed energy is equal to 121.9 grams per 1000 calories or greater than 121.9 grams, the component score is given 0 (68).

3.3.11. Sodium

While the sodium component score is calculated, the maximum score based on the intake is at most 1.1 g per 1000 calories of the energy received. If sodium intake is 2 grams or more than 2 grams per 1000 calories of energy intake, the component score is given 0 (68).

3.3.12. Empty Calories

It contains energy from solid fats, alcoholic beverages and added sugars. When the empty calories component score is calculated, the maximum score standard based on consumption is equivalent to at most 19% of the energy received. If the consumption is equal to or greater than 50% of the total energy intake, the component score is given 0 (68).

3.4. Statistical Analyses

All analyses were conducted using the Statistical Package for Social Sciences, SPSS (Version 22) (SPSS Inc., Chicago, IL, USA), with statistical significance set at $p<0.05$.

For the evaluation of data descriptive statistical methods (mean, standard deviation) were used. Chi – Square test was used when two or more independent groups were compared in the categorical variables. Normal distribution of quantitative data between independent two groups was compared by using Parametric Independent T test; and more than two groups was compared by using One Way ANOVA. Tukey post-hoc test was applied for binary comparisons in One Way ANOVA tests. Non-normal distributions in the independent two groups was compared by using Non-parametric Mann Whitney-U test and for more than two groups Non- parametric Kruskal Wallis test was applied. Mann Whitney U test was applied for binary comparisons in Kruskall Wallis tests.

4. RESULTS

4.1. General Characteristics of Students

In this section, the general characteristics of individuals are examined. Findings related to the socio-demographic characteristics such as sex, age, residence status according to the department and grade of the students who participated in the survey are showed in Table 4.1.

30.2% of students were registered in the NAD-1; 24.3% were in the PCG-1; 28.2% were in the NAD-4 and 17.3% were in the PCG-4.

Table 4.1. Socio-Demographic Features of Students

Socio-demographic features	NAD-1		PCG-1		NAD-4		PCG-4		Total (n: 202)	
	n	%	n	%	n	%	n	%	n	%
Department and Grade	61	30.2	49	24.3	57	28.2	35	17.3	202	100
Age (Year)										
x̄ ± S	20.6+1.8		20.8+1.3		23.5+0.7		23.1+1.2		21.9+1.9	
Sex										
Male	1	1.6	5	10.2	3	5.3	3	8.6	12	5.9
Female	60	98.4	44	89.8	54	94.7	32	91.4	190	94.1
Residence Status										
Alone, at home	10	16.4	7	14.6	21	36.8	10	28.6	48	23.9
With family, at home	26	42.6	22	45.8	20	35.1	11	31.4	79	39.3
With friends, at home	8	13.1	4	8.3	12	21.1	9	25.7	33	16.4
At dormitory	17	27.9	15	31.3	4	7.0	5	14.3	41	20.4

1.6% of NAD-1 students was male, 98.4% were female. 10.2% of the PCG-1 students were male, 89.8% were females. 5.3% of the NAD-4 students were male, 94.7% were female. 8.6% of PCG-4 students were male while 91.4% were female.

The percentage of NAD-1 students living alone, with family, with friends and dormitory were 16.4%, 42.6%, 13.1% and 27.9% respectively. The percentage of PCG-1 students living alone, with family, with friends and dormitory were 14.6%, 45.8%, 8.3% and 31.3% respectively. The percentage of NAD-4 students living alone, with family, with friends and dormitory were 36.8%, 35.1%, 21.1% and 7.0% respectively.

The percentage of PCG-4 students living alone, with family, with friends and dormitory were 28.6%, 31.4%, 25.7% and 14.3% respectively.

4.2. Anthropometric Measures of Students

The mean weight of NAD-1 students was 57.9±9.2; and 69.8±12.5 for the PCG-1 students. The mean height of NAD-1 students was 165.4 ± 6.1; and 167.7±7.4 for the PCG-1 students. The mean BMI of NAD-1 students was 21.1±2.9; and 21.1±12.7 for the PCG-1 students.

The mean weight of NAD-4 students was 57.1±9.0; and 59.2±11.0 for the PCG-4 students. The mean height of NAD-4 students was 166.4±6.8; and 165.7±7.8 for the PCG-4 students. The mean BMI of NAD-4 students was 20.6±2.7; and 21.5±3.4 for the PCG-4 students (Table 4.2).

Table 4.2. Antropometric Measures of Students According to Department and Grade

	NAD-1(60)		**PCG-1(47)**		**NAD-4(55)**		**PCG-4(35)**		**TOTAL(197)**	
Measures	**$\bar{x}$**	**S**	**$\bar{x}$**	**S**	**$\bar{x}$**	**S**	**$\bar{x}$**	**S**	**$\bar{x}$**	**S**
Weight (kg)	57.9	9.2	69.8	12.5	57.1	9.0	59.2	11.0	58.4	10.3
Height (cm)	165.4	6.1	167.7	7.4	166.4	6.8	165.7	7.8	166.3	6.9
BMI (kg/m²)	21.1	2.9	21.1	2.7	20.6	2.7	21.5	3.4	21.0	2.9

According to the BMI classification, 16.7% of NAD-1 students were underweight, 75.0% were in normal weight, 6.7% were overweight and 1.6% was obese. 10.6% of PCG-1 students were underweight, 80.9% were in normal weight, 6.4% were overweight and 2.1% was obese. 20.0% of NAD-4 students were underweight, 72.7% were in normal weight, 5.5% were overweight and 1.8% was obese. 14.2% of PCG-4 students were underweight, 82.9% were in normal weight and 2.9% was obese (Table 4.3).

Table 4.3. BMI Classification

BMI (kg/m²)	**NAD-1(60)**		**PCG-1(47)**		**NAD-4(55)**		**PCG-4(35)**		**Total(197)**	
Classification	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
underweight	10	16.7	5	10.6	11	20	5	14.2	31	15.7
normal weight	45	75.0	38	80.9	40	72.7	29	82.9	152	77.2
overweight	4	6.7	3	6.4	3	5.5	0	-	10	5.1
obese	1	1.6	1	2.1	1	1.8	1	2.9	4	2.0

4.3. Cigarette and Alcohol Using Status of Students

18.0% of NAD-1 students were smoking while 33.3% of PCG-1 students were smokers. 28.1% of NAD-4 students were smoking while 34.3% of PCG-4 students were smokers (Table 4.4).

54.1% of NAD-1 students were using alcohol while 54.2% of PCG-1 students were using alcohol. 54.4% of NAD-4 students were using alcohol while 31.4% of PCG-4 students were using alcohol (Table 4.4).

Table 4.4. Cigarette and Alcohol Using Status of Students

	NAD-1(61)		PCG-1(48)		NAD-4(57)		PCG-4(35)		Total(201)	
Using Status	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Cigarette										
No	50	82.0	32	66.7	41	71.9	23	65.7	146	72.6
Yes	11	18.0	16	33.3	16	28.1	12	34.3	55	27.4
Alcohol										
No	28	45.9	22	45.8	26	45.6	11	68.6	87	43.3
Yes	33	54.1	26	54.2	31	54.4	24	31.4	114	56.7

4.4. Health Status of Students and Use of Nutritional Supplement

85.2% of the NAD-1 students, 81.3% of the PCG-1 students, 91.2% of the NAD-4 students and 97.1% of the PCG-4 students had no health problems. When students with health problems is considered, it is seen that NAD-1 and NAD-4 students had endocrine nutritional and metabolic diseases (6.7% and 5.3%), PCG-1 students had more respiratory system diseases (12.4%) (Table 4.5).

Table 4.5. Distribution of Students According to Health Problems

	NAD-1(61)		PCG-1(48)		NAD-4(57)		PCG-4(35)		Total(201)	
Health Problem	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
No	52	85.2	39	81.3	52	91.2	34	97.1	177	88.1
Yes	9	14.8	9	18.7	5	8.8	1	2.9	24	11.9
Endocrine, nutritional and metabolic diseases	4	6.7	-	-	3	5.3	-	-	7	3.5
Digestive system diseases	1	1.5	1	2.1	-	-	-	-	2	1.0
Respiratory system d.	2	3.3	6	12.4	-	-	-	-	8	4.0
Blood and Immunological d.	2	3.3	1	2.1	2	3.5	1	2.9	6	3.0
Muscle, skeletal, connective tissue d.	-	-	1	2.1	-	-	-	-	1	0.4

85.2% of NAD-1 students, 77.1% of PCG-1 students, 78.9% of NAD-4 students and 65.7% of PCG-4 students were not using nutritional supplements. When students using supplements is assesed, it is seen that both of the NAD and PCG fourth grade students (21.1% and 34.3%) were using more supplement than first grade students (14.8% and 32.9%) (Table 4.6).

Table 4.6. Nutritional Supplement Using Status of Students

Using	**NAD-1(61)**		**PCG-1(48)**		**NAD-4(57)**		**PCG-4(35)**		**Total(201)**	
Status	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
No	52	85.2	37	77.1	45	78.9	23	65.7	157	78.1
yes	9	14.8	11	32.9	12	21.1	12	34.3	44	21.9

4.5. Energy and Nutrient Intake of Students

Table 4.7. shows energy and nutrient intake of NAD-1 and PCG-1 students. The mean energy intake of NAD-1 students was 1327.0±366.8 kcal and PCG-1 students was 1383.1±493.6 kcal. Energy intake did not show a significant difference between NAD-1 and PCG-1 students (p=0,496, p>0.05).

The mean protein intake of NAD-1 students was 58.0±31.1 g and PCG-1 students was 54.7±20.1 g. Protein intake did not show a significant difference between NAD-1 and PCG-1 students (p=0.523, p>0.05).

The mean fat intake of NAD-1 students was 58.8±18.0 g and PCG-1 students was 62.4±25.7 g. Fat intake did not show a significant difference between NAD-1 and PCG-1 students (p=0.409, p>0.05).

The mean carbohydrate intake of NAD-1 students was 138.9±50.6 g and PCG-1 students was 149.3±62.6 g. Carbohydrate intake did not show a significant difference between NAD-1 and PCG-1 students (p=0.336, p>0.05).

The mean fibre intake of NAD-1 students was 15.7±8.6 g and PCG-1 students was 14.3±6.2 g. Fibre intake did not show a significant difference between NAD-1 and PCG-1 students (p=0.295, p>0.05).

The mean omega-3 intake of NAD-1 students was 1.4±1.5 g and PCG-1 students was 1.0±0.8 g. Omega-3 intake did not show a significant difference between NAD-1 and PCG-1 students (p=0.141, p>0.05).

The mean omega-6 intake of NAD-1 students was 10.6±5.8 g and PCG-1 students was 13.0±6.5 g. PCG-1 students were found to have higher omega-6 intake than NAD-1 students ($p=0.039$, $p<0.05$).

The mean saturated fatty acids (SFAs) intake of NAD-1 students was 20.8±8.0 g and PCG-1 students was 21.4±10.6 g. SFAs intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.755$, $p>0.05$).

The mean monounsaturated fatty acids (MUFAs) intake of NAD-1 students was 20.3±7.2 g and PCG-1 students was 20.8±10.0 g. MUFAs intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.726$, $p>0.05$).

The mean polyunsaturated fatty acids (PUFAs) intake of NAD-1 students was 12.3±6.4 g and PCG-1 students was 14.2±7.0 g. PUFAs intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.129$, $p>0.05$).

The mean cholesterol intake of NAD-1 students was 237.0±140.7 mg while and PCG-1 students was 217.2±149.8 mg. Cholesterol intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.362$, $p>0.05$).

The mean vitamin A intake of NAD-1 students was 816.5±640.0 mcg and PCG-1 students was 606.6±395.5 mcg. Vitamin A intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.171$, $p>0.05$).

The mean vitamin E intake of NAD-1 students was 13.1±7.8 mcg and PCG-1 students was 15.8±7.6 mcg. Vitamin E intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.068$, $p>0.05$).

The mean thiamine intake of NAD-1 students was 0.7±0.3 mg and PCG-1 students was 0.7±0.2 mg. Thiamine intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.928$, $p>0.05$).

The mean riboflavin intake of NAD-1 students was 1.1±0.4 mg and PCG-1 students was 0.9±0.4 mg. Riboflavin intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.090$, $p>0.05$).

The mean niacin intake of NAD-1 students was 23.7±19.8 mg and PCG-1 students was 20.9±9.1 mg. Niacin intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.373$, $p>0.05$).

The mean vitamin B_6 intake of NAD-1 students was 1.1±0.7 mg and PCG-1 students was 0.9±0.4 mg. Vitamin B_6 intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.088$, $p>0.05$).

The mean folate intake of NAD-1 students was 216.9±121.4 mcg and PCG-1 students was 210.0±99.7 mcg. Folate intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.748$, $p>0.05$).

The mean vitamin B_{12} intake of NAD-1 students was 3.9±2.4 mcg and PCG-1 students was 3.7±2.5 mcg. Vitamin B_{12} intake did not show a significant difference between NAD-1 and PCG-1 first grade students ($p=0.633$, $p>0.05$).

The mean vitamin C intake of NAD-1 students was 63.4±52.4 mg and PCG-1 students was 57.0±38.3 mg. Vitamin C intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.916$, $p>0.05$).

The mean biotin intake of NAD-1 students was 33.9±17.2 mcg while the mean biotin intake of PCG-1 students was 28.6±14.5 mcg. Biotin intake did not show a significant difference between NAD and PCG first grade students ($p=0.091$, $p>0.05$).

The mean pantothenic acid intake of NAD-1 students was 3.7±1.6 mg and PCG-1 students was 3.3±1.3 mg. Pantothenic acid intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.229$, $p>0.05$).

The mean iron intake of NAD-1 students was 7.9±4.1 mg and PCG-1 students was 8.3±4.2 mg. Iron intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.626$, $p>0.05$).

The mean iodine intake of NAD-1 students was 109.0±38.2 mcg and PCG-1 students was 108.0±40.3 mcg. Iodine intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.898$, $p>0.05$).

The mean zinc intake of NAD-1 students was 7.5±2.9 mg and PCG-1 students was 7.5±3.1 mg. Zinc intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.929$, $p>0.05$).

The mean copper intake of NAD-1 students was 1.0±0.5 mg and PCG-1 students was 1.0±0.5 mg. Copper intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.898$, $p>0.05$).

The mean flourine intake of NAD-1 students was 389.6±180.4 mcg and PCG-1 students was 413.2±173.4 mcg. Flourine intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.489$, $p>0.05$).

The mean sodium intake of NAD-1 students was 2190.6±698.0 mg and PCG-1 students was 2593.7±990.0 mg. PCG-1 students were found to have higher sodium intake than NAD-1 students ($p=0.018$, $p<0.05$).

The mean potassium intake of NAD-1 students was 18950.3±820.1 mg and PCG-1 students was 1729.4±767.6 mg. Potassium intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.281$, $p>0.05$).

The mean calcium intake of NAD-1 students was 596.8±258.7 mg and PCG-1 students was 505.9±209.6 mg. NAD-1 students were found to have higher calcium intake than PCG-1 students ($p=0.049$, $p<0.05$).

The phosphorus intake of NAD-1 students was 945.7±370.3 mg and PCG-1 students was 386.0±276.3 mg. Phosphorus intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.078$, $p>0.05$).

The mean magnesium intake of NAD-1 students was 218.6±93.2 mg and PCG-1 students was 201.8±94.8 mg. Magnesium intake did not show a significant difference between NAD-1 and PCG-1 students ($p=0.351$, $p>0.05$).

