

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

**EVALUATION OF NUTRITION LABEL USAGE OF  
HEALTH SCIENCES STUDENTS AT A FOUNDATION  
UNIVERSITY**

MASTER THESIS

MERVE NUR AKDEMİR TÜFEKÇİLERLİ

İstanbul–2019

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## THESIS APPROVAL

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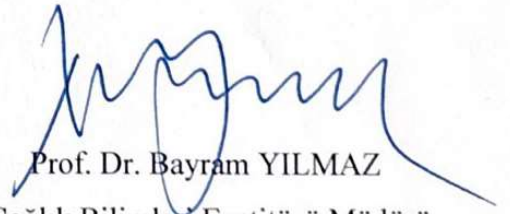
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### ONAY

Bu tez Yeditepe Üniversitesi Lisansüstü Eğitim-Öğretim ve Sınav Yönetmeliğinin ilgili maddeleri uyarınca yukarıdaki jüri tarafından uygun görülmüş ve Enstitü Yönetim Kurulu'nun 28/06/2019 tarih ve 2019/11-59 sayılı kararı ile onaylanmıştır.

  
Prof. Dr. Bayram YILMAZ  
Sağlık Bilimleri Enstitüsü Müdürü

## DECLARATION

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

16/07/2019

İmza

Merve Nur Akdemir Tüfekçilerli

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## LIST OF ABBREVIATIONS

<b>FDA</b>	Food and Drug Administration
<b>NLEA</b>	Nutrition Labeling and Education Act
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>PAHO</b>	Pan American Health Organization
<b>UPF</b>	Ultra-Processed Food
<b>USA</b>	United States of America
<b>UK</b>	United Kingdom
<b>BMI</b>	Body Mass Index
<b>WHO</b>	World Health Organization

## ABSTRACT

**Akdemir Tüfekçilerli, M. N. (2019) An Evaluation of the Status of the Students' Usage of Nutrition Labels in a Foundation University's Faculty of Health Science. Yeditepe University, Institute of Health Sciences, Department of Nutrition and Dietetics, Master Thesis. Istanbul.**

This study was conducted to evaluate the usage of nutrition labels and examine the factors affecting the usage of nutrition labels by the students who receive education in a foundation university's Faculty of Health Sciences in Istanbul. Nutrition and Dietetics (n=106), Physiotherapy and Rehabilitation (n=97) and Nursing (n=72) Departments, 243 female and 32 male students (n=275) between the age of 18 and 25 have accepted to take part in the study. The research was conducted as a cross-sectional descriptive study. The data of the research was obtained through the application of the developed form as a data collection tool. The socio-demographic characteristics, anthropometric measurements, physical exercise status, basic nutrition knowledge, usage of nutrition labels and opinions about nutrition labels of the participants have been evaluated. The average Body Mass Index (BMI) of the participants was  $21.55 \pm 2.91$ , and 78.8% of them are in normal BMI range. It was determined that 66.9% of the participants do read the nutrition labels. Participants find the expiration date to be the most important factor while they purchase food. The most examined information found on the nutrition labels were determined to be the sugar, ingredients, calorie/energy and the serving size. The least examined information was determined to be the sodium/salt, preservative content, sweetener information and allergen warnings. The connection between being a Nutrition and Dietetic student and reading the nutrition label and finding the distribution of the nutrient content during the purchasing of food products is statistically significant ( $p < 0.05$ ). While the male students found the price to be the more important factor during purchasing, the female students found the ingredients more important ( $p < 0.05$ ). It is thought that there is a positive association between nutritional information and the use of nutrition labels, and it is observed that although the university students think that the nutrition labels are useful, they do not use them effectively.

**Key Words:** Nutrition label, Food label, Nutrition label use, Nutrition knowledge

## ABSTRACT (Turkish)

**Akdemir Tüfekçilerli, M. N. (2019) Bir Vakıf Üniversitesindeki Sağlık Bilimleri Fakültesi Öğrencilerinin Besin Etiketleri Kullanım Durumunun Değerlendirilmesi. Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Anabilim Dalı, Master Tezi. İstanbul.**

Bu çalışma, İstanbul ilindeki bir vakıf üniversitesinde Sağlık Bilimleri Fakültesi'nde eğitim gören öğrencilerin besin etiketleri kullanım durumlarını ve besin etiketleri kullanımını etkileyen faktörleri değerlendirmek amacıyla yapılmıştır. Beslenme ve Diyetetik (n=106), Fizyoterapi ve Rehabilitasyon (n=97) ve Hemşirelik (n=72) bölümlerinde 1.,2.,3. ve 4. sınıflarda okuyan, çalışmaya katılmayı kabul eden, yaşları 18 ile 25 aralığında olan, 243 kadın, 32 erkek öğrenci (n=275) ile yapılan araştırma kesitsel tipte tanımlayıcı olarak gerçekleştirilmiştir. Çalışmanın verileri, veri toplama aracı olarak geliştirilmiş formun uygulanmasıyla elde edilmiştir. Araştırmaya katılanların sosyodemografik özellikleri, egzersiz yapma durumu, antropometrik ölçüleri, temel beslenme bilgisi, besin etiketleri kullanımı, besin etiketleri hakkındaki düşünceleri ile ilgili veriler değerlendirilmiştir. Katılımcıların Beden Kitle İndeksi (BKİ) ortalaması  $21,55 \pm 2,91$ 'dir ve %78,8'i normal BKİ değerine sahiptir. %66,9'unun besin etiketleri okuduğu, gıda satın alma sürecinde en çok son tüketim tarihini önemli buldukları belirlenmiştir. Besin etiketinde en sık şeker, içecekler, kalori/enerji, porsiyon miktarı gibi bilgilere bakıldığı görülmüştür. En az bakılan bilgiler ise sodyum/tuz, koruyucu içeriği, tatlandırıcı bilgisi ve alerjen uyarısıdır. Beslenme ve Diyetetik Bölümü öğrencisi olma ve besin etiketleri okuma, satın alma sürecinde besin içerik dağılımını önemli bulma arasındaki ilişki istatistiksel açıdan anlamlıdır ( $p < 0,05$ ). Erkek öğrenciler satın alma sürecinde fiyatı daha önemli bulurken, kadın öğrencilerin ise içecekleri önemli bulduğu görülmüştür ( $p < 0,05$ ). Beslenme bilgisi ve besin etiketleri kullanımı arasında pozitif bir ilişki olduğu düşünülmektedir. Üniversite öğrencilerinin besin etiketlerinin kullanışlı olduğunu düşünmelerine karşın yeteri kadar etkili kullanmadıkları görülmektedir.

**Anahtar Kelimeler:** Besin etiketleri, Gıda etiketleri, Besin etiketleri kullanımı, Beslenme bilgisi

## 1. INTRODUCTION

One of the most challenging situations around the world in public health concerns the development of a healthy lifestyle and nutrition. Nutritional diseases such as obesity, diabetes and metabolic syndrome in modern societies have remarkable effects on individuals' health (1).

As a result of the adaptation of people to modern life, the trend towards ready and packaged foods is increasing. Thus, processed foods are important part of today's food sector (2). Processed foods contain high amounts of refined sugar, salt, saturated and trans fats. Therefore, it is known that processed foods lead to nutrient-related obesity and non-communicable diseases caused by diet (3).

The prevalence of obesity has increased dramatically worldwide in recent years and continues to increase (4). Obesity results from an imbalance in individuals' energy intake and expenditure, but the social dimension of this imbalance has not yet been fully elucidated. Increased availability of foods with high energy content is in parallel with the obesity epidemic. An important part of the struggle against obesity is to educate the community about nutrition and nutritional components of the foods they buy. A nutrition label is a tool that covers information such as serving size, calorie and nutritional value of a product and informs the consumer about the product content. It has been shown in various studies that nutrition label reading habit plays a role in reducing the occurrence of chronic diseases, weight control and healthy nutrition by helping individuals to choose healthy food (5–7). The use of nutrition labeling is thought to be due to the mechanism of its effect on obesity, as the information on the calorie content in the nutrition label, provides motivation and guidance for individuals to consume the appropriate amount of calories for weight management (8).

Nutrition labels are also an important part of food safety as they provide information to the consumers about products, protect them from wrong information and help consumers make informed choices (9). In recent years, although many studies have been carried out to reveal the importance and effects of the use of nutrition labels around the world, this issue has not been given sufficient importance in our country. The nutrition label, which was previously left to the request of the manufacturer in our country, was made compulsory in 2017 (10).

The declaration of the nutrition content in nutrition labels by the companies in Turkey being optional subject in the early days, the nutritional label not being in a specific format, the consumers not knowing how to use nutrition labels for consumers and the lack of sufficient knowledge of nutrition to interpret has led to reading nutrition labels less. Increasing the frequency of reading nutrition labels, using the information stated on the nutrition label for the purpose and interpreting it correctly will contribute to the increase of the country's welfare in terms of economic, social and cultural aspects by preventing the abovementioned nutritional diseases and increasing the health awareness in the society overall.