Table 4.7. Daily Energy and Nutrient Intake of NAD-1 and PCG-1 Students

	NAD-1(61)				PCG-1(49)				
	x̄	**S**	**Min**	**Max**	**x̄**	**S**	**Min**	**Max**	**p***
Energy (kcal)	1327.0	366.8	604.8	2158.3	1383.1	493.6	613.0	2833.6	0.496
Protein (g)	58.0	31.1	26.5	263.6	54.7	20.1	20.2	119.5	0.523
Fat (g)	58.8	18.0	22.6	95.6	62.4	25.7	23.9	137.6	0.409
Carbohydrate (g)	138.9	50.6	33.4	275.0	149.3	62.6	30.1	307.1	0.336
Fibre (g)	15.7	8.6	5.1	41.2	14.3	6.2	5.0	32.5	0.295
Omega-3 (g)	1.4	1.5	0.3	9.3	1.0	0.8	0.2	5.5	0.141
Omega-6 (g)	10.6	5.8	1.6	29.6	13.0	6.5	2.7	40.9	**0.039***
SFAs (g)	20.8	8.0	5.9	41.6	21.4	10.6	6.0	53.6	0.755
MUFAs (g)	20.3	7.2	7.0	38.3	20.8	10.0	6.6	61.7	0.726
PUFAs (g)	12.3	6.4	2.8	33.4	14.2	7.0	3.4	46.4	0.129
Cholesterol (mg)	237.0	140.7	47.2	702.0	217.2	149.8	10.8	810.0	0.362
Vitamin A (mcg)	816.5	640.0	118.8	3113.8	606.6	395.5	133.7	2499.3	0.171
Vitamin E (mcg)	13.1	7.8	0.6	32.7	15.8	7.6	1.9	38.7	0.068
Thiamine (mg)	0.7	0.3	0.3	1.5	0.7	0.2	0.3	1.3	0.928
Riboflavin (mg)	1.1	0.4	0.5	2.3	0.9	0.4	0.2	2.1	0.090
Niacin (mg)	23.7	19.8	8.7	165.9	20.9	9.1	7.4	55.0	0.373
Vitamin B_6 (mg)	1.1	0.7	0.4	5.9	0.9	0.4	0.3	2.3	0.088
Folate (mcg)	216.9	121.4	77.7	613.8	210.0	99.7	74.4	517.8	0.748
Vitamin B_{12} (mcg)	3.9	2.4	0.8	14.2	3.7	2.5	0.0	11.5	0.633
Vitamin C (mg)	63.4	52.4	0.0	245.7	57.0	38.3	2.2	141.0	0.916
Biotin (mcg)	33.9	17.2	9.6	84.6	28.6	14.5	8.9	78.4	0.091
Pantothenic acid (mg)	3.7	1.6	1.3	9.7	3.3	1.3	0.8	7.1	0.229
Iron (mg)	7.9	4.1	2.6	22.1	8.3	4.2	3.0	27.0	0.626
Iodine (mcg)	109.0	38.2	42.7	209.8	108.0	40.3	35.3	233.2	0.898
Zinc (mg)	7.5	2.9	2.4	13.9	7.5	3.1	2.4	15.7	0.929
Copper (mg)	1.0	0.5	0.3	2.2	1.0	0.5	0.4	2.9	0.898
Fluorine (mcg)	389.6	180.4	163.5	891.2	413.2	173.4	186.6	828.9	0.489
Sodium (mg)	2190.6	698.0	1047.5	4313.3	2593.7	990.0	664.5	5411.7	**0.018***
Potassium (mg)	1895.3	820.1	562.0	3906.8	1729.4	767.6	727.7	4095.3	0.281
Calcium (mg)	596.8	258.7	177.6	1395.1	505.9	209.6	116.1	1208.3	**0.049***
Phosphorus (mg)	945.7	370.3	420.2	2519.5	386.0	276.3	344.4	1716.9	0.078
Magnesium (mg)	218.6	93.2	96.2	467.9	201.8	94.8	21.3	517.6	0.351

*p<0.05 was accepted as statistically significance
Independent T test and Mann Whitney U test were used

Table 4.8. shows energy and nutrient intake of NAD-4 and PCG-4 students. The mean energy intake of NAD-4 students was 1453.0±378.8 kcal and PCG-4 students was 1272.1±363.6 kcal. NAD-4 students were found to have higher energy intake than PCG-4 students (p=0.026, p<0.05).

The mean protein intake of NAD-4 students was 61.2±16.7 g and PCG-4 students was 49.4±23.9 g. NAD-4 students were found to have higher protein intake than PCG-4 students (p=0.007, p<0.05).

The mean fat intake of NAD-4 students was 67.0±20.2 g and PCG-4 students was 60.5±19.8 g. Fat intake did not show a significant difference between NAD-4 and PCG-4 students (p=0.134, p>0.05).

The mean carbohydrate intake of NAD-4 students was 149.0±53.2 g and PCG-4 students was 132.0±48.0 g. Carbohydrate intake did not show a significant difference between NAD-4 and PCG-4 students (p=0.125, p>0.05).

The mean fibre intake of NAD-4 students was 18.0±8.6 g and PCG-4 students was 12.7±6.7 g. NAD-4 students were found to have higher fibre intake than PCG-4 students (p=0.002, p<0.05).

The mean omega-3 intake of NAD-4 students was 1.3±0.8 g and PCG-4 students was 1.0±0.6 g. Omega-3 intake did not show a significant difference between NAD-4 and PCG-4 students (p=0.052, p>0.05).

The mean omega-6 intake of NAD-4 students was 11.8±5.8 g and PCG-4 students was 12.5±6.6 g. Omega-6 intake did not show a significant difference between NAD-4 and PCG-4 students (p=0.591, p>0.05).

The mean SFAs intake of NAD-4 students was 24.6±8.2 g and PCG-4 students was 20.9±8.6 g. NAD-4 students were found to have higher SFAs intake than PCG-4 students (p=0.041, p<0.05).

The mean MUFAs intake of NAD-4 students was 22.7±8.1 g and PCG-4 students was 19.8±8.4 g. MUFAs intake did not show a significant difference between NAD-4 and PCG-4 students (p=0.106, p>0.05).

The mean PUFAs intake of NAD-4 students was 13.6±6.2 g and PCG-4 students was 13.7±6.7 g. PUFAs intake did not show a significant difference between NAD-4 and PCG-4 students ($p=0.916$, $p>0.05$).

The mean cholesterol intake of NAD-4 students was 243.0±159.0 mg and PCG-4 students was 216.0±218.3 mg. Cholesterol intake did not show a significant difference between NAD-4 and PCG-4 students ($p=0.094$, $p>0.05$).

The mean vitamin A intake of NAD-4 students was 1020.8±892.3 mcg and PCG-4 students was 629.0±608.3 mcg. NAD-4 students were found to have higher Vitamin A intake than PCG-4 students ($p=0.005$, $p<0.05$).

The mean vitamin E intake of NAD-4 students was 14.7±7.3 mcg and PDR-4 students was 15.3±8.9 mcg. Vitamin E intake did not show a significant difference between NAD-4 and PCG-4 students ($p=0.758$, $p>0.05$).

The mean thiamine intake of NAD-4 students was 0.8±0.3 mg and PCG-4 students was 0.6±0.2 mg. NAD-4 students were found to have higher thiamine intake than PCG-4 students ($p=0.001$, $p<0.05$).

The mean riboflavin intake of NAD-4 students was 1.3±0.5 mg and PCG-4 students was 1.0±0.5 mg. NAD-4 students were found to have higher riboflavin intake than PCG-4 students ($p=0.001$, $p<0.05$).

The mean niacin intake of NAD-4 students was 22.5±7.9 mg and PCG-4 students was 17.9±10.5 mg. NAD-4 students were found to have higher niacin intake than PCG-4 students ($p=0.001$, $p<0.05$).

The mean vitamin B_6 intake of NAD-4 students was 1.1±0.4 mg and PCG-4 students was 0.8±0.4 mg. NAD-4 students were found to have higher vitamin B_6 intake than PCG-4 students ($p=0.002$, $p<0.05$).

The mean folate intake of NAD-4 students was 243.0±97.4 mcg and PCG-4 students was 188.1±91.3 mcg. NAD-4 students were found to have higher folate intake than PCG-4 students ($p=0.009$, $p<0.05$).

The mean vitamin B_{12} intake of NAD-4 students was 4.5±2.2 mcg and PCG-4 students was 3.8±3.3 mcg. NAD-4 students were found to have higher vitamin B_{12} intake than PCG-4 students ($p=0.014$, $p<0.05$).

The mean vitamin C intake of NAD-4 students was 76.7±43.0 mg and PCG-4 students was 57.2±47.3 mg. NAD-4 students were found to have higher vitamin C intake than PCG-4 students ($p=0.019$, $p<0.05$).

The mean biotin intake of NAD-4 students was 39.8±52.2 mcg and PCG-4 students was 28.5±18.5 mcg. NAD-4 students were found to have higher biotin intake than PCG-4 students ($p=0.002$, $p<0.05$).

The mean pantothenic acid intake of NAD-4 students was 4.1±1.3 mg and PCG-4 students was 3.2±1.6 mg. NAD-4 students were found to have higher pantothenic acid intake than PCG-4 students ($p=0.002$, $p<0.05$).

The mean iron intake of NAD-4 students was 9.3±3.8 mg and PCG-4 students was 6.7±2.9 mg. Iron intake did not show a significant difference between NAD-4 and PCG-4 students ($p=0.001$, $p>0.05$).

The mean iodine intake of NAD-4 students was 122.9±45.7 mcg and PCG-4 students was 100.9±34.8 mcg. NAD-4 students were found to have higher iodine intake than PCG-4 students ($p=0.017$, $p<0.05$).

The mean zinc intake of NAD-4 students was 8.9±2.9 mg and PCG-4 students was 7.1±3.5 mg. NAD-4 students were found to have higher zinc intake than PCG-4 students ($p=0.010$, $p<0.05$).

The mean copper intake of NAD-4 students was 1.2±0.5 mg and PCG-4 students was 0.9±0.6 mg. NAD-4 students were found to have higher copper intake than PCG-4 students ($p=0.001$, $p<0.05$).

The mean flourine intake of NAD-4 students was 426.9±193.8 mcg and PCG-4 students was 479.4±254.6 mcg. Flourine intake did not show a significant difference between NAD-4 and PCG-4 students ($p=0.267$, $p>0.05$).

The mean sodium intake of NAD-4 students was 2526.9±778.1 mg and PCG-4 students was 2198.1±818.1 mg. Sodium intake did not show a significant difference between NAD-4 and PCG-4 students (p=0.057, p>0.05).

The mean potassium intake of NAD-4 students was 2235.8±765.0 mg and PCG-4 students was 1598.6±692.5 mg. NAD-4 students were found to have higher potassium intake than PCG-4 students (p=0.000, p<0.05).

The mean calcium intake of NAD-4 students was 773.3.8±328.9 mg and PCG-4 students was 596.4±282.1 mg. NAD-4 students were found to have higher calcium intake than PCG-4 students (p=0.010, p<0.05).

The mean phosphorus intake of NAD-4 students was 1071.4±318.1 mg and PCG-4 students was 798.0±322.0 mg. NAD-4 students were found to have higher phosphorus intake than PCG-4 students (p=0.000, p<0.05).

The mean magnesium intake of NAD-4 students was 248.3±87.1 mg and PCG-4 students was 182.0±72.8 mg. NAD-4 students were found to have higher magnesium intake than PCG-4 students (p=0.000, p<0.05).

Table 4.8. Daily Energy and Nutrient Intake of NAD-4 and PCG-4 Students

	NAD-4(57)				PCG-4(35)				
	x̄	**S**	**Min**	**Max**	**x̄**	**S**	**Min**	**Max**	**p***
Energy (kcal)	1453.0	378.8	729.4	2250.2	1272.1	363.6	622.6	2123.1	**0.026***
Protein (g)	61.2	16.7	30.8	108.5	49.4	23.9	23.5	146.7	**0.007***
Fat (g)	67.0	20.2	30.7	116.1	60.5	19.8	24.5	107.8	0.134
Carbohydrate (g)	149.0	53.2	46.0	268.4	132.0	48.0	45.3	251.4	0.125
Fibre (g)	18.0	8.6	3.8	44.4	12.7	6.7	4.0	35.4	**0.002***
Omega-3 (g)	1.3	0.8	0.4	4.2	1.0	0.6	0.3	2.3	0.052
Omega-6 (g)	11.8	5.8	1.7	28.8	12.5	6.6	2.4	35.7	0.591
SFAs (g)	24.6	8.2	10.1	46.8	20.9	8.6	5.2	41.6	**0.041***
MUFAs (g)	22.7	8.1	10.1	46.8	19.8	8.4	8.2	46.6	0.106
PUFAs (g)	13.6	6.2	2.5	31.7	13.7	6.7	2.9	37.7	0.916
Cholesterol (mg)	243.0	159.0	16.9	676.4	216.0	218.3	12.3	1150.0	0.094
Vitamin A (mcg)	1020.8	892.3	166.0	3826.1	629.0	608.3	143.6	3828.9	**0.005***
Vitamin E (mcg)	14.7	7.3	1.4	33.8	15.3	8.9	1.8	47.1	0.758
Thiamine (mg)	0.8	0.3	0.3	1.5	0.6	0.2	0.3	1.3	**0.001***
Riboflavin (mg)	1.3	0.5	0.4	2.6	1.0	0.5	0.3	2.5	**0.001***
Niacin (mg)	22.5	7.9	9.9	53.0	17.9	10.5	9.3	63.8	**0.001***
Vitamin B_6 (mg)	1.1	0.4	0.4	2.0	0.8	0.4	0.3	1.8	**0.002***
Folate (mcg)	243.0	97.4	80.4	480.5	188.1	91.3	65.6	463.8	**0.009***
Vitamin B_{12} (mcg)	4.5	2.2	0.9	9.8	3.8	3.3	0.1	17.9	**0.014***
Vitamin C (mg)	76.7	43.0	4.0	162.7	57.2	47.3	2.9	157.6	**0.019***
Biotin (mcg)	39.8	52.2	8.9	78.5	28.5	18.5	8.6	85.3	**0.002***
Pantothenic acid (mg)	4.1	1.3	1.9	7.7	3.2	1.6	1.0	9.0	**0.002***
Iron (mg)	9.3	3.8	4.0	18.9	6.7	2.9	2.2	12.9	**0.001***
Iodine (mcg)	122.9	45.7	46.8	246.7	100.9	34.8	27.0	168.2	**0.017***
Zinc (mg)	8.9	2.9	4.6	15.2	7.1	3.5	2.3	20.4	**0.010***
Copper (mg)	1.2	0.5	0.3	2.7	0.9	0.6	0.3	1.8	**0.001***
Fluorine (mcg)	426.9	193.8	169.0	998.9	479.4	254.6	104.7	1129.5	0.267
Sodium (mg)	2526.9	778.1	806.0	4115.1	2198.1	818.1	846.1	4251.9	0.057
Potassium (mg)	2235.8	765.0	645.8	4234.8	1598.6	692.5	628.1	3508.2	**0.000***
Calcium (mg)	773.3	328.9	235.2	1840.5	596.4	282.1	193.4	1123.7	**0.010***
Phosphorus (mg)	1071.4	318.1	472.2	1913.5	798.0	322.0	305.3	1781.7	**0.000***
Magnesium (mg)	248.3	87.1	84.3	448.9	182.0	72.8	82.7	379.0	**0.000***

*p<0.05 was accepted as statistically significance
Independent T test and Mann Whitney U test were used

Table 4.9. shows energy and nutrient intake of NAD-1 and NAD-4 students. The mean energy intake of NAD-1 students was 1327.0±366.8 kcal and NAD-4 students was 1453.0±378.8 kcal. Energy intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.069, p>0.05).

The mean protein intake of NAD-1 students was 58.0±31.1 g and NAD-4 students was 61.2±16.7 g. Protein intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.491, p>0.05).

The mean fat intake of NAD-1 students was 58.8±18.0 g and NAD-4 students was 67.0±20.2 g. NAD-4 students were found to have higher fat intake than NAD-1 students (p=0.022, p<0.05).

The mean carbohydrate intake of NAD-1 students was 138.9±50.6 g and NAD-4 students was 149.0±53.2 g. Carbohydrate intake did not show a significant difference NAD-1 and NAD-4 students (p=0.292, p>0.05).

The mean fibre intake of NAD-1 students was 15.7±8.6 g and NAD-4 students was 18±8.6 g. Fibre intake did not show a significant difference NAD-1 and NAD-4 students (p=0.155, p>0.05).

The mean omega-3 intake of NAD-1 students was 1.4±1.5 g and NAD-4 students was 1.3±0.8 g. Omega-3 intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.237, p>0.05).

The mean omega-6 intake of NAD-1 students was 10.6±5.8 g and NAD-4 students was 11.8±5.8 g. Omega-6 intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.261, p>0.05).

The mean SFAs intake of NAD-1 students was 20.8±8.0 g and NAD-4 students was 24.6±8.2 g. NAD-4 students were found to have higher SFAs intake than NAD-1 students (p=0.012, p<0.05).

The mean MUFAs intake of NAD-1 students was 20.3±7.2 g and NAD-4 students was 22.7±8.1 g. MUFAs intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.087, p>0.05).

The mean PUFAs intake of NAD-1 students was 12.3±6.4 g and NAD-4 students was 13.6±6.2 g. PUFAs did not show a significant difference NAD-1 and NAD-4 students ($p=0.278$, $p>0.05$).

The mean cholesterol intake of NAD-1 students was 237.0±140.7 mg and NAD-4 students was 243.0±159.0 mg. Cholesterol intake did not show a significant difference between NAD-1 and NAD-4 students ($p=0.933$, $p>0.05$).

The mean vitamin A intake of NAD-1 students was 816.5±640.0 mcg and NAD-4 students was 1020.8±892.3 mcg. Vitamin A intake did not show a significant difference between NAD-1 and NAD-4 students ($p=0.154$, $p>0.05$).

The mean vitamin E intake of NAD-1 students was 13.1±7.8 mcg and NAD-4 students was 14.7±7.3 mcg. Vitamin E intake did not show a significant difference between NAD-1 and NAD-4 students ($p=0.233$, $p>0.05$).

The mean thiamine intake of NAD-1 students was 0.7±0.3 mg and NAD-4 students was 0.8±0.3 mg. Thiamine intake did not show a significant difference between NAD-1 and NAD-4 students ($p=0.097$, $p>0.05$).

The mean riboflavin intake of NAD-1 students was 1.1±0.4 mg and NAD-4 students was 1.3±0.5 mg. NAD-4 students were found to have higher riboflavin intake than NAD-1 students ($p=0.010$, $p<0.05$).

The mean niacin intake of NAD-1 students was 23.7±19.8 mg and NAD-4 students was 22.5±7.9 mg. Niacin intake did not show a significant difference between NAD-1 and NAD-4 students ($p=0.539$, $p>0.05$).

The mean vitamin B_6 intake of NAD-1 students was 1.1±0.7 mg and NAD-4 students was 1.1±0.4 mg. vitamin B_6 intake did not show a significant difference between NAD-1 and NAD-4 students ($p=0.720$, $p>0.05$).

The mean folate intake of NAD-1 students was 216.9±121.4 mcg and NAD-4 students was 243.0±97.4 mcg. Folate intake did not show a significant difference between NAD-1 and NAD-4 students ($p=0.204$, $p>0.05$).

The mean vitamin B_{12} intake of NAD-1 students was 3.9±2.4 mcg and NAD-4 students was 4.5±2.2 mcg. Vitamin B_{12} intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.057, p>0.05).

The mean vitamin C intake of NAD-1 students was 63.4±52.4 mg and NAD-4 students was 76.7±43.0 mg. NAD-4 students were found to have higher vitamin C intake than NAD-1 students (p=0.032, p<0.05).

The mean biotin intake of NAD-1 students was 33.9±17.2 mcg while and NAD-4 students was 39.8±52.2 mcg. Biotin intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.051, p>0.05).

The mean pantothenic acid intake of NAD-1 students was 3.7±1.6 mg and NAD-4 students was 4.1±1.3 mg. Pantothenic acid intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.085, p>0.05).

The mean iron intake of NAD-1 students was 7.9±4.1 mg and NAD-4 students is 9.3±3.8 mg. Iron intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.054, p>0.05).

The mean iodine intake of NAD-1 students was 109.0±38.2 mcg and NAD-4 students was 122.9±45.7 mcg. Iodine intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.075, p>0.05).

The mean zinc intake of NAD-1 students was 7.5±2.9 mg and NAD-4 students was 8.9±2.9 mg. NAD-4 students were found to have higher zinc intake than NAD-1 students (p=0.010, p<0.05).

The mean copper intake of NAD-1 students was 1.0±0.5 mg and NAD-4 students was 1.2±0.5 mg. Copper intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.055, p>0.05).

The mean flourine intake of NAD-1 students was 389.6±180.4 mcg and NAD-4 students was 426.9±193.8 mcg. Flourine intake did not show a significant difference between NAD-1 and NAD-4 students (p=0.281, p>0.05).

The mean sodium intake of NAD-1 students was 2190.6±698.0 mg and NAD-4 students was 2526.9±778.1 mg. NAD-4 students were found to have higher sodium intake than NAD-1 students ($p=0.015$, $p<0.05$).

The mean potassium intake of NAD-1 students was 18950.3±820.1 mg and NAD-4 students was 2235.8±765.0 mg. NAD-4 students were found to have higher potassium intake than NAD-1 students ($p=0.022$, $p<0.05$).

The mean calcium intake of NAD-1 students was 596.8±258.7 mg and NAD-4 students was 773.3±328.9 mg. NAD-4 students were found to have higher calcium intake than NAD-1 students ($p=0.002$, $p<0.05$).

The mean phosphorus intake of NAD-1 students was 945.7±370.3 mg and NAD-4 students was 1071.4±318.1 mg. Phosphorus intake did not show a significant difference between NAD-1 and NAD-4 students ($p=0.051$, $p>0.05$).

The mean magnesium intake of NAD-1 students was 218.6±93.2 mg and NAD-4 students was 248.3±87.1 mg. Magnesium intake did not show a significant difference between NAD-1 and NAD-4 students ($p=0.077$, $p>0.05$).

Table 4.9. Daily Energy and Nutrient Intake of NAD Students

	NAD-1(61)				NAD-4(57)				
	$\bar{x}$	S	Min	Max	$\bar{x}$	S	Min	Max	p*
Energy (kcal)	1327.0	366.8	604.8	2158.3	1453.0	378.8	729.4	2250.2	0.069
Protein (g)	58.0	31.1	26.5	263.6	61.2	16.7	30.8	108.5	0.491
Fat (g)	58.8	18.0	22.6	95.6	67.0	20.2	30.7	116.1	**0.022***
Carbohydrate (g)	138.9	50.6	33.4	275.0	149.0	53.2	46.0	268.4	0.292
Fibre (g)	15.7	8.6	5.1	41.2	18.0	8.6	3.8	44.4	0.155
Omega-3 (g)	1.4	1.5	0.3	9.3	1.3	0.8	0.4	4.2	0.237
Omega-6 (g)	10.6	5.8	1.6	29.6	11.8	5.8	1.7	28.8	0.261
SFAs (g)	20.8	8.0	5.9	41.6	24.6	8.2	10.1	46.8	**0.012***
MUFAs (g)	20.3	7.2	7.0	38.3	22.7	8.1	10.1	46.8	0.087
PUFAs (g)	12.3	6.4	2.8	33.4	13.6	6.2	2.5	31.7	0.278
Cholesterol (mg)	237.0	140.7	47.2	702.0	243.0	159.0	16.9	676.4	0.933
Vitamin A (mcg)	816.5	640.0	118.8	3113.8	1020.8	892.3	166.0	3826.1	0.154
Vitamin E (mcg)	13.1	7.8	0.6	32.7	14.7	7.3	1.4	33.8	0.233
Thiamine (mg)	0.7	0.3	0.3	1.5	0.8	0.3	0.3	1.5	0.097
Riboflavin (mg)	1.1	0.4	0.5	2.3	1.3	0.5	0.4	2.6	**0.010***
Niacin (mg)	23.7	19.8	8.7	165.9	22.5	7.9	9.9	53.0	0.539
Vitamin B_6 (mg)	1.1	0.7	0.4	5.9	1.1	0.4	0.4	2.0	0.720
Folate (mcg)	216.9	121.4	77.7	613.8	243.0	97.4	80.4	480.5	0.204
Vitamin B_{12} (mcg)	3.9	2.4	0.8	14.2	4.5	2.2	0.9	9.8	0.057
Vitamin C (mg)	63.4	52.4	0.0	245.7	76.7	43.0	4.0	162.7	**0.032***
Biotin (mcg)	33.9	17.2	9.6	84.6	39.8	52.2	8.9	78.5	0.051
Pantothenic acid (mg)	3.7	1.6	1.3	9.7	4.1	1.3	1.9	7.7	0.085
Iron (mg)	7.9	4.1	2.6	22.1	9.3	3.8	4.0	18.9	0.054
Iodine (mcg)	109.0	38.2	42.7	209.8	122.9	45.7	46.8	246.7	0.075
Zinc (mg)	7.5	2.9	2.4	13.9	8.9	2.9	4.6	15.2	**0.010***
Copper (mg)	1.0	0.5	0.3	2.2	1.2	0.5	0.3	2.7	0.055
Fluorine (mcg)	389.6	180.4	163.5	891.2	426.9	193.8	169.0	998.9	0.281
Sodium (mg)	2190.6	698.0	1047.5	4313.3	2526.9	778.1	806.0	4115.1	**0.015***
Potassium (mg)	1895.3	820.1	562.0	3906.8	2235.8	765.0	645.8	4234.8	**0.022***
Calcium (mg)	596.8	258.7	177.6	1395.1	773.3	328.9	235.2	1840.5	**0.002***
Phosphorus (mg)	945.7	370.3	420.2	2519.5	1071.4	318.1	472.2	1913.5	0.051
Magnesium (mg)	218.6	93.2	96.2	467.9	248.3	87.1	84.3	448.9	0.077

*p<0.05 was accepted as statistically significance
Independent T test and Mann Whitney U test were used

Table 4.10 shows the distribution of daily energy intake to macronutrients for NAD-1 and PCG-1 students. The percentage of daily energy intake from carbohydrates was found an average of 42.4±9.0 for NAD-1 students and 43.5±10.3 for PCG-1 students. The percentage of daily energy intake from protein was found as an average of 18.0±6.9 for NAD-1 students and 16.4±3.6 for PCG-1 students. The percentage of daily energy intake from fat was found as an average of 39.6±6.8 for NAD-1 students and 40.1±8.8 for PCG-1 students. The percentages of energy from carbohydrates, proteins, and fat did not show a significant difference between NAD-1 and PCG-1 students (p=0.538; p=0.161; p=0.743, p>0.05).

Table 4.10. Distribution of Daily Energy Intake to Macronutrients for NAD-1 and PCG-1 Students

	NAD-1(61)				**PCG-1(49)**				
	x̄	**S**	**Min**	**Max**	**x̄**	**S**	**Min**	**Max**	**p**
Carbohydrate (%)	42.4	9.0	10.0	63.0	43.5	10.3	20.0	70.0	0.538
Protein (%)	18.0	6.9	9.0	59.0	16.4	3.6	10.0	26.0	0.161
Fat (%)	39.6	6.8	25.0	54.0	40.1	8.8	18.0	59.0	0.743

*p<0.05 was accepted as statistically significance
Independent T test was used

Table 4.11 shows the distribution of daily energy intake to food groups of NAD-4 and PCG-4 students. The percentage of daily energy intake from carbohydrates was found as an average of 41.4±8.2 for NAD-4 students and 42.4±9.2 for PCG-4 students. The percentage of daily energy intake from protein was found as an average of 17.6±4.3 for NAD-4 students and 15.7±4.7 for PCG-4 students. Percentage of daily energy intake from the protein was found to be higher in NAD-4 students than PCG-4 students (p=0.045, p<0.05). The percentage of daily energy intake from fat was found as an average of 41.1±6.5 for NAD-4 students and 42.0±7.6 for PCG-4 students. The percentages of energy from carbohydrates and fat did not show a significant difference between NAD-4 and PCG-4 students (p=0.595; p=0.527, p>0.05).

Table 4.11. Distribution Daily Energy Intake to Macronutrients for NAD-4 and PCG-4 Students

	NAD-4(57)				PCG-4(35)				
	x̄	**S**	**Min**	**Max**	**x̄**	**S**	**Min**	**Max**	**p***
Carbohydrate (%)	41.4	8.2	21.0	56.0	42.4	9.2	11.0	60.0	0.595
Protein (%)	17.6	4.3	10.0	36.0	15.7	4.7	9.0	34.0	**0.045***
Fat (%)	41.1	6.5	30.0	58.0	42.0	7.6	26.0	55.0	0.527

*p<0.05 was accepted as statistically significance
Independent T test was used

Table 4.12 shows the distribution of daily energy intake to macronutrients for NAD-1 and NAD-4 students. The percentage of daily energy intake from carbohydrates was found as an average of 42.4±9.0 for NAD-1 students and 41.4±8.2 for NAD-4 students. The percentage of daily energy intake from protein was found as an everage of 18.0±6.9 for NAD-1 students and 17.6±4.3 for NAD-4 students. The percentage of daily energy intake from fat was found as an average of 39.6±6.8 for NAD-1 students and 41.1±6.5 for NAD-4 students. The percentages of energy from carbohydrates, proteins, and fat did not show a significant difference between NAD-1 and NAD-4 students (p=0.527; p=0.741; p=0.231, p>0.05).

Table 4.12. Distribution of Daily Energy Intake to Macronutrients for NAD Students

	NAD-1(61)				NAD-4(57)				
	x̄	**S**	**Min**	**Max**	**x̄**	**S**	**Min**	**Max**	**p**
Carbohydrate (%)	42.4	9.0	10.0	63.0	41.4	8.2	21.0	56.0	0.527
Protein (%)	18.0	6.9	9.0	59.0	17.6	4.3	10.0	36.0	0.741
Fat (%)	39.6	6.8	25.0	54.0	41.1	6.5	30.0	58.0	0.231

*p<0.05 was accepted as statistically significance
Independent T test was used

The percentage of meeting DRIs according to daily energy and nutrient intake for NAD-1 and PCG-1 students are given in the Table 4.14. The percentage of meeting energy requirement was 68.6% for NAD-1 students and 71.5% for PCG-1 students and there was no significant difference between them (p=0.495, p>0.05). The percentage of meeting protein requirement was 101.5% for NAD-1 students and 94.5% for PCG-1 students and there was no significant difference between them (p=0.498, p>0.05). The percentage of meeting fat requirement was 89.6% for NAD-1 students and 95.1% for PCG-1 students and there was no significant difference between them (p=0.409, p>0.05). The percentage of meeting carbohydrate requirement was 59.8% for NAD-1 students and 54.1% for PCG-1 students and there was no significant difference between them ($p=0.622$, $p>0.05$). The percentage of meeting fibre requirement was 62.9% for NAD-1 students and 56.3% for PCG-1 students and there was no significant difference between them ($p=0.241$, $p>0.05$).

The percentage of meeting vitamin A requirement was 117.3% for NAD-1 students and 85.2% for PCG-1 students and there was no significant difference between them ($p=0.109$, $p>0.05$). The percentage of meeting folate requirement was 54.2% for NAD-1 students and 52.5% for PCG-1 students and there was no significant difference between them ($p=0.749$, $p>0.05$). The percentage of meeting vitamin B_{12} requirement was 161.2% for NAD-1 students and 158.7% for PCG-1 students and there was no significant difference between them ($p=0.770$, $p>0.05$). The percentage of meeting vitamin C requirement was 71.1% for NAD-1 students and 65.4% for PCG-1 students and there was no significant difference between them ($p=0.983$, $p>0.05$).

The percentage of meeting iron requirement was 45.3% for NAD-1 students and 50.4% for PCG-1 students and there was no significant difference between them ($p=0.354$, $p>0.05$). The percentage of meeting iodine requirement was 72.7% for NAD-1 students and 72.0% for PCG-1 students and there was no significant difference between them ($p=0.899$, $p>0.05$). The percentage of meeting zinc requirement was 74.7% for NAD-1 students and 74.6% for PCG-1 students and there was no significant difference between them ($p=0.989$, $p>0.05$). The percentage of meeting calcium requirement was 59.7% for NAD-1 students and 158.7% for PCG-1 students and there was no significant difference between them ($p=0.075$, $p>0.05$).

Table 4.13. The Percentage of Meeting DRIs for NAD-1 and PCG-1 Students

	NAD-1(61)				PCG-1(49)				
	x̄	**S**	**Min**	**Max**	**x̄**	**S**	**Min**	**Max**	**p**
Energy (%)	68.6	19.0	31.3	111.6	71.5	25.5	31.7	146.5	0.495
Protein (%)	101.5	54.4	46.4	461.5	95.4	35.5	35.3	209.2	0.498
Fat (%)	89.6	27.4	34.4	145.7	95.1	39.2	36.4	209.7	0.409
Carbohydrate (%)	59.8	78.0	12.1	642.0	54.1	22.7	10.9	111.2	0.622
Fibre (%)	62.9	34.5	20.4	164.8	56.3	24.5	20.1	130.1	0.241
Vitamin A (%)*	117.3	91.6	19.8	444.8	85.2	56.1	19.1	357.0	0.109
Folate (%)	54.2	30.4	19.4	153.4	52.5	24.9	18.6	129.4	0.749
Vitamin B_{12} (%)*	161.2	100.2	35.0	592.1	158.7	104.8	13.7	478.2	0.770
Vitamin C (%)*	71.1	58.0	0.0	273.0	65.4	42.8	2.5	156.7	0.983
Iron (%)	45.3	27.5	14.4	173.1	50.4	30.0	16.7	149.9	0.354
Iodine (%)	72.7	25.4	28.5	139.9	72.0	26.8	23.5	155.4	0.899
Zinc (%)	74.7	28.6	24.4	138.7	74.6	30.6	23.7	157.2	0.989
Calcium (%)	59.7	25.9	17.8	139.5	51.4	21.3	11.6	120.8	0.075

*p<0.05 was accepted as statistically significance
Independent T test and Mann Whitney U test were used

Table 4.14 show percentage of meeting DRIs according to daily energy and nutrient for NAD-4 and PCG-4 students. The percentage of meeting energy requirement of NAD-4 students (75.1%) was found higher than PCG-4 students (65.8%) and this showed a meaningful difference (p=0.026, p<0.05). The percentage of meeting protein requirement of NAD-4 students (107.1%) was found to be higher than PCG-4 students (86.5%) and this showed a meaningful difference (p=0.007, p<0.05). The percentage of meeting fat requirement wass 102.1% for NAD-4 students and 92.2% for PCG-4 students and there was no significant difference between them (p=0.134, p>0.05). The percentage of meeting carbohydrate requirement was 54.0% for NAD-4 students and 47.8% for PCG-4 students and there was no significant difference between them (p=0.163, p>0.05). The percentage of meeting fibre requirement of NAD-4 students (71.7%) was found higher than PCG-4 students (51.0%) and this showed a meaningful difference (p=0.002, p<0.05).