Physical factors related to nutrient labeling, time that can be devoted to label reading, nutritional information, age, gender, marital status, educational level and socioeconomic status, and concern about the accuracy of the declared information affect the frequency of reading nutrition labels (11–13).

The main purpose of this study is to investigate the use of nutrition labels in food purchasing processes of university students. The research questions of our study are as follows:

- How often do university students read the label information?
- What are the factors affecting the frequency of nutrition label reading of university students?
- Does basic nutritional information affect nutritional label reading?
- Which of the information on the nutrition label university students pay more attention to?
- What factors affect university students more in decision-making during the purchasing process?
- Do sociodemographic characteristics of university students affect nutritional status, frequency, or what information they pay more attention to?

## **2. LITERATURE REVIEW**

### **2.1. Definition of Nutrition Label**

Nutrition labels are used to inform customers and to help sell the food products (9). The primary purpose of the nutrition labels is to provide the consumers information about the nutritional content of the food product they purchase in order to help them choose the food product that is appropriate for them. It is an attractive tool for a multitude of reasons: while supporting the goal of healthy eating, it also preserves the consumer's freedom of choice and reduces the cost of searching for information, which increases the likelihood of using the information provided. (14)

It allows healthier food choices by providing the necessary information, while not being the reason for it, it achieves this by providing a basic connection between the motivation to make the dietary changes and the ability to do it (15).

Consumer's right to obtain information allows them to make informed choices when choosing food products. Titles that are presented to consumers for information may take several forms: safety information on ingredients and additives, philosophical or ethical issues (mode of production, absence or presence of a particular ingredient, e.g. genetically modified foods), as well as nutritional information and notification of potential allergens (9).

### **2.2. History of Nutrition Labels**

Nutrition labeling of food products started in 1970's under U.S. Food and Drug Administration's (FDA) management. Initially, if a nutrient was added to a food product due to concerns about nutritional deficiencies, or if a nutrition claim was made, it was obligatory to state that within the nutrition label and it was started to be used for such purposes and aside of this, it was optional. But in the 1980's, more and more scientific discoveries regarding health and diet were made, thus consumers interest in diet began to increase in order to improve health. Food manufacturers have begun to multiply their nutrition claims to use consumers' interest to market food products. As a result, both consumers and manufacturers have expressed concern about the reliability of the information contained in the nutrition label and the potential of misleading the consumers. As a result of these events, in 1990 in the FDA congress, the Federal Food, Drug and Cosmetics Act which was issued in 1938 was changed, and passed the

Nutrition Labeling and Education Act (NLEA). This law obliges certain quantities of nutrient content to be indicated on packaged nutrition labels. The same law established a framework for producers to declare reliable, non-misleading food content declarations and health statements on food labels that they can use voluntarily. It also encouraged manufacturers to produce food products with better nutritional content, such as food products containing less saturated fat and sodium (15, 16).

In 1993, for the first time in Europe, it was required for the product to report the serving size information and the amount of portions contained in each package with the nutrition label if a nutritional declaration such as “low fat”, “high fiber”, or “reduces blood cholesterol levels” were made. According to the declaration, it was requested to specify the percentage of daily intake values of either group containing four nutrients (energy, protein, carbohydrate and fat) or eight nutrients (previous four plus sugar, saturated fat, fiber and sodium) (17). Although nutrition label notification was not mandatory in the early days, it was made compulsory by the decision of the European Parliament and Council in 2011 after long discussions. With this regulation, food producers are obliged to declare the energy value, fat, saturated fat, carbohydrate, sugar, protein and salt amount for 100 g and 100 mL of packaged food by nutrition labels (18).

Information on nutrition labels, being used for the first time with the European Union harmonization process in Turkey was collected in 2008 and it was observed that its usage was low (19). Within the framework of the harmonization with the legislation of the European Union, Food Labeling and Consumers Information Regulation was prepared by taking into account the Regulation of European Parliament and Council No. 1169/2011 on the Information of Consumers on Foods dated October 25, 2011. With this regulation, the general rules, requirements and responsibilities related to information about food, especially labeling of foods, have been determined. Labeling in terms of nutrition in the previous case, was optionally made or expected to be made if the food meets certain requirements, is required by this arrangement on all pre-packaged food labels. On pre-packaged food labels; the amount of nutrients (fat, saturated fat, trans fat, carbohydrate, sugar, protein and salt) was obligated to be included in 100 g or 100 mL of food with the energy value.

Food businesses that are currently active are given 3 years to comply with the regulations. Enterprises must comply with the provisions of the Regulation until 31

December 2019. Foods labeled or placed on the market before this date may be available until the end of their shelf life (10).

### **2.3. Classification of Processed Foods**

#### **2.3.1. NOVA system**

Food processing level is determined by the NOVA system, which is recognized as a valid instrument for nutrition and public health policies and actions by the United Nations Food and Agriculture Organization (FAO) and the Pan American Health Organization (PAHO). When grouping, all physical, biological and chemical methods used in the production process of food are taken into consideration. There are 4 groups in the NOVA classification system; Group 1: unprocessed or slightly processed foods, Group 2: processed kitchen ingredients, Group 3: processed foods, Group 4: ultra-processed foods (UPFs) (20).

1st Group - Unprocessed or slightly processed foods:

Vegetable (seed, fruit, leaf, stem, root) or animal (muscle, offal, egg, milk), substances collected from nature. Minimally processed foods are natural foods that are altered by processes such as removal of inedible or unwanted parts, drying, boiling, crushing, fractioning, grinding, roasting, filtering, non-alcoholic fermentation, pasteurization, cooling, freezing, placing in containers and vacuum packaging. It is the process applied to protect natural food, to make it suitable for storage, to make it safe or edible or to make it more enjoyable to consume, while substances such as salt, sugar and fat are not added to the original food.

2nd Group - Processed kitchen ingredients:

Oil, butter, sugar, salt produced after being obtained from the nature or from the foods in the 1st group by pressing, refining, grinding, spray drying. They are not consumed alone. They are used in combination with the foods of group 1 to prepare soups, broths, bread, canned food, salads, drinks, desserts etc..



### 3rd Group - Processed foods:

It includes products that have undergone production processes to maintain, differentiate or improve its flavor. They are generally 2-3 components undergone through relatively simple processes. Typical examples are; canned vegetables, fish, legumes; salted, dried or smoked meats, fruits, cheeses and breads in syrup.

### 4th Group - Ultra-processed foods:

They are products which contain many components together and are produced with a specific formula. Usually contains additives like sugar, fat, salt, antioxidants, stabilizers, preservatives etc. Some of the substances in this group include substances such as casein, lactose, whey, gluten directly derived from food, and some include hydrogenated or interesterified oils, hydrolyzed protein, soy protein isolate, maltodextrin, invert sugar and high fructose corn syrup from further processing of food components. Some additives are also used to increase the sensory properties of foods, hide unpleasant aspects, and extend shelf life. Soft drinks, sweet or salty packaged snacks, pre-made frozen dishes, ice cream, chocolate, confectionery, etc. are generally branded, low-cost content, long shelf life, ready for consumption, attractive, extremely tasty foods often packaged and marketed in attractive form (21).

### **The Relationship of Ultra Processed Foods with Health**

Ultra-processed foods are generally poorer in nutrient quality, with higher energy density, more sugar, unhealthy fats, and much poorer than unprocessed foods in terms of dietary fiber, protein, vitamins and minerals. This has been demonstrated in national diet research studies in Brazil, Chile, Colombia, Mexico, USA, Canada, UK, France, Belgium, Australia, New Zealand and Japan.

Experimental studies have shown that these foods provide low satiety, cause a high glycemic response and trigger inflammatory diseases by creating a nutrient environment that will allow the growth of harmful bacteria in the intestine. Cross-sectional and longitudinal studies have shown that ultra-processed foods have a dose-response relationship with obesity, hypertension, cardiovascular diseases, dyslipidemia, metabolic syndrome, gastrointestinal diseases, all cancers and breast cancer, depression, and death due to all these causes (22).

## 2.4. Studies on the Use of Nutrition Labels

Satia et al. (2005) examined the relationship between the use of nutrition labels with demographic, behavioral and psychosocial factors, and reported that 78% of the participants read the nutrition labels during the purchasing process of packaged food products. They reported that the use of nutrition labels was significantly higher in women, older individuals, high school educated individuals, and obese individuals. After eliminate demographic characteristics, the most powerful psychosocial aspect of nutrition label use were found to be healthy self-efficacy, strong belief in the diet-cancer relationship, and trying to lose weight. It was determined that participants who use labels frequently consumed more fruits and vegetables and their dietary fat intake was lower (5).

In a study by Jasti and Kovacs (2007) related to the use of trans fat information on nutrition label with 222 university students in New York, 37% of the participants stated that they did not look at the trans fat information on nutrition labels. It was found that males and ethnic minority groups used information about the amount of trans fats reported on the nutrition label less and had fewer information about trans fats than women and non-Hispanic whites. Trans fat information and low fat diet were considered to be positively related to both the use of nutrition label and the use of trans fat information on the nutrition label. The lack of use of nutrition label and trans fat information on nutrition label was found to be associated with higher consumption of fried foods (23).