The percentage of meeting vitamin A requirement of NAD-4 students (145.0%) was found higher than PCG-4 students (87.1%) and this showed a meaningful difference (p=0.003, p<0.05). The percentage of meeting folate requirement of NAD-4 students (60.7%) was found higher than PCG-4 students (47.0%) and this showed a meaningful difference (p=0.009, p<0.05). The percentage of meeting vitamin B_{12}

requirement was 185.9% for NAD-4 students and 156.8% for PCG-4 students and this showed a meaningful difference (p=0.026, p<0.05). The percentage of meeting vitamin C requirement of NAD-4 students (85.3%) was found higher than PCG-4 students (63.5%) and this showed a meaningful difference (p=0.019, p<0.05).

The percentage of meeting iron requirement of NAD-4 students (53.9%) was found higher than PCG-4 students (41.2%) and this showed a meaningful difference (p=0.011, p<0.05). The percentage of meeting iodine requirement of NAD-4 students (81.9%) was found higher than PCG-4 students (67.3%) and this showed a meaningful difference (p=0.017, p<0.05). The percentage of meeting zinc requirement of NAD-4 students (88.2%) was found higher than PCG-4 students (69.6%) and this showed a meaningful difference (p=0.005, p<0.05). The percentage of meeting calcium requirement of NAD-4 students (78.1%) was found higher than PCG-4 students (59.6%) and this showed a meaningful difference (p=0.006, p<0.05).

Table 4.14. The Percentage of Meeting DRIs for NAD-4 and PCG-4 Students

	NAD-4(57)				**PCG-4(35)**				
	x̄	**S**	**Min**	**Max**	**x̄**	**S**	**Min**	**Max**	**p***
Energy (%)	75.1	19.6	37.7	116.3	65.8	18.8	32.2	109.8	**0.026***
Protein (%)	107.1	29.2	54.0	190.0	86.5	41.8	41.2	256.9	**0.007***
Fat (%)	102.1	30.8	46.8	176.9	92.2	30.3	37.4	164.2	0.134
Carbohydrate (%)	54.0	19.3	16.7	97.2	47.8	17.4	16.4	91.0	0.163
Fibre (%)	71.7	34.8	15.1	177.6	50.1	26.9	15.8	141.7	**0.002***
Vitamin A (%)	145.0	128.0	23.7	546.6	87.1	86.5	20.5	547.0	**0.003***
Folate (%)	60.7	24.4	20.1	120.1	47.0	22.8	16.4	115.9	**0.009***
Vitamin B_{12} (%)	185.9	94.7	25.8	409.1	156.8	137.1	4.3	745.8	**0.026***
Vitamin C (%)	85.3	47.7	4.4	180.8	63.5	52.5	3.2	175.1	**0.019***
Iron (%)	53.9	22.4	22.4	104.8	41.2	23.2	12.3	124.0	**0.011***
Iodine (%)	81.9	30.4	31.2	164.4	67.3	23.2	18.0	112.1	**0.017***
Zinc (%)	88.2	28.7	45.5	152.0	69.6	32.4	22.8	185.7	**0.005***
Calcium (%)	78.1	32.4	23.5	184.1	59.6	27.8	19.3	112.4	**0.006***

*p<0.05 was accepted as statistically significance
Independent T test and Mann Whitney U test were used

Table 4.15 shows percentage of meeting DRIs according to daily energy and nutrient for NAD-1 and NAD-4. The percentage of meeting energy requirement was 68.6% for NAD-1 students and 75.1% for NAD-4 students and there was no significant difference between them (p=0.069, p>0.05). The percentage of meeting protein requirement was 101.5% for NAD-1 students and 107.1% for NAD-4 students and there was no significant difference between them ($p=0.492$, $p>0.05$). The percentage of meeting fat requirement of NAD-4 students (102.1%) was found to be higher than NAD-1 students (89.6%) and this showed a meaningful difference ($p=0.022$, $p<0.05$). The percentage of meeting carbohydrate requirement was 59.8% for NAD-1 students and 54.0% for NAD-4 students and there was no significant difference between them ($p=0.534$, $p>0.05$). The percentage of meeting fibre requirement was 62.9% for NAD-1 students and 71.7% for NAD-4 students and there was no significant difference between them ($p=0.171$, $p>0.05$).

The percentage of meeting vitamin A requirement was 117.3% for NAD-1 students and 128.0% for NAD-4 students and there was no significant difference between them ($p=0.214$, $p>0.05$). The percentage of meeting folate requirement was 54.2% for NAD-1 students and 60.7% for NAD-4 students and there was no significant difference between them ($p=0.203$, $p>0.05$). The percentage of meeting vitamin B_{12} requirement was 161.2% for NAD-1 students and 185.9% for NAD-4 students and there wass no significant difference between them ($p>0.05$). The percentage of meeting vitamin C requirement of NAD-4 students (85.3%) was found higher than NAD-1 students (71.1%) and this showed a meaningful difference ($p=0.038$, $p<0.05$).

The percentage of meeting iron requirement was 45.3% for NAD-1 students and 53.9% for NAD-4 students and there was no significant difference between them ($p=0.066$, $p>0.05$). The percentage of meeting iodine requirement was 72.7% for NAD-1 students and 81.9% for NAD-4 students and there was no significant difference between them ($p=0.075$, $p>0.05$). The percentage of meeting zinc requirement of NAD-4 students (88.2%) was found higher than NAD-1 students (74.7%) and this showed a meaningful difference ($p=0.012$, $p<0.05$). The percentage of meeting calcium requirement of NAD-4 students (78.1%) was found higher than NAD-1 students (59.7%) and this showed a meaningful difference ($p=0.001$, $p<0.05$).

Table 4.15. The Percentages of Meeting DRIsfor NAD-1 and NAD-4 Students

	NAD-1(61)				**NAD-4(57)**				
	x̄	**S**	**Min**	**Max**	**x̄**	**S**	**Min**	**Max**	**p***
Energy (%)	68.6	19.0	31.3	111.6	75.1	19.6	37.7	116.3	0.069
Protein (%)	101.5	54.4	46.4	461.5	107.1	29.2	54.0	190.0	0.492
Fat (%)	89.6	27.4	34.4	145.7	102.1	30.8	46.8	176.9	**0.022***
Carbohydrate (%)	59.8	78.0	12.1	642.0	54.0	19.3	16.7	97.2	0.534
Fibre (%)	62.9	34.5	20.4	164.8	71.7	34.8	15.1	177.6	0.171
Vitamin A (%)	117.3	91.6	19.8	444.8	145.0	128.0	23.7	546.6	0.214
Folate (%)	54.2	30.4	19.4	153.4	60.7	24.4	20.1	120.1	0.203
Vitamin B_{12} (%)	161.2	100.2	35.0	592.1	185.9	94.7	25.8	409.1	0.098
Vitamin C (%)	71.1	58.0	0.0	273.0	85.3	47.7	4.4	180.8	**0.038***
Iron (%)	45.3	27.5	14.4	173.1	53.9	22.4	22.4	104.8	0.066
Iodine (%)	72.7	25.4	28.5	139.9	81.9	30.4	31.2	164.4	0.075
Zinc (%)	74.7	28.6	24.4	138.7	88.2	28.7	45.5	152.0	**0.012***
Calcium (%)	59.7	25.9	17.8	139.5	78.1	32.4	23.5	184.1	**0.001***

p<0.05 was accepted as statistically significance
Independent T test and Mann Whitney U test were used

4.6. HEI-2010 Findings of Students

The categorization of students according to good, needs to be imroved and poor diet quality are shown in Table 4.16. 6.6% of NAD-1 students had good, 50.8% had needs to be improved and 42.6% had poor diet quality. 2.0% of PCG-1 students had good, 22.5% had needs to be improved and 75.5% had poor diet quality. 56.1% of NAD-4 students had needs to be improved and 43.9% had poor diet quality. 41.5% of PCG-4 students had needs to be improved and 56.0% had poor diet quality.

Table 4.16. Categorization of Students According to Diet Quality

	Good		**Needs to be Improved**		**Poor**	
	n	**%**	**n**	**%**	**n**	**%**
NAD-1 (n: 61)	4	6.6	31	50.8	26	42.6
PCG-1 (n: 49)	1	2.0	11	22.5	37	75.5
NAD-4 (n: 57)	0	0.0	32	56.1	25	43.9
PCG-4 (n: 35)	0	0.0	10	28.6	25	71.4
TOTAL (n: 202)	5	2.5	84	41.5	113	56.0

Table 4.17 gives the HEI-2010 scores of NAD-1 and PCG-1 students. HEI-2010 score an average of NAD-1 students (52.4±16.8) were found higher than PCG-1 students (43.5±12.4) (p=0.002, p<0.05).

Total fruit component was calculated as an average of 1.4±1.8 for NAD-1 students and 0.9±1.5 for PCG-1 students over 5 points and did not showed any significant difference (p=0.321, p>0.05). Whole fruit component was calculated as 1.9±2.2 for NAD-1 students and 1.1±2.0 for PCG-1 students over 5 points, and did not showed any significant difference (p=0.058, p>0.05).

Total vegetables component was calculated as an average of 2.8±4.5 for NAD-1 students and 2.3±1.5 for PCG-1 students over 5 points and did not showed any significant difference (p=0.709, p>0.05).

Greens and beans component was calculated as an average of 0.9±1.6 for NAD-1 students and 0.7±1.5 for PCG-1 students over 5 points and did not showed any significant difference (p=0.304, p>0.05).

Whole grains component was calculated as an average of 3.4±4.3 for NAD-1 students and 0.4±1.8 for PCG-1 students over 10 points, and was found to be significantly higher in NAD-1 students (p=0.000, p<0.05).

Dairy component was calculated as an average of 5.0±3.1 for NAD-1 students and 3.3±2.9 for PCG-1 students over 10 points, and was found to be significantly higher in NAD-1 students (p=0.001, p<0.05).

Total protein foods component was calculated as an average of 4.5±1.1 for NAD-1 students and 4.4±1.1 for PCG-1 students over 5 points and did not show any significant difference (p=0.695, p>0.05). Seafood and plant proteins component was calculated as an average of 2.8±2.2 for NAD-1 students and 2.6±2.4 for PCG-1 students over 5 points and did not showed any significant difference (p=0.934, p>0.05).

Fatty acids component was calculated as an average of 3.8±3.7 for NAD-1 students and 4.3±3.5 for PCG-1 students over 10 points and did not showed any significant difference (p=0.303, p>0.05).

Refined grains component was calculated as an average of 4.4±4.0 for NAD-1 students and 3.0±3.7 for PCG-1 students over 10 points and did not showed any significant difference (p=0.062, p>0.05).

Sodium component was calculated as an average of 4.4±3.4 for NAD-1 students and 3.0±3.5 for PCG-1 students over 10 points, and was found to be significantly higher in NAD-1 students (p=0.021, p<0.05).

Empty calories component was calculated as an average of 17.8±4.5 for NAD-1 students and 17.5±4.8 for PCG-1 students over 20 points and did not showed any significant difference (p=0.763, p>0.05).

Table 4.17. Comparison of HEI-2010 Scores of NAD-1 and PCG-1 Students

	NAD-1(61)		**PCG-1(49)**		
	x̄	**S**	**x̄**	**S**	**p***
Total HEI-2010 Score (100	52.4	16.8	43.5	12.4	**0.002***
Total Fruit (5)	1.4	1.8	0.9	1.5	0.321
Whole Fruit (5)	1.9	2.2	1.1	2.0	0.058
Total Vegetables (5)	2.8	4.5	2.3	1.5	0.709
Greens and Beans (5)	0.9	1.6	0.7	1.5	0.304
Whole Grains (10)	3.4	4.3	0.4	1.8	**0.000***
Dairy (10)	5.0	3.1	3.3	2.9	**0.001***
Total Protein Foods (5)	4.5	1.1	4.4	1.1	0.695
Seafood and Plant Proteins (5)	2.8	2.2	2.6	2.4	0.934
Fatty Acids (10)	3.8	3.7	4.3	3.5	0.303
Refined Grains (10)	4.4	4.0	3.0	3.7	0.062
Sodium (10)	4.4	3.4	3.0	3.5	**0.021***
Empty Calories (20)	17.8	4.5	17.5	4.8	0.763

*p<0.05 was accepted as statistically significance
Independent T test and Mann Whitney U test were used

Table 4.18 gives the HEI-2010 scores of NAD-4 and PCG-4 students. HEI-2010 score of NAD-4 students (51.5±14.5) were found higher than PCG-4 students (44.3±11.6) (p=0.014, p<0.05).

Total fruit component was calculated as an average of 1.4±1.7 for NAD-4 students and 0.9±1.7 for PCG-4 students over 5 points and was found to be significantly higher in NAD-4 students (p=0.049, p<0.05). Whole fruit component was calculated as an average of 2.1±2.2 for NAD-4 students and 1.3±2.1 for PCG-4 students over 5 points and was found to be significantly higher in NAD-4 students (p=0.049, p<0.05).

Total vegetables component was calculated as an average of 2.6±1.4 for NAD-4 students and 2.3±1.6 for PCG-4 students over 5 points and did not showed any significant difference (p=0.250, p>0.05).

Greens and beans component was calculated as an average of 0.7±1.4 for NAD-4 students and 0.2±0.8 for PCG-4 students over 5 points and and was found to be significantly higher in NAD-4 students (p=0.045, p<0.05).

Whole grains component was calculated as an average of 2.4±3.5 for NAD-4 students and 0.8±2.4 for PCG-4 students over 10 points, and was found to be significantly higher in NAD-4 students (p=0.018, p<0.05).

Dairy component was calculated as an average of 6.1±3.3 for NAD-4 students and 5.0±3.4 for PCG-4 students over 10 points, and was found to be significantly higher in NAD-4 students (p=0.005, p<0.05).

Total protein foods component was calculated as an average of 4.5±1.1 for NAD-4 students and 3.9±1.4 for PCG-1 students over 5 points and and was found to be significantly higher in NAD-4 students (p=0.041, p<0.05). Seafood and plant proteins component was calculated as an average of 2.8±2.2 for NAD-4 students and 2.5±2.5 for PCG-4 students over 5 points and did not showed any significant difference (p=0.428, p>0.05).

Fatty acids component was calculated as an average of 3.0±3.0 for NAD-4 students and 4.0±3.7 for PCG-4 students over 10 points and did not showed any significant difference (p=0.195, p>0.05).

Refined grains component was calculated as an average of 4.6±4.1 for NAD-4 students and 3.8±3.8 for PCG-4 students over 10 points and did not showed any significant difference (p=0.343, p>0.05).

Sodium component was calculated as an average of 3.4±3.3 for NAD-4 students and 3.8±3.8 for PCG-4 students over 10 points, and was found to be significantly higher in NAD-1 students (p=0.867, p<0.05).

Empty calories component was calculated as an average of 17.9±5.0 for NAD-4 students and 16.8±5.4 for PCG-4 students over 20 points and did not showed any significant difference (p=0.283, p>0.05).

Table 4.18. Comparison of HEI-2010 Scores of NAD-4 and PCG-4 Students

	NAD-4(57)		PCG-4(35)		
	x̄	**S**	**x̄**	**S**	**p***
Total HEI-2010 Score (100)	51.5	14.5	44.3	11.6	**0.014***
Total Fruit (5)	1.4	1.8	0.9	1.5	**0.049***
Whole Fruit (5)	1.9	2.2	1.1	2.0	**0.049***
Total Vegetables (5)	2.8	4.5	2.3	1.5	0.250
Greens and Beans (5)	0.9	1.6	0.7	1.5	**0.045***
Whole Grains (10)	3.4	4.3	0.4	1.8	**0.018***
Dairy (10)	5.0	3.1	3.3	2.9	**0.005***
Total Protein Foods (5)	4.5	1.1	3.9	1.4	**0.041***
Seafood and Plant Proteins (5)	2.8	2.2	2.5	2.5	0.428
Fatty Acids (10)	3.0	3.0	4.0	3.7	0.195
Refined Grains (10)	4.6	4.1	3.8	3.8	0.343
Sodium (10)	3.4	3.3	3.8	3.8	0.867
Empty Calories (20)	17.9	5.0	16.8	5.4	0.283

*p<0.05 was accepted as statistically significance
Independent T test and Mann Whitney U test were used

Table 4.19 gives the HEI-2010 scores of NAD-1 and PCG-1 students. HEI-2010 score was calculated as an average of 52.4±16.8 for NAD-1 students and 51.5±14.5 for NAD-4 students over 100 points and did not showed any significant difference (p=0.752, p>0.05).

Total fruit component was calculated as an average of 1.4±1.8 for NAD-1 students and 1.4±1.7 for NAD-4 students over 5 points and did not showed any significant difference (p=0.657, p>0.05). Whole fruit component was calculated as 1.9±2.2 for NAD-1 students and 2.1±2.2 for NAD-4 students over 5 points and did not showed any significant difference (p=0.706, p>0.05).

Total vegetables component was calculated as an average of 2.8±4.5 for NAD-1 students and 2.6±1.4 for NAD-4 students over 5 points and did not showed any significant difference (p=0.399, p>0.05).