Rasberry et al. (2007) conducted a study with 1294 university students in Texas and found that those using nutrition labels had more information, appropriate attitudes, and more accurate perception about the concept of diet-disease relationship. It was found that women had more information about the nutrition label than men, and had the appropriate attention and used the nutrition label more frequently. It was found that the reasons such as health and weight control and nutrition knowledge results looking at specific information and more frequent use of nutrition labels. It has been found that the desire for a certain food, time constraints and "ignorance" attitude decreases the frequency of nutrition label usage (24).

Misra Ranjita (2007) stated that previous nutritional education and positive attitudes were the most direct and strongest factors affecting nutrient label use in a study in which she investigated the use of nutrition labels, knowledge and behaviors in 537 university students. It was reported that female students read nutrition labels more often than male students and older students read nutrition labels more often than younger students, 44% of all students read nutrition labels (25).

Yılmaz et al. (2009) reported that the consumer behavior dynamics of consumers in foodstuffs in the Thrace region were examined in terms of production and consumption dates, taste-flavor, food processing and hygiene, respectively. Another issue that consumers find important to is the price (26).

Jacobs et al. (2010), in a study conducted by adult consumers to understand and use the information on the nutrition label, reported that the last consumption date, contents and nutritional information such as fat, cholesterol are the most commonly used information on the label. The difficulties regarding the use of nutrition labels are explained by the small font size of the label, the fact that taste and price are more important than the nutritional content of the food, the lack of educational and nutritional information and the time constraints of individuals. They stated that nutrition label usage and food purchasing processes are related to many internal and external factors and they are summarized in the literature as in Figure 1.

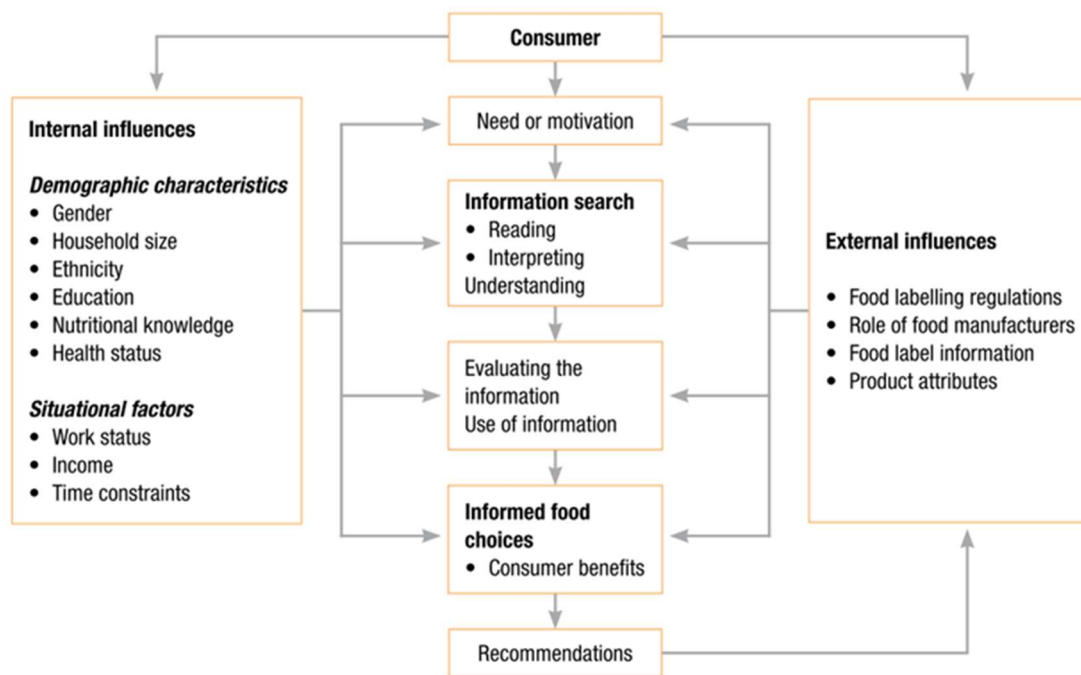


Figure 1. Conceptual framework for consumers to understand and use the information on the food label

Jacobs SA, Beer H De, Larney M. Adult consumers' understanding and use of information on food labels: a study among consumers living in the Potchefstroom and Klerksdorp regions, South Africa. 2010; 14(3): 510-522.

Grunert et al. (2010) observed the use of nutrition labels by 2019 consumers in three major retail stores in the UK, then conducted face-to-face interviews at the store, and finally 921 participants responded to the questionnaire to be answered at home. In the six product categories, 27% of the participants looked at the nutritional information on the label, and the daily reference intake and nutritional values table were the primary sources examined. It was seen that consumers understood the information in front of the package at a high percentage of 87.5% and as a result, they could identify the healthy product. It is pointed out that although the nutrition label reading is mainly related to being concerned about healthy eating, the ability to understand the information on the nutrition label is more related to nutritional knowledge. They reported that both reading the nutrition label and understanding nutritional information on the nutrition label were affected by demographic variables in different ways (27).

Campos et al. (2011) reported in their review that they included 120 research articles that nutrient label usage status changed among different groups. They reported that middle-aged or young adults were more prone to using nutrition labels, while women used more nutrition labels than men and low-income groups used less nutrition labels. They concluded that there is often a link between nutrition label reading and having a healthy diet (28).

Norazmir et al. (2012) stated that the most frequently used information in the nutrition label is the list of ingredients in Malaysia, and the least frequently used information is the percentage of daily reference intake. More than half (53.6%) of the participants stated that they did not use nutrition labels because they could not understand the terms on the nutrition labels. Nutrition label users (38.4%) reported that they used to look for specific nutritional information. According to the results of the study, it is reported that young adults have little understanding of the nutrition label due to insufficient nutritional information and therefore cannot use it sufficiently (29).

Mahdavi and friends (2012) in a cross-sectional study conducted with 332 university students aged 18-25 in Iran, a questionnaire was applied to the students of five different departments. As a result of the study, it was seen that 89.2% of the students believed that nutrition labels had an effect on eating consciousness, 77.4% found that nutrition labels were useful and 79.2% did not find the nutritional statements found on the nutrition labels reliable. Only 26.2% of the students stated that they trust the accuracy of the information given on the nutrition label, while 49.1% said they found the nutrition labels understandable. For 84% of students, the last consumption date and storage conditions on the nutrition label are the most important information on the label. While 47.6% of the students reported that they looked at the nutrition facts section frequently or always while shopping, only 32.3% of them were found to use nutrition labels to adapt the food to their daily diet. Fatty acids were found to be the least observed section on nutrition labels with 1.9% attention. It was found that the students' behavior towards importance of nutrition labeling and health statements, their trust in nutritional statements, knowledge, attitudes and were significantly different based on department (30).

Besler et al. (2012) reported that the use of nutrition labels was 72.4% in a survey conducted with 1536 consumers between the ages of 12-56 and there was a

significant relationship between gender, age, education level and socioeconomic variables. They identified barriers to the use of nutrition labels as insufficient understanding of expressions, symbols and values on the label, poor presentation of information on the label, and concerns about the accuracy of the information written. Consumers, who want to use food labels to make healthy choices, have stated that they want a standardized location on the package for the nutrition label and present the label in a standardized format, as well as a clear explanation and simplification of the label information (11).

Cooke and Papadaki (2014) conducted an online survey with 524 participants at 37 universities in the UK in 2013 regarding the use of nutrition labels, 333 participants used nutrition labels and 191 did not use them. It was found that the majority of the participants met the dietary recommendations for fat, added sugar and fast food while not meeting recommendations for the amounts of calcium, dairy products, fiber, fruit and vegetables. While the dietary quality score of women was found to be significantly higher than men, it was found that they also met the recommended daily intake of fruits and vegetables compared to men, while men had higher fast food consumption (31).

In Aday and Yener's (2014) study to understand the impact of packaging and nutrition labels during buying process of young consumers in Turkey, it was found that many consumers read the labels, but also state that it is hard to understand the content. Production and expiry dates and contents have been considered as important information on the food label by consumers. It has been determined that women pay more attention to fat content information and men care about protein content more (32).

Christoph et al. (2015), have evaluated 16 university survey studies which were conducted in the USA, UK, Canada and South Korea. The reported prevalence of nutrient label use varies widely, and according to the weighted average calculation, 36.5% of university students and young adults use nutritional labels at all times or frequently. Women were more likely to use the nutrition label than men. The use of nutrition label was found to be related with attitude towards healthy nutrition, trusting nutrition labels in food selection, self-efficacy and nutritional knowledge and education (33).

Tam et al. conducted a study with 653 university students in 2015, 93% of the students on campus frequently consumed hot drinks and sandwiches, and the main factors determining the choice of food were taste, value, convenience and price. It was found that female students were more concerned with health-related factors and adopted more special dietary behaviors than male students (34).

Lim et al. in a research conducted by female students in a Korean college in 2015 on the use of nutrition labels, it was concluded that behavioral beliefs of “comparison and better food selection” and “choosing healthy food” were statistically related to nutrition label usage in individuals who frequently used nutrition labels, whereas negative beliefs of those who did not use nutrition labels were “boring”. It is reported that the main sources of information about the use of nutrition labels are parents, siblings and close friends (35).

Miller and Cassady (2015) compiled studies on the effects of nutritional information on nutritional label use and concluded that having nutritional information supports the use of nutritional label and prepared a cognitive model about it (Figure 2). However, measurement of nutritional information has shown a great difference in studies because it contains very different dimensions and is a wide-ranging subject (36).

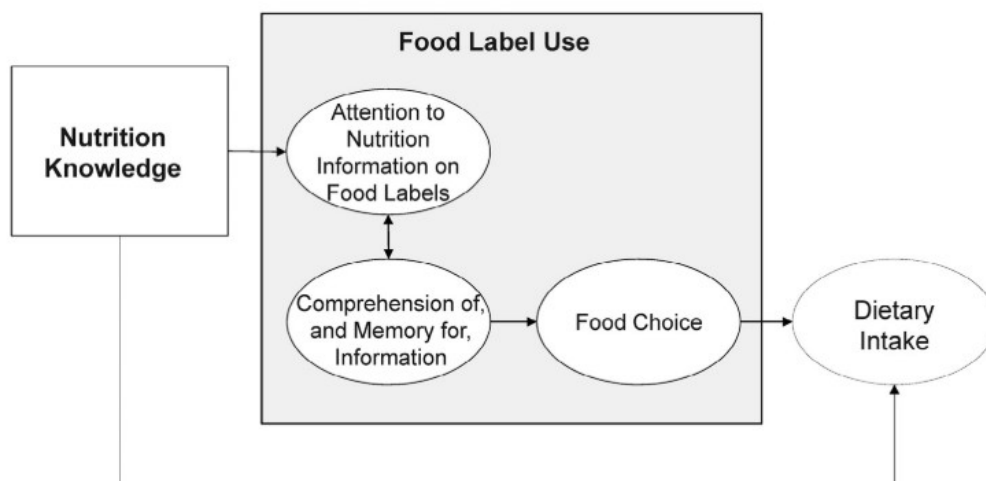


Figure 2. Cognitive model of nutrition label use

Miller LMS, Cassady DL. The effects of nutrition knowledge on food label use. A review of the literature. *Appetite*. 2015; 92: 207-216.

Koen et al. (2016), in his review of the past and present situation of food and nutrition label use, reported some common results from the evidence-based studies on nutrition label usage since 1991. The data collected on the use of nutrition labels in the researches were created with the individuals' own statements and it was revealed in many studies that label use was widespread. However, it was determined that consumers had difficulty in interpreting the quantitative information on the label, and also reported that the label formats and the numerous information mentioned were confusing. It has been demonstrated by studies that consumers find graphic information such as logo more understandable than nutrition label information given in tabular form in the traditional way (37).

Karadağ and Türközü (2017) determined that in 10 cities of Turkey, in 1200 consumers aged between 18-65 years, the education level rises along with increased frequency of reading nutrition labels. It is found that female consumers have more nutritional declaration information than men. Nutritional statements, which are often read, were determined to be trans fat free and low fat / non-fat declarations, while the organic declaration is the most examined statement in the fruit and vegetable purchasing processes. The most commonly read health statements were said to be “low cholesterol helps to protect cardiovascular health” (38).

Gül and Dikmen (2018) reported their research on nutrition label reading habits and allergen knowledge levels in 410 women between 19-44 years of age living in Hatay, it was found that more than half of the individuals read nutrition labels when purchasing products. Milk and dairy products were the most read nutrition label and carbonated drinks were the least read. They stated that 57% of consumers knew the reason why the allergens on the nutrition label were written in bold. As a result of the research it was found that individuals read the nutrition labels but they do not understand the information written on them (39).

Mhurchu et al. (2018) investigated how individuals use nutrition labels in their purchasing process and how they affect their nutritional habits by a telephone application was designed to track whether consumers purchased packaged foods by scanning barcodes for four weeks. 23% of the products purchased by 1255 people scanned the nutrition label and found that the frequency of use decreased over time. It was observed that consumers mostly looked at the nutrition label of ready meals,



breakfast cereals, snack foods, bread and bakery products and cooking oils. It was determined that they looked least at the label of sugar and honey products, eggs, fish, fruits and vegetables. It is observed that they look at the label most when the nutritional content of packaged foods was heterogeneous and ambiguous. They found that there was a positive relationship between the participants looking at the nutrition label of the products during shopping and the healthiness of the product they prefer at the end of the purchase process. The use of nutrition labels has been said to provide a healthier food choice (40).



### 3. MATERIALS AND METHODS

This research was carried out at the cross-sectional level in order to determine the nutrition label usage of university students, to determine the factors that affect the use and to develop strategies to increase the use.

The research was conducted in the departments of Nutrition and Dietetics, Physiotherapy and Rehabilitation and Nursing at the Faculty of Health Sciences of a university.

Scientific ethical principles were taken into consideration in planning the research. Subsequently, the research proposal was submitted to the Yeditepe University Clinical Research Ethics Committee and it was found ethically and scientifically appropriate by the decision of the Board dated 14.02.2018 (Annex-1) of decision 810.

The universe of the study consists of the students studying at the undergraduate level in the 2017-2018 academic years at the Faculty of Health Sciences of the selected university.

The sample of the study consisted of 275 volunteer participants (243 females and 32 males) who participated in the 1st, 2nd, 3rd and 4th grades at the undergraduate level in Nutrition and Dietetics, Physiotherapy and Rehabilitation, Nursing departments between March 2018 and April 2018. The age range of the participants was 18-25. The mean age of the participants was 21.55 and their average BMI was 21.55.

Firstly, the content and purpose of the research were explained to the participants during the study and then a written informed consent form was obtained from the participants (Appendix-2).

Distribution of participants according to their departments were; Nutrition and Dietetics: 106, Physiotherapy and Rehabilitation: 97, and Nursing: 72.

The research data were obtained by the data form consisting of 6 sections and 51 questions developed by the researcher in the light of the literature (Appendix-3). It took approximately 10 minutes to complete the data form during the application.

While preparing the data form and the information used in the research, data were obtained from research articles published in international and Turkish journals

published in the field of nutrition, and Databases such as Google Scholar, Science Direct, PubMed, Web of Science, Springer Link. While searching the literature, related keywords were used and generally the publications of the last 10 years were taken into consideration.

In the data form, participants were asked questions about socio-demographic characteristics (age, gender, department, class, monthly income, etc.) and exercise status, anthropometric measures, basic nutritional information, use of nutrition labels, and thoughts about nutrition labels.

The independent variables of the study consisted of socio-demographic characteristics, anthropometric measurements and basic nutrition knowledge of the students.

Dependent variables of the study were determined as the students' usage of nutrition label usage, and their thoughts on nutrition labels while purchasing food.

The height and weight declared by the participants were calculated according to the BMI classification of the World Health Organization (WHO). WHO's adult weight status using BMI was identified and BMI data were grouped according to this scale (<18.5 kg / m<sup>2</sup> underweight, 18.5 - 24.9 kg / m<sup>2</sup> normal, 25.0 - 29.9 kg / m<sup>2</sup> overweight, ≥30.0 kg / m<sup>2</sup> obese)

Statistical analysis of the data was performed by using SPSS (IBM SPSS Statistics 24) package program on computer environment. Frequency tables and descriptive statistics were also used in the evaluation of the data.

“Kruskal-Wallis H” test ( $\chi^2$ -table value) statistics were used to compare 3 or more independent groups with normal distribution and measured as Median [Min.-Max.].

“ $\chi^2$ -cross tables” are used according to the expected value levels in examining the relationship between two qualitative variables. (Pearson, Yates-continuity correction). Data were evaluated at  $p < 0.05$  significance level.

#### 4. RESULTS

Upon inspection of Table 1: It was found that 106 attendants (38.5%) studied in the Nutrition and Dietetics department, along with 97 attendants (35.3%) in the Physiotherapy and Rehabilitation department, and 72 attendants (26.2%) in the Nursing department.

It was determined that 113 (41.1%) of the participants were 1st grade students, 53 (19.3%) were 2nd grade students, 69 (25.1%) were 3rd grade students and 40 (14.5%) were 4th grade students.

Of all the participants, 178 of them (64.7%) were in the 21-23 age group, 78 (28.4%) were under 20 years old, 19 (6.9%) were 24 years and older, and the mean age of the participants was  $21.55 \pm 1.12$  (years).

243 participants (88.4%) were female and 32 participants (11.6%) were male.

105 (41.7%) of the participant's nuclear families had a monthly income of 1500-4999 TL, 88 (34.9%) had a monthly income of 5000-9999 TL, 38 (15.1%) had a monthly income of 10000, 19 people (7.5%) had 20000 TL and above, and 2 people (0.8%) had less than 1500 TL.