Greens and beans component was calculated as an average of 0.9±1.6 for NAD-1 students and 0.7±1.4 for NAD-4 students over 5 points and did not showed any significant difference (p=0.629, p>0.05).

Whole grains component was calculated as an average of 3.4±4.3 for NAD-1 students and 2.4±3.5 for NAD-4 students over 10 points, and did not showed any significant difference ($p=0.219$, $p>0.05$).

Dairy component was calculated as an average of 5.0±3.1 for NAD-1 students and 6.1±3.3 for NAD-4 students over 10 points, and was found to be significantly higher in NAD-4 students ($p=0.036$, $p<0.05$).

Total protein foods component was calculated as an average of 4.5±1.1 for NAD-1 students and 4.5±1.1 for NAD-4 students over 5 points and did not showed any significant difference ($p=0.872$, $p>0.05$). Seafood and plant proteins component was calculated as an average of 2.8±2.2 for NAD-1 students and 2.8±2.2 for NAD-4 students over 5 points and did not showed any significant difference ($p=0.953$, $p>0.05$).

Fatty acids component was calculated as an average of 3.8±3.7 for NAD-1 students and 3.0±3.0 for NAD-4 students over 10 points and did not showed any significant difference ($p=0.412$, $p>0.05$).

Refined grains component was calculated as an average of 4.4±4.0 for NAD-1 students and 4.6±4.1 for NAD-4 students over 10 points and did not showed any significant difference ($p=0.677$, $p>0.05$).

Sodium component was calculated as an average of 4.4±3.4 for NAD-1 students and 3.4±3.3 for NAD-4 students over 10 points and did not showed any significant difference ($p=0.075$, $p>0.05$).

Empty calories component was calculated as an average of 17.8±4.5 for NAD-1 students and 17.9±5.0 for NAD-4 students over 20 points and did not showed any significant difference ($p=0.863$, $p>0.05$).

Table 4.19. Comparison of HEI-2010 Scores of NAD-1 and NAD-4 Students

	NAD-1(61)		**NAD-4(57)**		
	x̄	**S**	**x̄**	**S**	**p***
Total HEI-2010 Score (100)	52.4	16.8	51.5	14.5	0.752
Total Fruit (5)	1.4	1.8	1.4	1.7	0.657
Whole Fruit (5)	1.9	2.2	2.1	2.2	0.706
Total Vegetables (5)	2.8	4.5	2.6	1.4	0.399
Greens and Beans (5)	0.9	1.6	0.7	1.4	0.629
Whole Grains (10)	3.4	4.3	2.4	3.5	0.219
Dairy (10)	5.0	3.1	6.1	3.3	**0.036***
Total Protein Foods (5)	4.5	1.1	4.5	1.1	0.872
Seafood and Plant Proteins (5)	2.8	2.2	2.8	2.2	0.953
Fatty Acids (10)	3.8	3.7	3.0	3.0	0.412
Refined Grains (10)	4.4	4.0	4.6	4.1	0.677
Sodium (10)	4.4	3.4	3.4	3.3	0.075
Empty Calories (20)	17.8	4.5	17.9	5.0	0.863

*p<0.05 was accepted as statistically significance
Independent T test and Mann Whitney U test were used

Table 4.20 shows HEI-2010 categories that are given according to the BMI classification of the individuals who involved in the study. 41.9% of underweight individuals had needs to be improved, 58.1% had poor diet quality; 3.3% of normal weight individuals had good diet, 38.8% had needs to be improved, 57.9% had poor diet quality; 70.0% of overweight indivudials had needs to be improved, 30.0% had poor diet quality; 25.0% of obese indivuduals had needs to be improved, 75.0% had poor diet quality.

Table 4.20. HEI-2010 Categories According to Students BMI

	Good (n:5)		**Needs to be Improved (n:80)**		**Poor (n:112)**		**p**
BMI Classification	**n**	**%**	**n**	**%**	**n**	**%**	**0.479**
Underweight	0	0.0	13	41.9	18	58.1	
Normal weight	5	3.3	59	38.8	88	57.9	
Overweight	0	0.0	7	70.0	3	30.0	
Obese	0	0.0	1	25.0	3	75.0	

*p<0.05 was accepted as statistically significance
Chi-Square test was used

Table 4.21 gives HEI-2010 categories according to the students's residence status. 4.2% of alone living at home had good, 45.8% had needs be improved, 50% had poor; 2.5% of living with family had good, 39.2% had needs to be improved, 58.2% had poor; 39.4 of living with friends had needs to be improved, 60.6% had poor; 2.4% of living at dormitary had good, 41.5% had needs to be improved, 56.1% had poor diet quality.

Table 4.21. HEI-2010 Categories According to Students Residence Status

	Good (n:5)		Needs to be Improved (n:83)		Poor (n:113)		p
	n	**%**	**n**	**%**	**n**	**%**	**0.899**
Alone, at home	2	4.2	22	45.8	24	50.0	
With family, at home	2	2.5	31	39.2	46	58.2	
With friends, at home	0	0.0	13	39.4	20	60.6	
At dormitory	1	2.4	17	41.5	23	56.1	

*p<0.05 was accepted as statistically significance
Chi-Square test was used

Table 4.22 shows HEI-2010 categories according to energy and nutrient intake of individuals. Energy intake was found individuals with good diet quality an average of 1402.0±201.3 kcal, individuals with needs to be improved diet quality an average of 1401.2±390.8 kcal and individuals with poor diet quality an average of 1339.4±423.8 kcal. Energy intake did not showed a significant difference between these groups (p=0.564, p>0.05).

Protein intake was found an average of 65.7±10.1 g for individuals with good diet quality, an average of 61.3±29.1 g for individuals with needs to be improved diet quality and an average of 52.7±19.0 g for individuals with poor diet quality. Protein intake in those who have needs to be improved diet quality was more than the poor diet quality (p=0.031, p<0.05).

Fat intake was found an average of 72.4±20.5 g for individuals with good diet quality, an average of 63.5±21.1 g for individuals with needs to be improved diet quality and an average of 60.9±21.1 g for individuals with poor diet quality. Fat intake did not show a significant difference between these groups (p=0.394, p>0.05).

Carbohydrate intake was found an average of 117.9±27.9 g for individuals with good diet quality, an average of 143.2±54.4 g for individuals with needs to be improved diet quality and an average of 144.1±54.8 g for individuals with poor diet quality. Carbohydrate intake did not showed a significant difference between these groups (p=0.574, p>0.05).

Fibre intake was found an average of 22.9±5.7 g for individuals with good diet quality, an average of 19.7±8.7 g for individuals with needs to be improved diet quality and an average of 12.0±5.3 g for individuals with poor diet quality. Fibre intake in those who have needs to be improved and good diet quality were more than the poor diet quality ($p=0.000$, $p<0.05$).

SFAs intake was found an average of 17.9±1.3 g for individuals with good diet quality, an average of 21.1±8.6 g for individuals with needs to be improved diet quality and an average of 22.9±9.3 g for individuals with poor diet quality. SFAs intake did not showed a significant difference between these groups ($p=0.218$, $p>0.05$).

MUFAs intake was found an average of 32.4±17.1 g for individuals with good diet quality, an average of 22.0±8.7 g for individuals with needs to be improved diet quality and an average of 19.8±7.2 g for individuals with poor diet quality. MUFAs intake in those who good diet quality was more than the needs to be improved and poor diet quality ($p=0.001$, $p<0.05$).

PUFAs intake was found an average of 16.2±6.6 g for individuals with good diet quality, an average of 14.4±6.3 g for individuals with needs to be improved diet quality and an average of 12.5±6.6 g for individuals with poor diet quality. PUFAs intake did not showed a significant difference between these groups ($p=0.083$, $p>0.05$).

The average percentage of energy coming from respectively protein, fat and carbohydrates was found for good, needs to be imporoved and bad diet quality groups respectively; 19.4±2.8, 46.0±8.7, 35.0±7.3; 18.0±6.2, 40.4±7.3, 41.5±9.8 and 16.3±4.3, 40.4±7.4, 43.3±8.5.

Table 4.22. HEI-2010 Categories According to Students Energy and Nutrient Intake

	Good (n:5)		**Needs to be Improved (n:84)**		**Poor (n:113)**		
	x̄	**S**	**x̄**	**S**	**x̄**	**S**	**p***
Energy (kcal)	1402.0	201.3	1401.2	390.8	1339.4	423.8	0.564
Protein (g)	65.7	10.1	61.3	29.1	52.7	19.0	**0.031***
Fat (g)	72.4	20.5	63.5	21.1	60.9	21.1	0.394
Carbohydrate (g)	117.9	27.9	143.2	54.4	144.1	54.8	0.574
Fibre (g)	22.9	5.7	19.7	8.7	12.0	5.3	**0.000***
SFAs (g)	17.9	1.3	21.1	8.6	22.9	9.3	0.218
MUFAs (g)	32.4	17.1	22.0	8.7	19.8	7.2	**0.001***
PUFAs (g)	16.2	6.6	14.4	6.3	12.5	6.6	0.083
Distribution of Daily Energy to nutrients							
Protein (%)	19.4	2.8	18.0	6.2	16.3	4.3	**0.039***
Fat (%)	46.0	8.7	40.4	7.3	40.4	7.4	0.246
Carbohydrate (%)	35.0	7.3	41.5	9.8	43.3	8.5	0.074

*p<0.05 was accepted as statistically significance
One Way ANOVA test was used and Tukey Post-Hoc test was used to compare the two groups

Table 4.23 shows HEI-2010 categories according to vitamin and mineral intakes of individuals. Vitamin A intake was found an average of 1665.3±1148.5 g for individuals with good diet quality, an average of 1015.9±901.4 g for individuals with needs to be improved diet quality and an average of 584.7±286.7 g for individuals with poor diet quality. Vitamin A intake in those who good and needs to be improved diet qualities were more than poor diet quality (p=0.001, p<0.05).

Vitamin E intake was found an average of 1665.3±1.9 g for individuals with good diet quality, an average of 143.2±54.4 g for individuals with needs to be improved diet quality and an average of 144.1±54.8 g for individuals with poor diet quality. Vitamin E intake in those who good and needs to be improved diet qualities were more than poor diet quality (p=0.000, p<0.05).

Folate intake was found an average of 310.0±93.0 g for individuals with good diet quality, an average of 262.3±116.6 g for individuals with needs to be improved diet quality and an average of 180.3±80.0 g for individuals with poor diet quality. Folate intake in those who good and needs to be improved diet qualities were more than poor diet quality (p=0.000, p<0.05).

Vitamin B_{12} intake was found an average of 5.0±2.7 g for individuals with good diet quality, an average of 4.3±2.9 g for individuals with needs to be improved diet quality and an average of 3.8±2.3 g for individuals with poor diet quality. Vitamin B_{12} intake did not showed a significant difference between these groups ($p=0.287$, $p>0.05$).

Vitamin C intake was found an average of 156.0±98.5 g for individuals with good diet quality, an average of 77.3±41.3 g for individuals with needs to be improved diet quality and an average of 51.1±39.1 g for individuals with poor diet quality. Vitamin C intake in those who good and needs to be improved diet qualities were more than poor diet quality ($p=0.000$, $p<0.05$).

Iron intake was found an average of 10.2±3.1 g for individuals with good diet quality, an average of 9.5±3.6 g for individuals with needs to be improved diet quality and an average of 7.2±3.9 g for individuals with poor diet quality. Iron intake in those who needs to be improved diet qualities were more than poor diet quality ($p=0.000$, $p<0.05$).

Iodine intake was found an average of 105.9±37.4 g for individuals with good diet quality, an average of 117.9±41.6 g for individuals with needs to be improved diet quality and an average of 106.6±40.1 g for individuals with poor diet quality. Iodine intake did not showed a significant difference between these groups ($p=0.155$, $p>0.05$).

Zinc intake was found an average of 9.2±2.4 g for individuals with good diet quality, an average of 8.5±3.3 g for individuals with needs to be improved diet quality and an average of 7.3±2.9 g for individuals with poor diet quality. Zinc intake in those who needs to be improved diet qualities were more than poor diet quality ($p=0.014$, $p<0.05$).

Sodium intake was found an average of 1543.1±555.3 g for individuals with good diet quality, an average of 2286.2±755.0 g for individuals with needs to be improved diet quality and an average of 2495.0.3±873.6 g for individuals with poor diet quality. Sodium intake in those who good diet qualities were more than poor diet quality ($p=0.016$, $p<0.05$).

Potassium intake was found an average of 3104.7±622.8 g for individuals with good diet quality, an average of 2274.9±767.1 g for individuals with needs to be improved diet quality and an average of 1567.5±646.3 g for individuals with poor diet quality. Potassium intake was found to be higher in good diet quality than in the other groups and potassium intake was found to be higher in the needs to be improved than in the poor ones (p=0.000, p<0.05).

Calcium intake was found an average of 715.6±139.5 g for individuals with good diet quality, an average of 724.2±327.5 g for individuals with needs to be improved diet quality and an average of 546.3±238.4 g for individuals with poor diet quality. Calcium intake was found higher than in those who needs to be improved diet qualities were more than poor diet quality (p=0.000, p<0.05).

Magnesium intake was found an average of 349.2±123.7 g for individuals with good diet quality, an average of 258.4±87.2 g for individuals with needs to be improved diet quality and an average of 179.6±72.4 g for individuals with poor diet quality. Magnesium intake of good diet quality group was found to be higher than the other groups and more magnesium intake was found in the needs to be improved than in the poor ones (p=0.000, p<0.05).

Table 4.23. HEI-2010 Categories According to Students Vitamin and Mineral Intake

Vitamin and Mineral	**Good (n:5)**		**Needs to be Improved (n:84)**		**Poor (n:113)**		
Intake	**x̄**	**S**	**x̄**	**S**	**x̄**	**S**	**p***
Vitamin A (mcg)	1665.3	1148.5	1015.9	901.4	584.7	286.7	**0.001***
Vitamin E (mg)	23.5	9.1	16.6	7.3	12.7	7.6	**0.000***
Folate (mcg)	310.0	93.0	262.3	116.6	180.3	80.0	**0.000***
Vitamin B_{12} (mcg)	5.0	2.7	4.3	2.9	3.8	2.3	0.287
Vitamin C (mg)	156.0	98.5	77.3	41.3	51.1	39.1	**0.000***
Iron (mg)	10.2	3.1	9.5	3.6	7.2	3.9	**0.000***
Iodine (mcg)	105.9	37.4	117.9	41.6	106.6	40.1	0.155
Zinc (mg)	9.2	2.4	8.5	3.3	7.3	2.9	**0.014***
Sodium (mg)	1543.1	555.3	2286.2	755.0	2495.0	873.6	**0.016***
Potassium (mg)	3104.7	622.8	2274.9	767.1	1567.5	646.3	**0.000***
Calcium (mg)	715.6	139.5	724.2	327.5	546.3	238.4	**0.000***
Magnesium (mg)	349.2	123.7	258.4	87.2	179.6	72.4	**0.000***

*p<0.05 was accepted as statistically significance
One Way ANOVA test was used and Tukey Post-Hoc test was used to compare the binary groups
Kruskall Wallis test was used and Mann Whitney U test was used to compare the binary groups

Table 4.24 gives the percentage of meeting energy and nutrient requirements according to HEI-2010 categorizations. The percentage of meeting energy requirement of individuals who have good diet quality was found to be 72.5±10.4 on average, 72.4±20.2 for needs to be improved diet quality, 69.3±21.9 for poor diet quality. The percentage of meeting energy requirement did not showed a significant difference between these groups ($p=0.563$, $p>0.05$).

The percentage of meeting protein requirement of individuals who have good diet quality was found to be 115.1±17.7 on average, 107.3±51.0 for needs to be improved diet quality, 92.1±33.4 for poor diet quality. The percentage of meeting protein requirement of needs to be improved diet quality group was found to be higher than in the poor ones ($p=0.029$, $p<0.05$).

The percentage of meeting fat requirement of individuals who have good diet quality was found to be 110.4±31.2 on average, 96.7±32.2 for needs to be improved diet quality, 92.9±32.2 for poor diet quality. The percentage of meeting fat requirement did not showed a significant difference between these groups ($p=0.394$, $p>0.05$).

The percentage of meeting carbohydrate requirement of individuals who have good diet quality was found to be 42.7±10.1 on average, 58.8±67.3 for needs to be improved diet quality, 52.2±19.9 for poor diet quality. The percentage of meeting carbohydrate requirement did not showed a significant difference between these groups ($p=0.043$, $p>0.05$).

The percentage of meeting fibre requirement of individuals who have good diet quality was found to be 91.6±23.0 on average, 78.6±35.2 for needs to be improved diet quality, 47.6±20.9 for poor diet quality. The percentage of meeting fibre requirement of good and needs to be improved diet quality groups were found to be higher than in the poor ones ($p=0.000$, $p<0.05$).

The percentage of meeting vitamin A requirement of individuals who have good diet quality was found to be 237.9±164.1 on average, 144.2±129.2 for needs to be improved diet quality, 82.7±41.2 for poor diet quality. The percentage of meeting vitamin A requirement of good and needs to be improved diet quality groups were found to be higher than in the poor ones ($p=0.001$, $p<0.05$).