127 of the participants (46.2%) stayed with their families, 51 (18.5%) lived alone, 45 (16.4%) stayed in the university dormitory, 42 (15.3%) lived with friends and 10 people (3.6%) were staying in other private dormitories.

Table 1. Distribution of demographic and other characteristics of the study

<b>Variable (N=275)</b>	<b>n</b>	<b>%</b>
<b>Department</b>		
Nutrition and Dietetics	106	38.5
Physiotherapy and Rehabilitation	97	35.3
Nursing	72	26.2
<b>Grade</b>		
1st grade	113	41.1
2nd grade	53	19.3
3rd grade	69	25.1
4th grade	40	14.5
<b>Age [ <math>\bar{X} \pm S.S. \rightarrow 21.55 \pm 1.12</math> (year) ]</b>		
20 years and under	78	28.4
21-23 years	178	64.7
24 years and older	19	6.9
<b>Sex</b>		
Female	243	88.4
Male	32	11.6
<b>Monthly Income</b>		
Less than 1500	2	0.8
1500-4999 TL	105	41.7
5000-9999 TL	88	34.9
10000-19999 TL	38	15.1
20000 TL and above	19	7.5
<b>Place of residence</b>		
University dormitory	45	16.4
Private dormitory	10	3.6
Living with family	127	46.2
Living with friends	42	15.3
Living alone	51	18.5

Upon examination of table 2; Of the participants, 193 (70.2%) did not exercise, 82 (29.8%) of them exercised, 35 (42.7%) of them exercise 3 times a week, 20 (24.3%) of them exercising 5 times and above, 18 people (22.0%) exercise 4 times a week and 9 people (11%) were found to exercise 2 times a week. The average frequency of weekly exercise was  $3.78 \pm 1.33$  (weeks).

Of the 82 people exercising, 35 (42.7%) were exercising between 31-60 minutes a day, 31 (37.8%) were exercising 30 minutes or less a day and 16 (19.5%) were exercising 60 minutes or more a day.

Body mass index of 217 people (78.8%) was between 18.5 and 24.9, body mass index of 28 people (10.2%) was below 18.5, BMI of 26 people (9.5%) was in the range of 25.0-29.9, and 4 people (1.5%) had a BMI of 30 and over. The mean body mass index of the participants was  $21.55 \pm 2.91$  ( $\text{kg} / \text{m}^2$ ).

Table 2. Distribution of exercise and body mass index results

Variable (N=275)	n	%
<b>Exercise Status</b>		
No	193	70.2
Yes	82	29.8
<b>Exercise [ <math>\bar{X} \pm S.S. \rightarrow 3.78 \pm 1.33</math> (week) ]</b>		
2 Per week	9	11.0
3 Per week	35	42.7
4 per week	18	22.0
5 or more per week	20	24.3
<b>Exercise [ <math>\bar{X} \pm S.S. \rightarrow 3.78 \pm 1.33</math> (minute) ]</b>		
30 minutes or less per day	31	37.8
31-60 minutes per day	35	42.7
60 minutes or more per day	16	19.5
<b>BMI [ <math>\bar{X} \pm S.S. \rightarrow 21.55 \pm 2.91</math>(<math>\text{kg}/\text{m}^2</math>) ]</b>		
<18.5 – Underweight	28	10.2
18.5-24.9 – Normal	217	78.8
25.0-29.9 – Overweight	26	9.5
30 and above – Obese	4	1.5

Upon inspection of the Table 3; 257 of the participants (93.4%) considered the necessary nutrients for a healthy diet as carbohydrates, fats, proteins, minerals and vitamins, 9 (3.4%) considered vitamins and minerals, 5 (1.7%) have considered carbohydrates, fat, protein and minerals, 4 people (1.5%) were found to have no opinion on the matter.

Of the participants, 161 (59.0%) considered the most energy-giving food as fat, 82 (30.0%) considered carbohydrate, 28 (10.3%) considered protein, 2 (0.7%) had no opinion on the matter.

185 of the participants (67.8%) saw steaming as a healthier food preparation method, 51 (18.7%) considered boiling, 24 (8.8%) considered baking, 12 (4%), 3 had no opinion in the matter while 1 person (0.4%) considered frying.

190 participants (69.3%) considered the most unhealthy type of fat found in foods as trans fat, 52 (19.0%) considered margarine, 24 (8.8%) considered saturated fats, 5 (1%) had no opinion on the matter, and 3 people (1.1%) considered unsaturated fats.

Of the participants, 149 (54.3%) thought that the nutrient included the most in a healthy individual's diet was proteins, 98 (35.8%) thought they were carbohydrates, 13 (4.7%) thought they were fats, and 7 (2.6%) thought that vitamins were while 7 people (2.6%) had no opinion on the matter.

Table 3. Distribution of findings about basic nutrition information

<b>Variable (N=275)</b>	<b>n</b>	<b>%</b>
<b>Nutrients Required For A Healthy Diet</b>		
Vitamin and minerals	9	3.4
Carbohydrate, fat, protein and mineral	5	1.7
Carbohydrate, fat, protein, minerals and vitamins	257	93.4
No Opinion	4	1.5
<b>The highest calorie nutrient</b>		
Protein	28	10.3
Fat	161	59.0
Carbohydrate	82	30.0
No Opinion	2	0.7
<b>Healthier food preparation method</b>		
Steaming	185	67.8
Frying	1	0.4
Baking	24	8.8
Boiling	51	18.7
No Opinion	12	4.3
<b>Most unhealthy type of fat found in foods</b>		
Saturated fats (solid, animal fats)	24	8.8
Unsaturated fats (liquid, vegetable oils)	3	1.1
Trans fats	190	69.3
Margarine	52	19.0
No Opinion	5	1.8
<b>The nutrient that should be taken most in a healthy diet</b>		
Proteins	149	54.3
Fats	13	4.7
Carbohydrates	98	35.8
Vitamins	7	2.6
No Opinion	7	2.6



Upon inspection of Table 4: A statistically significant difference was found on the number of correctly answered questions about nutrition depending on the department. ( $\chi^2 = 108.925$ ;  $p = 0.000$ )

As a result of the Bonferroni paired correction comparisons made to determine from which group the significant difference originates; a statistically significant difference was found between the nutritional information score of the students in the Nutrition and Dietetics department and the students in Physiotherapy and Rehabilitation and Nursing departments. Nutritional information scores of the students studying in the Nutrition and Dietetics department were statistically higher than those of the students studying in the Physiotherapy and Rehabilitation and Nursing Departments.

Table 4. Comparison of the number of correctly answered questions regarding nutrition

Variable		<u>Correct Answers</u> Median [Min.-Max.]	Statistical Analysis* Possibility
<b>Department</b>			
Nutrition and Dietetics <sup>(1)</sup>	106	4.0 [1.0-5.0]	$\chi^2=108.925$ <b>p=0.000</b> <b>[1-2,3]</b>
Physical therapy and rehabilitation <sup>(2)</sup>	97	3.0 [1.0-5.0]	
Nursing <sup>(3)</sup>	72	3.0 [0.0-5.0]	
<b>based on department</b>			

\* “Kruskal-Wallis H” test ( $\chi^2$ -table value) statistics were used to compare 3 or more independent groups with normal distribution.

Upon inspection of Table 5; 181 people (66.5%) who attended the research think that the price is important when buying food, 61 people (22.4%) think that the price is less important, 28 people (10.3%) think that the price is very important, and 2 (0.8%) do not think the price is important.

175 participants (63.6%) thought that taste was very important when buying food, 93 people (33.8%) thought it was important, 6 people (2.2%) thought it was less important, 1 person (0.4%) didn't think it was important at all.

133 of the participants (48.4%) thought that the distribution of food content was important when buying food products, 69 (25.1%) thought that the distribution of food content was less important, 62 (22.5%) thought that the distribution of food content was very important and lastly, 11 people (4.0%) think that the distribution of nutrients is not important.

130 participants (47.8%) thought that the ingredients were important when buying food products, 80 people (29.4%) thought the ingredients were very important, 52 people (19.1%) thought that the ingredients were less important, 10 people (3.7%) thought that the ingredients weren't important at all.

112 participants (41.1%) thought that the package was less important when buying food products, 85 people (31.3%) thought the package was important, 57 people (21.0%) thought that the package was not important, 18 people (18%) thought that the package is very important.

Of the participants 241 people (87.6%) thought that the expiration date was very important when buying a food product, 29 people (10.5%) thought that expiration date was important; 1 person (0.4%) thought that the expiration date is not important at all.

Table 5. Distribution of findings related to the order of importance when buying food

Priority list during purchase	Not important		Less important		Important		Very important	
	n	%	n	%	n	%	n	%
Price	2	0.8	61	22.4	<b>181</b>	<b>66.5</b>	28	10.3
Taste	1	0.4	6	2.2	93	33.8	<b>175</b>	<b>63.6</b>
Distribution of nutrients	11	4.0	69	25.1	<b>133</b>	<b>48.4</b>	62	22.5
Ingredients	10	3.7	52	19.1	<b>130</b>	<b>47.8</b>	80	29.4
Packaging	57	21.0	<b>112</b>	<b>41.1</b>	85	31.3	18	6.6
Expiration date	1	0.4	4	1.5	29	10.5	<b>241</b>	<b>87.6</b>

Upon inspection of Table 6; It is observed that 99 (37.8%) of the participants frequently paid attention to the contents of the nutrition label, 86 (32.8%) sometimes paid attention, 46 (17.6%) always paid attention, 29 (11.0%) rarely and 2 people (0.8%) never paid attention.

105 (38.3%) participants sometimes paid attention to the serving size indicated on the nutrition label, 94 people (34.3%) frequently paid attention, 35 people (12.8%) rarely paid attention, 33 people (12.0%) always paid attention, and lastly, 7 people (2.6%) never paid attention.

86 (31.7%) of the participants frequently paid attention to the calorie / energy information indicated on the nutrition label, 84 people (31.0%) sometimes paid attention, 50 people (18.5%) always paid attention, 43 people (15%) rarely paid attention and lastly, 8 people (3.0%) never paid attention.

94 (34.3%) participants sometimes paid attention to the total amount of fat indicated on the nutrition label, 75 people (27.4%) frequently paid attention, 66 people (24.1%) rarely paid attention, 22 (8%) always paid attention, 17 people (6.2%) never paid attention.

80 (29.2%) of the participants sometimes paid attention to the amount of trans fat included on the nutrition label, 70 (25.5%) frequently paid attention, 64 (23.4%) rarely paid attention, 42 (15.3%) have always paid attention, 18 people (6.6%) never paid attention.

Of the participants, 86 (31.4%) sometimes paid attention to the amount of saturated fat indicated on the nutrition label, 70 (25.5%) rarely paid attention, 60 (21.9%) frequently paid attention, 34 people (12.4%) always have paid attention, and lastly, 24 people (8.8%) never paid attention.

Of the participants, 84 (30.7%) people rarely paid attention to the amount of cholesterol indicated on the nutrition label, 79 people (28.8%) sometimes paid attention, 48 people (17.5%) often paid attention, 40 people (14.6%) never paid attention, and 23 people (8.4%) always paid attention.

86 (31.3%) participants sometimes paid attention to the amount of carbohydrate indicated on the nutrition label, 80 people (29.9%) often paid attention, 57 people (20.7%) rarely paid attention, 29 people (10.5%) always paid attention, and 23 (8.4%) people never paid attention.

84 (30.7%) participants paid attention to the amount of protein indicated on the nutrition label sometimes or frequently, 52 people (19.0%) rarely paid attention, 34 people (12.3%) always paid attention, and 20 (7.3%) people never paid attention.

91 (33.2%) participants sometimes paid attention to the amount of vitamin-mineral information indicated on the nutrition label, 74 people (27.0%) rarely paid attention, 62 people (22.6%) often paid attention, and 25 (9.2%) people never paid attention while 22 (8.0%) people always paid attention.

84 (30.9%) participants sometimes paid attention to the amount of fiber indicated on the nutrition label, 70 people (25.7%) frequently paid attention, 67 people (24.6%) rarely paid attention, 28 (10.3%) people have always paid attention while 23 people (8.5%) never paid attention.

Of the participants, 84 (30.7%) people frequently paid attention to the amount of sugar indicated on the nutrition label, 65 people (23.7%) sometimes paid attention, 59 people (21.5%) always paid attention, 49 people (17%, 9) seldom paid attention, and 17 people (6.2%) never paid attention.

Of the participants, 72 (26.6%) paid attention to the type of sugar indicated on the nutrition label, 62 (22.9%) rarely paid attention, 58 (21.4%) frequently paid attention, 40 (14.8%) people have always paid attention while 39 people (14.3%) never paid attention.

92 (33.6%) of the participants rarely paid attention to the sodium / salt content indicated on the nutrition label, 76 (27.7%) sometimes paid attention, 48 (17.5%) frequently paid attention, 39 (14.3%) never paid attention while 19 people (6.9%) always paid attention.

Of the participants, 80 people (29.1%) sometimes paid attention to the sweetener content indicated on the nutrition label, 64 people (23.3%) rarely paid attention, 51 people (18.5%) frequently paid attention, and 46 people (16.7%) never paid attention while 34 people (12.4%) always paid attention.

Of the participants, 78 (28.7%) sometimes paid attention to preservative content indicated on the nutrition label, 74 (27.7%) rarely paid attention, 55 (20.2%) frequently paid attention, 36 (13.2%) never paid attention while 29 people (10.7%) always paid attention.

71 of the participants (25.8%) never paid attention to the allergy warnings indicated on the nutrition label, 70 people (25.5%) rarely paid attention, 51 people (18.5%) sometimes paid attention, 48 people (17.5%) frequently paid attention, and 35 people (12.7%) always paid attention.

76 participants (27.6%) sometimes paid attention to the health claims written on the nutrition label, 75 people (27.4%) frequently paid attention, 49 people (17.8%) rarely paid attention, and 43 people (15.6%) always paid attention while 32 people (11.6%) never paid attention.

Table 6. Distribution of findings on what is examined the most when reading nutrition labels

Information on the nutrition label	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
Ingredients	2	0.8	29	11.0	86	32.8	99	37.8	46	17.6
Serving Size	7	2.6	35	12.8	105	38.3	94	34.3	33	12.0
Calorie/Energy	8	3.0	43	15.8	84	31.0	86	31.7	50	18.5
Total Fat	17	6.2	66	24.1	94	34.3	75	27.4	22	8.0
Trans fat	18	6.6	64	23.4	80	29.2	70	25.5	42	15.3
Saturated Fat	24	8.8	70	25.5	86	31.4	60	21.9	34	12.4
Cholesterol	40	14.6	84	30.7	79	28.8	48	17.5	23	8.4
Carbohydrate	23	8.4	57	20.7	86	31.3	80	29.1	29	10.5
Protein	20	7.3	52	19.0	84	30.7	84	30.7	34	12.3
Vitamin-Minerals	25	9.2	74	27.0	91	33.2	62	22.6	22	8.0
Fiber	23	8.5	67	24.6	84	30.9	70	25.7	28	10.3
Sugar	17	6.2	49	17.9	65	23.7	84	30.7	59	21.5
Type of sugar	39	14.3	62	22.9	72	26.6	58	21.4	40	14.8
Sodium/Salt	39	14.3	92	33.6	76	27.7	48	17.5	19	6.9
Sweetener	46	16.7	64	23.3	80	29.1	51	18.5	34	12.4
Preservatives	36	13.2	74	27.2	78	28.7	55	20.2	29	10.7
Allergy advice	71	25.8	70	25.5	51	18.5	48	17.5	35	12.7
Health claims	32	11.6	49	17.8	76	27.6	75	27.4	43	15.6

When Table 7 is examined; it is examined that 100 participants (36.4%) strongly disagreed with the statement “I do not look at nutrition labels”, 84 people (30.5%) disagreed, 44 people (16.0%) agreed, 39 people (14.2%) stated that they were undecided while 8 people (2.9%) strongly agreed.

109 participants (39.8%) strongly disagreed with the statement “I am not interested in the information on the nutrition label.”, 83 (30.3%) disagreed, 42 (15.3%) was undecided, while 36 (13,1%) agreed and 4 people (1,5%) have strongly agreed.

120 participants (43.6%) strictly disagreed with the statement “I do not look at the nutrition label because I do not have enough nutritional knowledge.”. 64 people (23.3%) disagreed, 44 (16.0%) were undecided, 35 people (12.7%) agreed, while 12 people (4.4%) strictly agreed.

129 participants (46.9%) strictly disagreed with the statement “I do not look at the nutrition label because it is not interesting and confusing.” 61 people (22.2%) disagreed, 40 people (14.5%) agreed, 34 people (12.4%) were undecided while 11 people (4.0%) strongly agreed.

122 of the participants (44.5%) strictly disagreed with the statement “It is time consuming to read the nutrition label.” 67 people (24.5%) disagreed, 40 people (14.7%) were undecided, 35 people (12.8%) agreed while 10 people (3.6%) strongly agreed.

76 of the participants (27.9%) strongly disagreed with the statement “The information on the nutrition label is not written clearly, it is complex and difficult.”, 70 people (25.7%) disagreed, 54 people (19.9%) agreed, 46 people (16.9%) was undecided while 26 people (9,6%) strongly agreed.

149 of the participants (54.1%) strictly disagreed with the statement “I don't look at the nutrition labels because I don't have any health problems.”, 55 people (20.0%) disagreed, 28 people (10.0%) agreed, 23 people (8,4%) was undecided while 20 people (7.3%) strictly agreed.

182 participants (67.2%) strictly disagreed with the statement “I look at the nutrition label because I have allergies.” 29 people (10.7%) disagree, 23 people (8.5%) agreed, 19 people (7.0%) were undecided while 18 people (6.6%) strongly agreed.

110 participants (40.0%) strictly agreed with the statement “I make healthier choices when I use a nutrition label.” 79 people (28.7%) agreed, 54 people (19.7%) were undecided, 19 people (6.9%) disagreed while 13 people (4.7%) strictly disagreed.