The percentage of meeting folate requirement of individuals who have good diet quality was found to be 77.9±23.2 on average, 65.6±29.1 for needs to be improved diet quality, 45.1±20.0 for poor diet quality. The percentage of meeting folate requirement of good and needs to be improved diet quality groups were found to be higher than in the poor ones ($p=0.000$, $p<0.05$).

The percentage of meeting vitamin B_{12} requirement of individuals who have good diet quality was found to be 207.6±111.2 on average, 178.2±121.0 for needs to be improved diet quality, 156.7±94.8 for poor diet quality. The percentage of meeting vitamin B_{12} requirement did not showed a significant difference between these groups ($p=0.307$, $p>0.05$).

The percentage of meeting vitamin C requirement of individuals who have good diet quality was found to be 173.4±109.5 on average, 86.8±45.0 for needs to be improved diet quality, 57.2±43.9 for poor diet quality. The percentage of meeting vitamin C requirement of good and needs to be improved diet quality groups were found to be higher than in the poor ones ($p=0.000$, $p<0.05$).

The percentage of meeting iron requirement of individuals who have good diet quality was found to be 56.8±17.3 on average, 55.5±25.4 for needs to be improved diet quality, 42.5±26.2 for poor diet quality. The percentage of meeting iron requirement of needs to be improved diet quality group was found to be higher than in the poor ones ($p=0.002$, $p<0.05$).

The percentage of meeting iodine requirement of individuals who have good diet quality was found to be 70.6±24.9 on average, 78.6±27.7 for needs to be improved diet quality, 71.1±26.7 for poor diet quality. The percentage of meeting iodine requirement did not showed a significant difference between these groups ($p=0.155$, $p>0.05$).

The percentage of meeting zinc requirement of individuals who have good diet quality was found to be 92.4±24.0 on average, 84.2±31.7 for needs to be improved diet quality, 72.1±28.6 for poor diet quality. The percentage of meeting zinc requirement of needs to be improved diet quality group was found to be higher than in the poor ones ($p=0.011$, $p<0.05$).

The percentage of meeting calcium requirement of individuals who have good diet quality was found to be 71.6±13.9 on average, 72.4±32.6 for needs to be improved diet quality, 32.6±55.4 for poor diet quality. The percentage of meeting calcium requirement of needs to be improved diet quality group was found to be higher than in the poor ones ($p=0.000$, $p<0.05$).

Table 4.24. HEI-2010 Categories According to Percentages of Students Meeting DRIs

Percentages of Meeting DRIs	Good (n:5)		Needs to be Improved (n:84)		Poor (n:113)		
	x̄	**S**	**x̄**	**S**	**x̄**	**S**	**p***
Energy (%)	72.5	10.4	72.4	20.2	69.3	21.9	0.563
Protein (%)	115.1	17.7	107.3	51.0	92.1	33.4	**0.029***
Fat (%)	110.4	31.2	96.7	32.2	92.9	32.2	0.394
Carbohydrate (%)	42.7	10.1	58.8	67.3	52.2	19.9	0.043
Fibre (%)	91.6	23.0	78.6	35.2	47.6	20.9	**0.000***
Vitamin A (%)	237.9	164.1	144.2	129.2	82.7	41.2	**0.001***
Folate (%)	77.5	23.2	65.6	29.1	45.1	20.0	**0.000***
Vitamin B_{12} (%)	207.6	111.2	178.2	121.0	156.7	94.8	0.307
Vitamin C (%)	173.4	109.5	86.8	45.0	57.2	43.9	**0.000***
Iron (%)	56.8	17.3	55.5	25.4	42.5	26.2	**0.002***
Iodine (%)	70.6	24.9	78.6	27.7	71.1	26.7	0.155
Zinc (%)	92.4	24.0	84.2	31.7	72.1	28.6	**0.011***
Calcium (%)	71.6	13.9	72.4	32.6	55.4	24.0	**0.000***

*p<0.05 was accepted as statistically significance
One Way ANOVA test was used and Tukey Post-Hoc test was used to compare the binary groups
Kruskall Wallis test was used and Mann Whitney U test was used to compare the binary groups

5. DISCUSSION and CONCLUSION

Nutrition education has a vital importance for university students making choices that affect their diet choices and lifestyles. Nutrition and dietetics students are trained in many subjects such as nutrition, food selection, dietary behaviors, diseases, food preparation and exercise physiology (71). So it is often assumed that dietitians will have better nutritional choices and better diet qualities but Turkey has limited the number of studies examining it (71, 101). Therefore, in this study, the effect of nutrition and dietetics education on the dietary quality of the students was investigated.

Many studies have shown that healthy eating options are decreasing when university students live far away from their families (7, 18, 44). When the residence status of the students participating in the study is examined, majority of the participants live with their family (39.3%).

TUİK 2016 data was shown that average heights in Turkey was 167.2 cm while average weight was 72.8 kg in 15-24 age group (72). The average height of the students (166.3±6.9) is similar to the country average, while the average body weight (58.4±10.3) is below the country average. In this study, average height and body weight of the students in both depertment were found similar.

The average BMI of the participants was 21.0±2.9 kg/m^2. Most of the students in all groups in this study were found to be normal weight (NAD-1: 75.0%, PCG-1: 80.9, NAD-4: 72.7, PCG-4: 82.9). In a study on university students in Finland in 2015, the BMI value was found to be 22.7 (46). In 2011, 79.8% of students were found to be within the normal range of BMI values in a study conducted in Turkey (73). The average BMI values of students in another study in Turkey was found to be 21.9±2.7 kg/m^2 (21). This study found that students were underweight (15.7%) than obese (2.0%). A similar result was found in a study conducted in China in 2015 (74). Looking at these results, the underweight prevalence of university students is emerging as a rising trend (74). Underweight percentage was found to be more frequent among NAD students than PCG students. Many studies have demonstrated the prevalence of eating disorder in university students receiving nutrition education (75, 76, 77). Early screening, awareness raising and encouraging healthy eating habits may be potatial strategies to treat disorders and their health related conditions in nutrition and non-nutrition students (78).

When students' alcohol consumption was examined, 56.7% of the students were found to be consuming alcohol. In a study published in 2012 which NHANES data was used, reported that 27% of individuals over the age of 19 were consuming alcohol (57). It has been determined that students use alcohol in the range of 1.8-76.0% in the studies showing the frequency of alcohol use by university students (79, 80, 81, 82). In a study in which students alcohol use was at a rate of 76%, it was linked to factors such as developing roles and social behaviors in accordance with their gender, entering new social relationships, participating in new friendships, and needing to be adopted by them (83).

Many university students exhibit nutritional habits that can lead to nutritional deficiencies, diabetes, heart disease (84). Nutritional deficiencies cause the global burden of 10 diseases (85). While the vast majority of students exceed the daily intake of fat, sugar and sodium, very few of the students meet their daily vitamin and mineral needs (84).

According to TOBR energy intake should be 2850 kcal for men, 2180 kcal for women per day (3). In this study, daily total energy intake and percentage of meeting daily energy requirement of the students were found to be 1327.0±366.8 kcal (68.6%) for NAD-1, 1383.1±493.6 kcal (71.5%) for PCG-1, 1453.0±378.8 kcal (75.1%) for NAD-4 and 1272.1±363.6 kcal (65.8%) for PCG-4. When comparisons were made between first year students, students from both departments received energy below the recommended level and there was no significant difference between them. Lack of time to purchase food products, skipping meals, having inadequate or inaccurate knowledge about nutrition may have affected the energy intake of students. NAD-4 students have received more energy than PCG-4 students and have found it to meet their energy needs more. It can’t be said that the education of NAD-4 students is positively influenced in their diet. In the study, which Jann der ver kruk and his colleagues compared energy and nutrient intake of first and fourth grade nutrition and dietetic students in 2013, they found no significant difference between them in the energy intake (86).

The percentage of energy coming from protein and carbohydrates did not show any significant difference between NAD and PCG students. We only found that NAD-4 (17.6%) students have received more energy from proteins than PCG-4 students (15.7%). Energy contribution rates of fats should be between 20-30% according to the

TUBER (2). When the energy ratio coming from fats of the students is examined, it is seen that it is found between 39-42% on average. Students are consuming a more fatty diet content than they should be. The preferred foods at meals are effective at increasing these rates. This situation can be caused by the fact that excessive fat content in ready-to-eat foods, not consuming enough homemade food, prefering to consume easily accessible foods like fast-foods (51). Dietary fat intake is associated with obesity, cardiovascular diseases and diabetes mellitus, and it is recommended that the dietary fat intake should not exceed 20-35% (2). TUBER, states that 45-60% of daily energy intake need to be met from of carbohydrates (2). According to this study 41-44% of the daily energy of the students was sourced from carbohydrates. This amount is below the recommendations. Another study conducted in 2006 with university students in Istanbul found similar results (20). This can be explained by the fact that the students are consuming a more fatty diet than they should be.

The average daily protein intake and percentage of meeting the daily protein requirement of NAD students was higher than DRI levels (NAD-1: 58.0±31.1, 101.5% and NAD-4: 61.2±16.7, 107.1%) while under the DRI levels for PCG students (PCG-1: 54.7±20.1, 95.4% and PCG-4: 49.4±23.9, 86.5%). The contribution of the protein as an energy source was found between 15 and 18%. These values are consistent with the recommendations of TUBER (2). NAD-4 students were found to consumed more protein than PCG-4 students. According to the TBSA-2010 data, the daily energy sourced from proteins for individuals aged 19-30 years were found to be 13% (87). A similar study with university students in Tunisia in 2014 found that the daily energy contribution of the proteins was 18% (88). Looking at these results, we can say that the students who participated in the study generally get enough protein.

The average daily fat consumption of students is found between 60-67 g. Compared with the TBSA-2010 results, it is seen that the consumption amounts are close (66.6 g for woman 19-30 aged and 86.0 g for man 19-30 aged) (87). No significant difference was found when comparing NAD and PCG departments but NAD-4 students were found to consume more fat than NAD-1 students. The percentage of meeting fat requirement for NAD students were 89.6% in the first grade and 102.1% in the fourth grade. The fourth grades exceeded the daily intake of fat and this excess was found to be due to excessive consumption of saturated fats. Excessive consumption of saturated fats should be avoided in order to preserve cardiovascular health and consumption of monounsaturated fats should be preferred instead of saturated fats. The energy from saturated fats should not exceed 10% of the daily energy intake (89). In a similar study conducted in Germany, the percentage of consumed fat meeting RDA was found to be 81% for NAD-1 students and 82% for NAD-4 students (87). The high fat consumption, saturated fat in particular, of NAD-4 students shown that nutrition and dietetics education does not have a positive effect on dietary fat intake.

Daily carbohydrate intake with diet was 138.9±50.6 g in NAD-1, 149.3±62.6 g in PCG-1, 149.0±53.2 g in NAD-4 and 132.0±48.0 g in PCG-4. No significant difference was found when comparing NAD and PCG departments. TUBER suggest that individuals whom aged 19-39, 130 g carbohydrates intake per day is sufficient (2). According this suggestion, students intake enough carbohydrates in their diets. 45-60% of daily energy needs to be provided from carbohydrates (2). In this study, 41-44% of the energy were found to be derived from carbohydrates and this level is below the recommendation. Carbohydrates are important sources of energy for the body. Carbohydrates are necessary for life. The only source of energy to the central nervous system is glucose, the simplest form of carbohydrate (90). For an adequate and balanced diet, the carbohydrate must also be in the amounts recommended in our diet.

TOBR recommended to individuals fiber intake 25 g for women and 29 g for men aged 19-30 (3). In the TBSA-2010 survey, men aged 19-30 years consumed 22.4 g fibre, while women consumed 19.2 g fibre (87). In a study conducted by university students in Greece, it was found that male students consumed 16.9 g and female students consumed 13.7 g fibre (91). The amount of fibre taken by the diet and the percentage of meeting DRI were found 15.7±8.6 g (62.9%) at NAD-1, 14.3±6.2 g (56.3%) at PCG-1, 18.0±8.6 g (71.7) at NAD-4 and 12.7±6.7 g (50.1%) at PCG-4. It was found that NAD-4 students consumed more fibre than PCG-4 students. However, all students generally did not consume enough amount of fibre. There is a beneficial effect of dietary fibre on the defecation, regulation of blood cholesterol, and regulation of blood sugar (92). Dietary fiber should be consumed in sufficient amounts to prevent from diseases such as diabetes, cardiovascular diseases, digestive system diseases.

Vitamin and mineral intake of the students were analyzed according to their department (Table 4.8 and 4.9) and grade (Table 4.10), and then vitamin and mineral intakes were examined according to the DRI levels. There was no significant difference in vitamin intake of NAD-1 and PCG-1 students. NAD-4 students consumed more folate and vitamin C than PCG-4 nad NAD-1 students. NAD-4 students consumed more vitamin A, thiamine, riboflavin, niacin, pyridoxine, vitamin B_{12}, biotin and pantothenic acid than PCG-4 students.

In general, students' daily folate and vitamin C consumption were below the DRI recommendations. In a study conducted in Iran by female college students, the percentage of folate intake that met RDA was found to be 77% (93). In another study conducted in Korea, the percentage of college students meeting the RDA of folate intake was found to be 75% (94). In a study conducted with university students in Turkey, meeting the RDA of folate intake it was found to be 72% for men and 61% for women (44). In another study conducted in Turkey, percentage of meeting RDA for folate intake of students studying in different universities were found to be 38-59% (20). Based on this information, it seems that the folate taken by the students with the diet is inadequate. Folate is required in cell development and in the specific reactions required for metabolism. Folate and vitamin B_{12} metabolism are interrelated in the body. Severe folic acid deficiency increases the risk of neural tube defects (NTDs) and to protect against NTDs, it is recommended that folate consumption of 400 mcg / day be consumed for women of childbearing age (95). Lack of folate deficiency is common in Turkey (2). For this reason, especially in the universities, it is necessary to make the students aware of this and carry out studies aiming to eliminate deficiencies. The percentage of meeting DRI for folate intake of students was found to be low compared to similar studies (20, 44, 82, 93, 94). Vitamin C is a necessary nutrient for various biological functions. It has a potential role in the prevention of cancer and cardiovascular diseases (96). It also protects the body from oxidative stress (32). Lack of vitamin C results in delayed healing of the wounds, pain in the muscles and joints, fatigue, weakness, nose bleeding symptoms (31, 32). The consumption of five servings of vegetables and fruit a day provides enough vitamin C to people (32).

There was no significant difference between NAD-1 and PCG-1 students in terms of mineral intake by diet. NAD-4 students were found to had more iron, iodine, zinc, copper, potassium, calcium, phosphorus, and magnesium with diet than PCG-4 students. NAD-4 students also received more sodium, potassium, zinc and calcium in the diet than NAD-1 students.

When students daily dietary mineral intake compared with the DRI levels found that iron, iodine, zinc and calcium intake of students were under the recommendations. It is indicated that the most common mineral deficiencies are iodine, iron, calcium and zinc deficiencies in Turkey (2). The same results have been found in this study. Similar results have been found when looking at the studies that are examining students' calcium intake (20, 44, 94). Calcium has many different roles in the body related to blood clotting, blood pressure, cellular communication, brain function and signal transduction and muscle contraction (97). Calcium deficiency causes problems such as nerve conduction disorder, blood clotting disorder, tetany. Four portions of milk and dairy products should be consumed per day (one glass of milk, one glass of yogurt and two matchbox sized cheese) to meet your calcium needs (2). Zinc intake with diet of students in this study was found to be low compared to similar studies (20, 44, 93). In order to get enough zinc in the body, whole grains, meat, liver and seafood must be found in the diet as adequate and balanced (2). The percentage of meeting DRI for iron intake of students found to be between 41-54%. This result is low compared to similar studies which are done abroad and domestically (20, 44, 93, 94). Iron is an important mineral required for cellular functions such as iron respiration, oxygen transport, DNA synthesis, energy production and cell proliferation (98). It has been found that in developing countries there are 30-70% iron deficiency and the highest incidence is in those who are fed on low dietary diets and in those who have lost blood by gastrointestinal bleeding and women who have a menstrual cycle (98, 99). Red meat and meat products, chicken, dried fruit and dark green leafy vegetables are sources of iron. Low consumption of these nutrients causes inadequate intake of iron (2). The percentage of meeting DRI for iodine intake of students found to be 67-82%. In 1998, iodination of salts was made compulsory in order to prevent diseases of iodine deficiency (100). People should be educated about iodine fortified salt and its storage so that this iodine taken with salt can be taken into the body without losing its nutritional value.

According to the results of research on nutrition and health surveys in Turkey it is known that we are experiencing the many nutritional and health problems. Vitamin mineral deficiencies and non-communicable chronic diseases related to nutrition are the most commons (2). Many dietary indices have been developed to establish the relationship between diet quality and health. HEI is an index that is widely used in adults evaluating dietary quality and updated every five years (101). In a study conducted in the United States of America, Guenther and colleagues reported an HEI-2010 score of 45.5±1.1 for individuals aged 20-30 (68). Doostan et al found a mean of total HEI-2005 score of 64.22±8.98 which participated 229 university students in 2016 (102). In a study published by Ervin et al, the total HEI score was 54.2 for 20-39 age group (69). There are a few studies that examine the quality of the diet using diet quality indexes in Turkey (101). In a study with 566 female university students in Ankara, the average HEI score of the participants was found to be 66.8±11.26 (73). In the study conducted on 498 university students in Bingöl, the mean of total HEI-2005 score was found to be 55.7±6.7 (82). In this study, HEI-2010 scores of NAD-1, PCG-1, NAD-4 and PCG-4 students were found to be 52.4±16.8, 43.5±12.4, 51.5±14.5 and 44.3±11.6 respectively. According to these results, nutrition and dietetics students' diet quality was found to be higher than psychological counseling and guidance students. The result showed that education factor did not showed any difference among the NAD department while there were differences among the NAD and PCG departments.

When HEI-2010 scores of the students were categorized, 75.5% of PCG-1 and 71.4% of PCG-4 students were included in the poor diet quality group and 50.8% of NAD-1 and 56.1% of NAD-4 students were in the needs to be improved diet quality group. It is generally seen that the diet quality of the NAD students is better than the PCG students. However, the diet quality of both students should be improved.

When the HEI-2010 component scores were examined one by one, NAD-1 students had more whole grains, dairy and sodium component scores than PCG-1 students. NAD-4 students consumed more total fruit, whole fruit, greens and beans, whole grains, dairy and total protein foods component scores than PCG-4 students. NAD-4 students dairy component scores were higher than NAD-1 students. According to these results, we can say that NAD students prefer whole grains consumption to refined grains consumption rather than PCG students. In addition, NAD students also comsumes the dairy group with excess calcium content more than PCG students. The nutritional value of legumes (beans, peas) is becoming evident in the developing countries, due to demand for healthy food. Epidemiological studies have proved that a diet rich in antioxidants is associated with a lesser-degenerative disease incidence. Whole grains and legumes contain phytochemicals possesing potent antioxidant. According to this information the consumption of whole grains and legumes should be increased (103). It can be said from these results that the intake of nutrition and dietetics education can be effective in food choice.

In a study to determine HEI and abdominal obesity in adults, HEI component scores were associated with abdominal obesity. There is also a inverse relationship between diet quality and obesity in many studies (101, 104). In this study conducted with university students, the individuals were classified as underweight, normal weight, overweight and obese according to their BMI classification, but the diet quality was found to be similar among these groups. In a study conducted with university students in Turkey, it was found that overweight individuals have recieved more total scores of HEI-2010 than normal weight students (101).

The place where a student lives, affects their eating habits and their diet-related health (49). When we looked at the HEI-2010 categories according to the place where the students reside, it was found that living alone, living with family, living with friends or living in the dormitory, did not affect the quality of the students' diets.

In healthy nutrition, it is aimed to take the energy and nutrients into the body in adequate quantities and balanced for the body's growth, renewal and work (2). One of the terms that reflects the adequacy of the nutrient is the diet quality (10). Diet quality of university students in this study was determined by HEI-2010, and diet qualities were divided into 3 groups as good, needs to be improved and poor diet quality. It was found that 2.5% of the students had a good diet quality, 41.5% had the needs to be improved diet quality and 56% had poor diet quality. In a study conducted by university students in Tunisia, it was found that more than 40% of the students had “needs improvement” diet quality to be improved and more than 50% of the students had “poor” diet quality (88). Differences between intake of significant macro and micro nutrient intake and dietary quality groups were examined.

Macro nutrient intake and the relation between the HEI-2010 groups, statistically significant differences were found in terms of protein, fiber and MUFAs. Protein intake of needs to be improved group is higher than the poor diet quality group and needs to be improved group, in terms of meeting the protein requirement, meets protein requirement more than poor group. It has been found that fibre intake is higher in the good and needs to be improved diet quality groups than in the poor diet quality group. Good and needs to be improved groups met protein requirement more than poor group. Fatty acids are also the cause of cardiovascular diseases and also play a role in protection from these diseases. The risk of cardiovascular disease can be reduced by reducing the consumption of saturated fats and by replacing saturated fats with a combination of PUFAs and MUFAs (105). In this study, MUFAs intake was found to be better in the group of good diet qualitiy than in the needs to be improved and poor diet quality groups. The percentage of energy coming from protein, fat and carbohydrates did not differ between groups. In a study conducted with university students in Iran, it was found that individuals with poor dietary qualities had more energy, saturated fat, sodium, and the percentage of energy sourced from the fat (102). Furthermore, in the same study, it was found that students with poor diet quality received more energy from empty energy sources including added sugar, solid fat and alcoholic beverages (102).

Comparing micro nutrient intake and the relation between the HEI-2010 groups, statistically significant differences were found in terms of vitamin A, vitamin E, folate, vitamin C, iron, zinc, sodium, potassium, calcium and magnesium. Vitamin A, vitamin E, folate, vitamin C and calcium intake were found to be higher in the diet quality groups which good and needs to be improved than the poor ones. Also iron and zinc intake was found higher in needs to be improved group than poor group. The percentage of meeting DRI for vitamin A, folate and vitamin C that meet DRI were found higher in the good and needs to be improved groups than poor group. The percentage of meeting DRI for iron, zinc and calcium that meet DRI were found higher in the needs to be improved group than poor group.

The major limitation of this study is that this study was conducted only on one campus within one non-nutrition and dietetic depertment. Similar studies have to be done at different universities in order to achieve more generalized results. In addition, self-reported anthropometric measures was used.

In conclusion, studies examining the quality of diet bu using HEI-2010 are limited in Turkey. According to the results of this study, NAD students dietary intake was much healthier than PCG students, but not enough to meet all nutritient needs such as folate, vitamin C, iron and calcium. Besides, even NAD-4 students did not consume enough fruits, dark green vegetables, beans, whole grains and dairy. Generally, the diet qualities of the students are not influenced by education and not influenced by the residence status and BMI values of the individuals.

6. REFERENCES

1. Yılmaz E and Özkan S. Üniversite Öğrencilerinin Beslenme Alışkanlıklarının İncelenmesi. *Fırat Sağlık Hizmetleri Dergisi*. 2007; **2**: 87-104.
2. Public Health Agency of Turkey. *Turkey Dietary Guidelines (TUBER)*. Ankara: Ministry of Health of Turkey Publication; 2016.
3. The Ministry of Health of Turkey, The General Directorate of Primary Health Care, Hacettepe University Department of Nutrition and Dietetics. *Dietary Guidelines for Turkey (TOBR)*. Ankara: Sağlık Bakanlığı Yayını. 2004.
4. Onurlubaş E, Doğan H, Demirkıran S. Üniversite Öğrencilerinin Beslenme Alışkanlıkları. *JAFAG*. 2015; **32**: 61-69.
5. Hilger J, Loerbroks A, Diehl K. Eating behaviour of university students in Germany: Dietary intake, barriers to healthy eating and changes in eating behaviour since the time of matriculation. *Appetite*. 2017; **109**: 100-107.
6. Alibabić V, Mujić B, Rudić D, et al. Assessment of Diet Quality and Nutritional Risks Representation of University of Bihać. *Procedia - Social and Behavioral Sciences*. 2014; **116**: 2137-2140.
7. Korkmaz NH. Uludağ Üniversitesi Öğrencilerinin SporYapma ve Beslenme Alışkanlıklarının İncelenmesi. *Eğitim Fakültesi Dergisi.* 2010; **23:** 399-413.
8. Previdelli AN, Andrade SC, Pires MM, Ferreira SRG, Fisberg RM, Marchioni DM. A Revised version of the Healthy eating Index for he Brazilian population. *Rev Saúde Pública*. 2011; **45:** 1-5.
9. Miller PE, Mitchell DC, Harala PL, Pettit JM, Wright HS, Hartman TJ. Development and evaluation of a method for calculating the Healthy Eating Index-2005 using the Nutrition Data System for Research. *Public Health Nutrition.* 2010; **14:** 306-313.
10. Ruel MT. Is dietary diversity an indicator of food security or dietary quality? A review of measurement issues and research needs. Washington: *FCND Discussion Paper No:140.* 2003.
11. Hu FB. *Dietary pattern analysis: a new direction in nutritional epidemiology*. *Curr Opin Lipidol*. 2002; **13:** 3-9.
12. Bano R, Shammari E, Fatima SB, Shammari NA. A comparative study of knowledge, attitude, practice of nutrition and non-nutrition student towards a balanced diet in Hail University. *IOSR-JHNS*. 2013; **2**: 29-36.

13. Triches RM, Giugliani ERJ. Obesity, eating habits and nutritional knowledge among schol children. *Rev Saúde Pública.* 2005; **39:** 1-7.

14. Azizi M, Aghaee N, Ebrahimi M, Ranjbar K. Nutrition knowledge, the attitude and practices of college students. *FU Phys Ed Sport.* 2011; **9:** 349-357.

15. Tayfur M, Barış O, Baştaş NN. *Dünyada ve Türkiye'de Beslenme Diyetetik Eğitim-Öğretimi, Diyetisyenin Meslek Etiği.* Ankara: Hatiboğlu Yayınevi; 2011.

16. Bozhüyük A, Özcan S, Kurdak H, Akpınar E, Saatçı E, Bozdemir N. Sağlıklı yaşam biçimi ve aile hekimliği. *TJFMPC.* 2012; **6**: 13-21.

17. Merdol TK. *Beslenmeye Bağlı Kronik Hastalıkların Önlenmesinde Yeterli, Dengeli ve Sağlıklı Beslenmenin Önemi ve Temel İlkeler,* in Hastalıklarda Beslenme Tedavisi, Alphan ET, ed. Hatiboğlu Yayınevi. 2013. p. 3-31.

18. Abraham S, Noriega BR, Shin JY. College students eating habits and knowledge of nutritional requirements. *J Nutr Hum Health.* 2018; **2:** 13-17.

19. Koçoğlu G, Sümer H, Özdemir L, Polat H. Spor bölümü öğrencilerinin beslenme durumları ve alışkanlıkları diğer öğrencilerden farklı mı?. *Sendrom.* 2001; 74-80.

20. Garipağaoğlu M, Budak N, Öner İ, Sağlam Ö, Nişli K. Üç farklı üniversittede eğitim gören kız öğrencilerin beslenme durumları ve vücut ağırlıklarının değerlendirilmesi. *Sağlık Bilimleri Dergisi*. 2006; **15:** 173-180.

21. Vançelik S, Önal SG, Güraksın A, Beyhun E. Üniversite öğrencilerinin beslenme bilgi ve alışkanlıkları ile ilişkili faktörler. *Kor Hek.* 2007; **6:** 242-248.

22. Tapsell LC, Neale EP, Satija A, Hu FB. Foods, nutrients, and dietary patterns: interconnections and implications for dietary guidelines. *Adv Nutr.* 2016; **7:** 445-454.

23. Baysal A. *Beslenme.* Ankara: Hatiboğlu Yayınevi; 2011.

24. Lean MEJ. Principles of Human Nutrition. *Medicine.* 2014; **43:** 61-65.

25. Berg JM, Tymoczko JL, Stryer L. *Chapter 3 Protein Structure and Fuction,* in Biochemistry, 5th ed. W H Freeman: New York. 2002.

26. FAO/WHO/UNU Expert Consultation. Protein and amino acid requirements in human nutrition. *WHO Technical Report Series 935.*2007.

27. Food and Nutrition Board, Institıte of Medicine of the National Academies. *Dietary Reference Intakes for Energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids.* Washington D.C: The National academic Press; 2005.

28. T.C Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürllüğü Beslenme ve Fiziksel Aktiviteler Daire Başkanlığı. *Diyet Posası ve Beslenme.* Ankara: Sağlık Bakanlığı Yayını; 2008.

29. Dahl WJ, Stewart ML. Position of the Academy of Nutrition and Dietetics: Health implications of dietary fiber. *J Acad Nutr Diet.* 2015; **115:** 1861-1870.

30. Food and Agriculture Organization of the United Nations. *Fats and Fatty Acids in Human Nutrition.* Geneva: FAO Food and Nutrition Paper; 2008.

31. Bonner RS. Microntrients. *Paediatrics and Child Health.* 2017; **27:** 357-362.

32. Marian M, Sacks G. Micronutrients and older adults. *Nutr Clin Pract.* 2009; **24:** 179-195.

33. Montgomery S, Beebe ML. Micronutrient needs of the elderly. *Nutr Clin Pract.* 2014; **29:** 435-444.

34. Ulatowski LM, Manor D. Vitaminn E and neurodegeneration. *Neurobiology of Disease.* 2015; **84:** 78-83.

35. Palermo A, Tuccinardi D, D'Onofrio L. Vitamin K and osteoporosis: Myth or reality. *Metabolism.* 2017; **70:** 57-71.

36. Tran PN, Tran MH. Cobalamin deficiency presenting with trombotic microangiopathy (TMA) features. A systematic review. *Transfusion and Apheresis Science.* 2018; **57:** 102-106.

37. Orton CC. Vitamin B_{12} (Cobalamin) deficiency in the older adult. *JNP.* 2012; **8:** 547-553.

38. Talaulikar V, Arulkumaran S. Folic acid in pregnancy. O*bstetrics, Gynaecology and Reproductive Medicine.* 2013; **28:** 159-163.

39. T.C. Sağlık Bakanlığı Temel Sağlık Hizmetleri Genel Müdürlüğü Beslenme ve fiziksel Aktiviteler Daire Başkanlığı. *Kalsiyum, D Vitamini ve Osteporoz.* Ankara: Sağlık Bakanlığı Yayını; 2008.

40. Food and Agriculture Organization of the United Nations, World Health Organization. *Human Vitamin and Mineral Requirements.* Rome: Report of joint FAO/WHO expert consultation Bangkok; 2001.

41. Kim J, Wessling-Resnick M. Iron and mechanism of emotional behavior. *J Nutr Biochem.* 2014; **25:** 1101-1107.

42. Lopez A, Cacoub P, Macdougall IC, Peyrin-Biroulet L. Iron deficiency anaemia. *The Lancet.* 2016; **387:** 907-916.

43. Oğuz S, Çemçem N, Çamcı G, Gürkan A. Nutritional habits and hearth health of university students. *International Journal of Human Sciences.* 2017; **14:** 3606-3614.

44. Rakıcıoğlu N, Akal YE. Energy and nutrient intake and food patterns among turkish university students. *Nutr Res Pract.* 2011; **5:** 117-123.

45. Thorpe MG, Kestin M, Riddell LJ, Keast RSJ, McNaughton S. Diet quality in young adults and its association with food-related behaivours. *Public Health Nutrition.* 2013; **17:** 1767-1775.

46. Ansari WE, Suominen S, Samara A. Eating habits and dietary intake: Is adherence to dietary guidelines associated with importance of healthy eating among undergraduate university student in Finland. *Cent Eur J Public Health.* 2015; **23:** 306-313.

47. Driskell JA, Kim YN, Goebel KJ. Few differences found in typical eating and pyhsical activity habits of lower-level and upper-level university students. *J Am Diet Assoc.* 2005; **105:** 798-801.

48. Racette SB, Deusinger SS, Strube MJ, Highstein GR, Deusinger RH. Weight changes, exercise, and dietary patterns during fresman and sophomore years of college. *Journal of American College Health.* 2005; **53:** 245-251.

49. Desphande S, Basil MD, Basil DZ. Factors influencing healthy eatin habits among college students: An application of the health belief model. *Health Marketing Quarterly.* 2009; **26:** 145-164.

50. Kyrkou C, Tsakoumaki F, Fotiou M. Changing trends in nutritional behaivour among university students in Greece, between 2006 and 2016. *Nutrients.* 2018; **10:** 3-13.

51. Ganasegeran K, Al-Dubai SAR, Qureshi AM, Al-abed AAA, AM R, Aljunid SM. Social and pyschological factors affecting eating habits among university students in Malaysian medical schol. A cross-sectional study. *Nutrition Journal.* 2012; **11:** 1-7.

52. Carvalho KMB, Duatra ES, Pızato N, Gruezo ND, Ito MK. Diet quality assesment indexes. *Rev. Nutr.* 2014; **27:** 605-617.

53. Weinstein SJ, Vogt TM, Gerror SA. Healthy eating index scores are associated with blood nutrient concentrtions in the third national health and nutrition examination survey. *J Am Diet Assoc.* 2004; **104:** 576-584.

54. Kourlaba G, Panagiotakos DB. Dietary quality indices and human heallth. A review. *Maturitas*. 2009; **62:** 1-8.

55. Jaime PC, Bandoni DH, Duran ACFL, Fisberg RM. Diet quality index adjusted for energy requirements in adults. *Cad. Saúde Pública.* 2010; **26:** 2121-2128.

56. Adjoian TK, Firestone MJ, Eisenhower D, Yi SS. Validation of self-related overall diet quality by Healthy Eating Index-2010 score among New York City adults, 2013. *Preventive Medicine Reports.* 2016; **3:** 127-131.