94 participants (34.3%) agreed with the statement “Nutritional information on the nutrition label is useful to me.”, 89 people (32.5%) strictly agreed, 56 people (20.4%) were undecided, 23 people (8.4%) disagreed while 12 people (4.4%) strictly disagreed.

101 participants (36.7%) agreed with the statement “I am confident in how I choose healthy food products.”, 85 people (30.9%) were undecided, 59 people (21.5%) strongly agreed, 21 people (7.6%) disagreed while 9 people (3.3%) strictly disagreed.





Table 7. Distribution of findings related to the opinions of participants on statements related to nutrition labels

Statement regarding nutrition labels and their usage	Strongly disagree		Disagree		Undecided		Agree		Strongly agree	
	n	%	n	%	n	%	n	%	n	%
I do not look at the nutrition labels.	<b>100</b>	<b>36.4</b>	84	30.5	39	14.2	44	16.0	8	2.9
I am not interested in the information on the nutrition label.	<b>109</b>	<b>39.8</b>	83	30.3	42	15.3	36	13.1	4	1.5
I do not look at the nutrition label because I do not have enough nutritional knowledge	<b>120</b>	<b>43.6</b>	64	23.3	44	16.0	35	12.7	12	4.4
I do not look at the nutrition label because it is not interesting and confusing.	<b>129</b>	<b>46.9</b>	61	22.2	34	12.4	40	14.5	11	4.0
It is time consuming to read the nutrition label.	<b>122</b>	<b>44.5</b>	67	24.5	40	14.7	35	12.8	10	3.6
The information on the nutrition label is not written clearly, it is complex and difficult.	<b>76</b>	<b>27.9</b>	70	25.7	46	16.9	54	19.9	26	9.6
I do not look at the nutrition labels because I don't have any health problems.	<b>149</b>	<b>54.1</b>	55	20.0	23	8.4	28	10.2	20	7.3
I look at the nutrition label because I have allergies.	<b>182</b>	<b>67.2</b>	29	10.7	19	7.0	23	8.5	18	6.6
I make healthier choices when I use a nutrition label.	13	4.7	19	6.9	54	19.7	79	28.7	<b>110</b>	<b>40.0</b>
Nutritional information on the nutrition label is useful to me.	12	4.4	23	8.4	56	20.4	<b>94</b>	<b>34.3</b>	89	32.5
I am confident in how I choose healthy food products.	9	3.3	21	7.6	85	30.9	<b>101</b>	<b>36.7</b>	59	21.5

Upon inspection of Table 8; no statistically significant relationship was found between price, taste, ingredients, package, the expiration date and the department of the participants ( $p>0.05$ ).

It was found that there was a statistically significant relationship between the importance of nutrient content distribution and the department of the participants ( $\chi^2=21.968$ ;  $p=0.000$ ) and 91 people (85.8%) studying in the Nutrition and Dietetics department, 65 people (67.0%) in the Physiotherapy and Rehabilitation Department and 39 people (54.2%) in the Nursing Department paid attention to the distribution of nutrients. It was also determined that the students who studied in these 3 departments mostly paid attention the distribution of nutrient content, and the department who paid attention about at the highest rate was the Nutrition and Dietetics Department.

A statistically significant relationship was found between the department of the participants and agreement with the statement "I do not look at the nutrition label" ( $\chi^2=23.596$ ;  $p=0.000$ ). It was found that 86 people (81.1%) studying in Nutrition and Dietetics department, 56 people (57.7%) studying in Physiotherapy and Rehabilitation department and 42 people (58.3%) studying in Nursing Department did not agree with this statement. It was determined that the students who studied in these 3 departments did not agree with this statement with varying percentages and the department who disagreed with the statement at the highest rate was the Nutrition and Dietetics Department.

Table 8. Comparison of certain parameters and departments

Importance during purchase of a food product	Department			Statistical analysis* Possibility
	Nutrition and Dietetics	Physical Therapy and Rehabilitation	Nursing	
<b>Price</b>				
Not important	30 (28.3%)	15 (15.8%)	18 (25.4%)	$\chi^2=4.666$ p=0.097
Important	76 (71.7%)	80 (84.2%)	53 (74.6%)	
<b>Taste</b>				
Not important	3 (2.8%)	3 (3.1%)	1 (1.4%)	$\chi^2=0.540$ p=0.763
Important	103 (97.2%)	94 (96.9%)	71 (98.6%)	
<b>Food content distribution</b>				
Not important	15 (14.2%)	32 (33.0%)	33 (45.8%)	$\chi^2=21.968$ <b>p=0.000</b>
Important	91 (85.8%)	65 (67.0%)	39 (54.2%)	
<b>Ingredients</b>				
Not important	18 (17.3%)	25 (26.0%)	19 (26.4%)	$\chi^2=2.883$ p=0.237
Important	86 (82.7%)	71 (74.0%)	53 (73.6%)	
<b>Packaging</b>				
Not important	74 (69.8%)	58 (61.1%)	37 (52.1%)	$\chi^2=5.733$ p=0.057
Important	32 (30.2%)	37 (38.9%)	34 (47.9%)	
<b>Expiration date</b>				
Not important	2 (2.8%)	2 (2.1%)	-	$\chi^2=1.974$ p=0.373
Important	103 (97.2%)	95 (97.9%)	72 (100.0%)	
<b>“I don’t look at the nutrition labels”</b>				
Disagree	86 (81.1%)	56 (57.7%)	42 (58.3%)	$\chi^2=23.596$ <b>p=0.000</b>
Undecided	8 (7.5%)	23 (23.7%)	8 (11.1%)	
Agree	12 (11.4%)	18 (18.6%)	22 (30.6%)	

\* “ $\chi^2$ -cross tables” are used according to the expected value levels in examining the relationship between two qualitative variables.

When Table 9 is examined; when buying a food, there was no statistically significant relationship between gender and taste, distribution of nutrient content, package, last consumption date, or opinions such as “I do not look at the nutrition labels.” and “I make healthier decisions when I use nutrition labels.” ( $p > 0.05$ ).

A statistically significant relationship was found between the importance of gender and price when buying a food product ( $\chi^2=9.507$ ;  $p=0.002$ ). It was found that 177 women (73.8%) and 32 men (100.0%) considered the price to be important when buying a food product. It was determined that none of the men considered the price insignificant when buying a food.

Statistically significant relationship was found between the importance of gender and ingredients when buying a food product ( $\chi^2=6.108$ ;  $p=0.013$ ). When buying a food product, it was found that 192 women (79.7%) considered their ingredients important and 13 men (41.9%) considered their ingredients not important. It was determined that women had a higher rate of seeing the ingredients important than men.

Table 9. Comparison of some parameters and genders.

Importance while purchasing a food product	Gender		Statistical analysis* Possibility
	Female	Male	
<b>Price</b>			
Not important	63 (26.2%)	-	$\chi^2=9.507$
Important	177 (73.8%)	32 (100.0%)	<b>p=0.002</b>
<b>Taste</b>			
Not important	6 (2.5%)	1 (3.1%)	$\chi^2=0.049$
Important	237 (97.5%)	31 (96.9%)	p=0.828
<b>Food content distribution</b>			
Not important	69 (28.4%)	11 (34.4%)	$\chi^2=0.490$
Important	174 (71.6%)	21 (65.6%)	p=0.484
<b>Ingredients</b>			
Not important	49 (20.3%)	13 (41.9%)	$\chi^2=6.108$
Important	192 (79.7%)	18 (58.1%)	<b>p=0.013</b>
<b>Packaging</b>			
Not important	150 (62.5%)	19 (59.4%)	$\chi^2=0.117$
Important	90 (37.5%)	13 (40.6%)	p=0.732
<b>Expiration date</b>			
Not important	3 (1.2%)	2 (6.2%)	$\chi^2=1.670$
Important	240 (98.8%)	30 (93.8%)	p=0.196
<b>“I don’t look at nutrition labels”</b>			
Disagree	167 (68.7%)	17 (53.1%)	$\chi^2=5.993$
Undecided	30 (12.4%)	9 (28.1%)	p=0.051
Agree	46 (18.9%)	6 (18.8%)	
<b>“I make smarter choices when I use nutrition labels”</b>			
Disagree	26 (10.7%)	6 (18.8%)	$\chi^2=1.794$
Undecided	48 (19.8%)	6 (18.8%)	p=0.408
Agree	169 (69.5%)	20 (62.4%)	

\* “ $\chi^2$ -cross tables” is used according to the expected value levels in examining the relationship between two qualitative variables.

When Table 10 is examined; there was no significant relationship between monthly income and price, taste, distribution of nutrient contents, ingredients, package, expiration date, and agreeing with the statement “I don't look at nutrition labels.” or “I make smarter choices when I use nutrition labels.” ( $p>0.05$ ).