57. Nicklas TA, O'Neil CE, Fulgoni VL. Diet quality is inversely reletad to cardiovaskuler risk factors in adults. *J. Nutr.* 2012; **142:** 2112-2118.

58. Gil Á, Victoria EM, Olza J. Indicators for the evaluation of diet quality. *Nutr. Hosp.* 2015; **31:** 128-144.

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

60. Kranz S, McCabe GP. Examination of the five comparable component scores of the diet quality indexes HEI-2005 and RC-DQI using a nationally representative sample of 2-18 year old children: NHANES 2003-2006. *Journal of Obesity.* 2013; **2013:** 1-12.

61. Shim JS, Oh K, Kim HC. Dietary assessment methods in epidemiologic studies. *Epidemiology and Health.* 2014; **36:** 1-8.

62. Foster E, Bradley J. Methodological considerations and future insights for 24-hour dietary recall assessment in children. *Nutrition Research.* 2018; **51:** 1-11.

63. Pekcan G. *Beslenme Durumunun Saptanması,* in Diyet El Kitabı, Baysal A, Aksoy M, Besler T, et al. Hatiboğlu Yayınevi: Ankara. 2011. p. 67-142.

64. Ortega RM, Rodrigo CP, López-Sobaler AM. Dietary assessment methods: dietary records. *Nutr. Hosp.* 2015; **31:** 38-45.

65. Rodrigo CP, Aranceta J, Salvador G, Varela-Moreiras G. Food fequency questionnaires. *Nutr. Hosp.* 2015, **31:** 49-56.

66. World Health Organization. *Obesity: Preventing and Managing the Global Epidemic.* Geneva: WHO Technical Report Series; 2000.

67. Kennedy E. Putting yhe pyramid into action: the Healthy Eating Index and Food Quality Score. *Asia Pac J Clin Nutr.* 2008; **17:** 70-74.

68. Guenther PM, Kirkpatrick SI, Reedy J. The Halthy Eating Index-2010 is a valid and reliable measure of diet quality according to the 2010 Dietary Guidelines for Americans. *J. Nutr.* 2014; **144:** 399-407.

69. Ervin RB. Healthy Eating Index-2005 total and component scores for adults aged 20 and over: National Health and Nutrition Examination Survey, 2003-2004. *National Health Statistics Reports.* 2011; **44:** 1-10.

70. Hiza HAB, Guenther PM, Rihane CI. Diet quality of children age 2-17 years as measured by the Healthy Eating Index-2010. *Nutr Insight.* 2013; **52:** 1-2.

71. Hong MY, Shepanski TL, Gaylis JB. Majoring in nutrition influences BMI of female college students. *J Nutr Sci.* 2016; **5:** 1-7.

72. Türkiye İstatistik Kurumu, Türkiye sağlık Araştırması, *Yaş Grupları ve Cinsiyete Göre Boy Ortalamaları.* Access 05.05.2018. http://www.tuik.gov.tr/PreTablo.do?alt_id=1095

73. Akdevelioğlu Y, Gümüş H. The Relationship with self rated health status and the overall quality of dietary intake of turkish females: Healthy Eating Index studies. *International Journal of Human Sciences.* 2011; **8:** 410-420.

74. Ren X, Chen Y, He L. Prevalence of underweight, overweight and obesity in university students from the region of Anhui (China). *Nutr Hosp.* 2015; **31:** 1089-1093.

75. Poinhos R, Alves D, Vieira E, Pinhão S, Oliveira BM, Correia F. Eating behaviour among undergraduate students. Comparing nutrition students with other courses. *Appetite.* 2015; **84:** 28-33.

76. Kolka M, Abayomi J. Body image dissatisfaction among food-related degree students. *Nutrition & food Science.* 2012; **42:** 139-147.

77. Gonidakis F, Sigala A, Varsou E, Papadimitriou G. A study of eating attitudes and related factors in a sample of first-year female Nutrition and Dietetics students of Harokopion University in Athens, Greece. *Eat Weight Disord.* 2009; **14:** 121-127.

78. Yu Z, Tan M. Disordered eating behaivours and food addiction among nutrition majör college students. *Nutrients.* 2016; **8:** 1-16.

79. Pıçakçıefe M, Keskinoğlu P, Bayar B, Bayar K. Muğla Sağlık Yüksekokulu öğrencilerinin sigara içicilik sıklığı ve içiciliği arttıran nedenler. *TSK Koruyucu Hekimlik Bülteni.* 2007; **6:** 267-272.

80. Altındağ A, Yanık M, Yengil E, Karazeybek AH. Şanlıurfa'da üniversite öğrencilerinde madde kullanımı. *Bağımlılık Dergisi.* 2005; **6:** 60-64.

81. Uysal N, Khorshid L, Eşer İ. Sağlıklı genç bireylerde konstipasyon sorunun belirlenmesi. *TSK Koruyucu Hekimlik Bülteni.* 2010; **9:** 127-132.

82. Erçim RE. *Üniversite öğrencilerinin beslenme durumlarının değerlendirilmesi ve sağlıklı yeme indekslerinin saptanması*. Ankara, Hacettepe Üniversitesi, 2014.

83. Yiğit Ş, Khorshid L. Ege Üniversitesi Fen Fakültesi öğrencilerinde alkol kullanımı ve bağımlılığı. *Bağımlılık Dergisi*. 2006; **7:** 24-30.

84. Tallant A, Marques B, Martinez N. Dietary changes among first year university students: The Peer-to-Peer (P2P!) Nutrition Project. *The Open Nutrition Journal*. 2015; **9:** 22-27.

85. Delvarianzadeh M, Saadat S, Ebrahimi MH. Assessment of nutritional status and its related factors among Iranian University students: a cross-sectional study. *Iranian Journal of Health Sciences*. 2016; **4:** 56-68.

86. Kruk JJ, Jager-Wittenaar HJ, Nieweg RMB, Schans CP. Do Dutch nutrition and dietetics student meet nutritional requirements during education?. *Public Health Nutr*. 2013; **17:** 1237-1244.

87. T.C. Sağlık Bakanlığı, Hacettepe Üniversitesi. *Türkiye Beslenme Ve Sağlık Araştırması 2010 (TBSA-2010), Beslenme Durumu ve Alışkanlıklarının Değerlendirilmesi Sonuç Raporu.* Sağlık Bakanlığı Yayını: 2014.

88. Cervera Burriel F, Serrano Urrea R, Delicado Soria A, Garcia Meseguer MJ. Food habits and nutritional assessment in a Tunisian University population. *Nutr Hosp*. 2014; **30:** 1350-1358.

89. Hruby A, Hu FB. Saturated fat and hearth disease: The latest evidence. *Lipid Technology*. 2016; **28:** 7-12.

90. Neacşu NA. Effects of carbohydrate consumption. Case study: Carbohydrate in bread. *Bulletin of the Transilvania University of Braşov*. 2014; **7:** 39-44.

91. Mammas I, Bertsias G, Linardakis M, Joanna M, Kafatos A. Nutrient intake and food consumption among medical students in Greece assessed during a clinical nutrition course. *International Journal of Food Sciences and Nutrition*. 2004; **55:** 17-26.

92. Lunn J, Buttriss JL. Carbohydrates and dietary fibre. *Nutrition Bulletin, British Nutrtion Foundation*. 2007; **32:** 21-64.

93. Azadbakht L, Esmaillzadeh A. Macro ve micro- nutrients ıntake, food groups consumption and dietary habits among female students in Isfahan University of Medical Sciences. *Iran Red Crescent Med J*. 2012; **14:** 204-209.

94. Seok HJ, Song KH. A study on dietary habits and nutrient intakes of college students in Gyeonǵǵi Area. *J Community Nutrition.* 2005; **7:** 71-78.

95. Berg MJ. The importance of folic acid. *J Gend Specif Med.* 1999; **2:** 24-28.

96. Grosso G, Bei R, Mistretta A, et al. Effects of vitamin C on health: A review of evidence. *Front Biosci.* 2013; **18:** 1017-1029.

97. Cline J. Calcium and vitamin D metabolism, deficiency, and excess. *Topics in Compan an Med.* 2012; **27:** 159-164.

98. Percy L, Mansour D, Fraser I. Iron deficiency and iron deficiency anemia in woman. *Best Practise & Research Clinical Obstetrics and Gynaecology.* 2017; **40:** 55-67.

99. Dulundu BÇY, Turgut B. Etiyolojisi belirlenemeyen demir eksikliği anemilerinde mutasyon analizi. *Int J Basic Clin Med.* 2016; **4:** 134-143.

100. T.C. Sağlık Bakanlığı Türkiye Halk Sağlığı Kurumu Obezite, diyabet ve Metabolik Hastalıklar Daire Başkanlığı. *Türkiye Aşırı Tuz Tüketiminin Azaltılması Programı.* Ankara: Sağlık Bakanlığı Yayını; 2016.

101. Köksal E, Ermumcu MSK, Mortas H. Description of healthy eating indices-based diet quality in Turkish adults: a cross-sectional study. *Enviromental Health and Preventive Medicine.* 2017; **22:** 1-9.

102. Doostan F, Mohseni-Takolloo S, Nosrati M. Assessment of the ditary pattern of dormitory students in Kerman, Iran. *J Pak Med Assoc.* 2016; **66:** 1054-1059.

103. Bouchenak M, Lamri-Senhadji M. Nutritional quality of legumes, and their role in cardiometabolic risk prevention: A review. *J Med Food.* 2013; **16:** 185-198.

104. Tande DL, Magel R, Strand BN. Healthy Eating Index and abdominal obesity. *Public Health Nutr.* 2009; **13:** 208-214.

105. Michas G, Micha R, Zampelas A. Dietary fats and cardiovaskuler disease: Putting together the pieces of a complicated puzzle. *Atherosclerosis.* 2014; **234:** 320-328.

7. APPENDICES

Appendix 1: Ethical Approval

T.C. YEDİTEPE ÜNİVERSİTESİ

Sayı : 37068608-6100-15-1378
Konu: Klinik Araştırmalar
Etik kurul Başvurusu hk.

23/11/2017

İlgili Makama (Beyzanur Yıldırım)

Yeditepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Bölümü Yrd. Doç. Dr. Binnur Okan Bakır'ın sorumlu olduğu **"Yeditepe Üniversitesi Beslenme ve Diyetetik Bölümü 1. ve 4. Sınıf Öğrencilerinin Diyet Kalitesinin Kendi İçinde ve Diğer Bölüm Öğrencileri ile Karşılaştırması"** isimli araştırma projesine ait Klinik Araştırmalar Etik Kurulu (KAEK) Başvuru Dosyası (**1357** kayıt Numaralı KAEK Başvuru Dosyası), Yeditepe Üniversitesi Klinik Araştırmalar Etik Kurulu tarafından **22.11.2017** tarihli toplantıda incelenmiştir.

Kurul tarafından yapılan inceleme sonucu, yukarıdaki isimi belirtilen çalışmanın yapılmasının etik ve bilimsel açıdan uygun olduğuna karar verilmiştir (**KAEK Karar No: 748**).

Prof. Dr. Turgay ÇELİK
Yeditepe Üniversitesi
Klinik Araştırmalar Etik Kurulu Başkanı

Yeditepe Üniversitesi 26 Ağustos Yerleşimi, İnönü Mahallesi Kayışdağı Caddesi 34755 Ataşehir / İstanbul
T. 0216 578 00 00 www.yeditepe.edu.tr F. 0216 578 02 99

Appendix 2: Consent Form

BİLGİLENDİRİLMİŞ GÖNÜLLÜ OLUR FORMU

Yeditepe Üniversitesi Beslenme ve Diyetetik Bölümü ile Eğitim Fakültesi'nden rastgele seçilecek olan bir bölümde, araştırmacı Dyt. Beyzanur Yıldırım tarafından "Yeditepe Üniversitesi Beslenme ve Diyetetik Bölümü 1. ve 4. Sınıf Öğrencilerinin Diyet Kalitesinin Kendi İçinde ve Diğer Bölüm Öğrencileri ile Karşılaştırılması" adlı çalışma yapılacaktır. Bu çalışmadan elde edilecek bulgular ile ülkemizin üniversite öğrencilerinin beslenme durumu hakkında fikir sahibi olunması ve yetersiz/dengesiz/aşırı beslenme durumu söz konusu ise bu durumu düzeltmek adına yapılacaklara kaynak oluşturulması amaçlanmıştır. Çalışmaya katılım gönüllülük esasına dayanmaktadır. Bu bilgileri okuyup anladıktan sonra çalışmaya katılmak isterseniz onay formunu imzalayanız. Bu araştırmaya katılmanız araştırmanın başarısı açısından önemlidir.

Eğer araştırmaya katılmayı kabul ederseniz size 24 saatlik geriye dönük besin tüketim kaydı ile anket formu uygulayacağız. 24 saatlik besin tüketim kaydı formu ile son 24 saat boyunca yediğiniz ve içtiğiniz besinler sorulacak ve kaydedilecektir. Anket formu 9 sorudan oluşmaktadır ve yaklaşık olarak 2 dakika zamanınızı alacak bu sorular sizin genel özelliklerinizi, beslenme durumunuzu, sağlık durumunuzu, boy, vücut ağırlığı, öğün sıklığınız, öğün atlama durumunuz, besin desteği kullanımı ile ilgili birtakım soruları içermektedir. Size ait alınan tüm bilgilerin gizliliği araştırmacı tarafından korunacaktır.

Bana yapılan tüm açıklamaları ayrıntılarıyla anlamış bulunmaktayım. Bu koşullarla söz konusu araştırmaya hiçbir baskı ve zorlama olmaksızın "gönüllü katılımcı" olarak katılmayı kabul ediyorum. İmzalı bu formun bir kopyası bana verilecektir.

Gönüllü Katılımcı	**Katılımcı İle Görüşen Araştırmacı**
Adı- Soyadı:	Adı Soyadı: Beyzanur YILDIRIM
Adres:	Adres: Şair Erdem Beyazıt Caddesi, Onurkent Sağlık Kompleksi Kat:2 No:4, Başakşehir/İSTANBUL
Tel:	Tel: 0212 485 36 28
İmza	İmza
Tarih:	Tarih:

Appendix 3: Questionnaire Form and 24HR Recall Form

ANKET NO:

ANKET FORMU

1. Cinsiyet: a) Kadın b) Erkek
2. Doğum Tarihi:

3. İkametgah durumu:
a) yalnız, evde
b) ailemle birlikte, evde
c) arkadaşımla birlikte, evde
d) yurtta

4. Ağırlık(kg)
5. Boy(cm):

6. Sigara kullanıyor musunuz?
a) hayır, içmiyorum
b) evet, içiyorum ……………adet/gün

7. Alkol tüketiyor musunuz?
a) hayır, tüketmiyorum
b) evet, tüketiyorum

7.1. Cevabınız evet ise hangi türü, ne sıklıkla ve ne kadar içersiniz?
En sık……………………………. İçerim
Hergün/ Haftada/ Ayda/ Yılda……………………….. Bardak/ Kadeh/ Kutu/ Şişe

8. Doktor tarafından tanısı konmuş, kronik bir hastalığınız var mı?
a) hayır
b) evet ise adı …………………………

9. Vitamin/mineral/besin takviyesi kullanıyor musunuz?
a) hayır
b) evet ise adı:…………
kullanma sıklığı ve miktarı:……………

FORM NO:
AD-SOYAD:

24 SAATLİK GERİYE DÖNÜK BESİN TÜKETİM FORMU

<u>AÇIKLAMA:</u> *Son 24 saat içerisinde yediğiniz ve içtiğiniz besinleri tüketilen saati belirterek miktarları ile beraber kaydedin. Bu yiyecek ve içeceğin içine giren besinleri kaydedin.*

ÖĞÜN ADI	ÖĞÜN SAATİ	YİYECEK/İÇECEK ADI	İÇİNE GİREN BESİNLER	MİKTAR	
				EV ÖLÇÜSÜ	NET (mL/gr)

8. CURRICULUM VITAE

Personal Information

Name	Beyzanur	**Surname**	YILDIRIM
Place of Birth	Bakırköy	**Date of Birth**	21/10/1993
Nationality	Turkish	**ID No:**	24742636532
E-mail	Dyt.beyzanur.yildirim@gmail.com	**Telephone**	05394107780

Education Status

Degree	Department	Name of the Schools	Year of Graduation
Licence Degree	Nutrition and dietetic Departmant	**Marmara University**	2015
High School		**Fatih Gelenbevi Anadolu Lisesi**	2011

Foreign Languages	YDS Score
English	66.25

Working Experience

Job	Institution	Duration (Year - Year)
Dietitian	Başakşehir İlçe Sağlık Müdürlüğü	2016-
Research Assisstant	İstanbul Sabahattin Zaim University	2016-2016

Computer Knowledge

Program	Usage
Office Programs	Very good
Statistical Package for the Social Sciences (SPSS)	Good
Bilgi Beslenme Sistemi (BEBIS)	Very Good