Table 10. Comparison of monthly income and certain parameters

Importance during the purchase of food products	Monthly Income			Statistical analysis* Possibility
	Less than 5000 TL	5000-9999 TL	10000 TL or more	
<b>Price</b>				
Not important	20 (19.0%)	23 (26.1%)	15 (26.3%)	$\chi^2=1.753$ p=0.416
Important	85 (81.0%)	65 (73.9%)	42 (73.7%)	
<b>Taste</b>				
Not important	1 (0.9%)	2 (2.3%)	3 (5.3%)	$\chi^2=3.005$ p=0.223
Important	106 (99.1%)	86 (97.7%)	54 (94.7%)	
<b>Food content distribution</b>				
Not important	35 (32.7%)	23 (26.1%)	17 (29.8%)	$\chi^2=0.998$ p=0.607
Important	72 (67.3%)	65 (73.9%)	40 (70.2%)	
<b>Ingredients</b>				
Not important	18 (16.8%)	24 (28.2%)	16 (28.1%)	$\chi^2=4.397$ p=0.111
Important	89 (83.2%)	61 (71.8%)	41 (71.9%)	
<b>Packaging</b>				
Not important	57 (54.3%)	59 (67.0%)	37 (64.9%)	$\chi^2=3.711$ p=0.156
Important	48 (45.7%)	29 (33.0%)	20 (35.1%)	
<b>Expiration date</b>				
Not important	-	4 (4.5%)	-	$\chi^2=3.705$ p=0.157
Important	107 (100.0%)	84 (95.5%)	57 (100.0%)	
<b>“I don't look at the nutrition label”</b>				
Disagree	68 (63.6%)	62 (70.4%)	37 (64.9%)	$\chi^2=2.278$ p=0.685
Undecided	15 (14.0%)	13 (14.8%)	7 (12.3%)	
Agree	24 (22.4%)	13 (14.8%)	13 (22.8%)	
<b>“I make smarter choices when I use nutrition labels”</b>				
Disagree	13 (12.1%)	11 (12.5%)	6 (10.5%)	$\chi^2=0.155$ p=0.997
Undecided	20 (18.7%)	17 (19.3%)	11 (19.3%)	
Agree	74 (69.2%)	60 (68.2%)	40 (70.2%)	

“ $\chi^2$ -cross tables” is used according to the expected value levels in examining the relationship between two qualitative variables.

When Table 11 is examined; it was found that there was no statistically significant relationship between the importance of the price when buying a food product and the department where the students studied ( $p > 0.05$ ).

Table 11. Comparison of the importance of price and the place of stay

Variable	Importance of the price when buying a food product		Statistical analysis* Possibility
	Not Important	Important	
<b>Place of stay</b>			
University Dormitory	9 (14.3%)	36 (17.3%)	$\chi^2=1.926$ $p=0.749$
Private Dormitory	3 (4.8%)	7 (3.3%)	
With Family	31 (49.2%)	94 (45.0%)	
With Friends	7 (11.1%)	35 (15.7%)	
Alone	13 (20.6%)	37 (17.7%)	

“ $\chi^2$ -cross tables” is used according to the expected value levels in examining the relationship between two qualitative variables.

When Table 12 is examined; there was no statistically significant relationship between regular physical exercising and attention to BMI and Calories / energy nutrient label ( $p > 0.05$ ).

Table 12. Comparison of regular physical exercise status and certain parameters

Variable	Status of regular exercise		Statistical analysis* Possibility
	No	Yes	
<b>BMI</b>			
<18.5 – Underweight	21 (10.9%)	7 (8.5%)	$\chi^2=0.403$ $p=0.940$
18.5-24.9 – Normal	151 (78.2%)	66 (80.5%)	
25.0-29.9 – Overweight	18 (9.3%)	8 (9.8%)	
30 and above – Obese	3 (1.6%)	1 (1.2%)	
<b>Attention to calories / energy information</b>			
Doesn't pay attention	39 (20.5%)	12 (14.8%)	$\chi^2=2.948$ $p=0.229$
Sometimes	62 (32.7%)	22 (27.2%)	
Pays attention	89 (46.8%)	47 (58.0%)	

“ $\chi^2$ -cross tables” is used according to the expected value levels in examining the relationship between two qualitative variables.



When Table 13 is examined; there was no statistically significant relationship between the variables in the table and body mass index classes ( $p > 0.05$ ).

Table 13. Comparison of attention to some information on the label and BMI

Variable	Body mass index classification				Statistical analysis* Possibility
	Underweight	Normal	Overweight	Obese	
<b>Food content distribution</b>					
Not important	8 (28.6%)	65 (30.0%)	6 (23.1%)	1 (25.0%)	$\chi^2=0.570$ $p=0.903$
Important	20 (71.4%)	152 (70.0%)	20 (76.9%)	3 (75.0%)	
<b>Attention to calories/energy on nutrient label</b>					
Doesn't pay attention	8 (29.6%)	40 (18.7%)	2 (7.7%)	1 (25.0%)	$\chi^2=9.023$ $p=0.172$
Sometimes	11 (40.8%)	64 (29.9%)	7 (26.9%)	2 (50.0%)	
Pays attention	8 (29.6%)	110 (51.4%)	17 (65.4%)	1 (25.0%)	
<b>Attention to the total fat on nutrient label</b>					
Doesn't pay attention	8 (28.6%)	68 (31.5%)	5 (19.2%)	2 (50.0%)	$\chi^2=5.099$ $p=0.531$
Sometimes	12 (42.8%)	70 (32.4%)	10 (38.5%)	2 (50.0%)	
Pays attention	8 (27.6%)	78 (36.1%)	11 (42.3%)	-	
<b>Attention to the sugar on nutrition label</b>					
Doesn't pay attention	4 (14.8%)	53 (24.4%)	7 (26.9%)	2 (50.0%)	$\chi^2=3.972$ $p=0.680$
Sometimes	9 (33.3%)	49 (22.6%)	6 (23.1%)	1 (25.0%)	
Pays attention	14 (51.9%)	115 (53.0%)	13 (50.0%)	1 (25.0%)	
<b>Attention to the type of sugar on nutrition label</b>					
Doesn't pay attention	8 (27.6%)	81 (38.1%)	10 (38.5%)	2 (50.0%)	$\chi^2=2.860$ $p=0.826$
Sometimes	6 (21.4%)	58 (27.2%)	7 (26.9%)	1 (25.0%)	
Pays attention	14 (50.0%)	74 (34.7%)	9 (34.6%)	1 (25.0%)	

" $\chi^2$ -cross tables" is used according to the expected value levels in examining the relationship between two qualitative variables.

## 5. DISCUSSION

This research was conducted by collecting information with data form in order to evaluate the use of nutrition labels between 275 participants who are continuing their undergraduate education in the Nutrition and Dietetics, Physiotherapy and Rehabilitation and Nursing Departments of Faculty of Health Sciences of a foundation university.

Of the 275 students participating in the study, 178 were in the 21-23 age groups and the mean age of the participants was  $21.55 \pm 1.12$ . The majority of the participants were female students, consisting of 243 female participants (88.4%) and 32 male participants (11.6%). The reason for this is that the number of female students in the Faculty of Health Sciences is higher than the number of male students.

In this study, it was seen that 193 (70.2%) students did not exercise and 82 (29.8%) students did exercise. It has been informed that physical activity should be performed at moderate levels of 30 minutes or more on each day or most days of the week in order to provide health benefits (41). Of the 82 (29.8%) participants exercising in the study, 42.7% were exercising between 31-60 minutes a day, 37.8% were 30 minutes or less, and 19.5% were 60 minutes or more. In a study conducted by Aydoğan et al. (2016) with university students, only 8.5% of female and 28.1% of male students had sufficient physical activity levels (42). In another study conducted on university students, it was shown that only 35% of the students had sufficient physical activity (43). In their study with university students studying in the field of health sciences, Savcı et al. (2006) reported that only 18% had adequate physical activity level, 68% of them had low level of physical activity, and 15% were not physically active (44). The results of the studies are similar. The results showed that students in the Faculty of Health Sciences do not have sufficient physical activity level.

When the body mass indexes of 275 students were examined, it was found that 78.8% of the students were normal, 10.2% were underweight, 9.5% were overweight and 1.5% were obese, and mean BMI was found to be  $21.55 \pm 2.91$  (kg / m<sup>2</sup>). In another study conducted with students studying in the faculty of health sciences, only 13% of the students were evaluated as overweight (42). And in another study, the mean BMI

was reported to be  $21.30 \pm 2.72$  (kg / m<sup>2</sup>) (44). Not having high BMI rates of the students studying in the health sciences can be explained by their education in the field of health and therefore having the general health awareness.

In the research, the students who gave the most correct answers to questions about basic nutritional knowledge were the students of the Department of Nutrition and Dietetics. They answered 4 out of 5 questions correctly. Physiotherapy and Rehabilitation and Nursing Department students answered fewer questions correctly by an average of 3 correct answers. According to the results of our study, it can be said that there is a positively significant relationship between nutrition education and nutrition knowledge. When the relationship between the department and nutrition label reading status is examined, it is seen that there is a positive relationship between being a student of Department of Nutrition and Dietetics and reading nutrition labels as expected.

Nutritional and Dietetic Department students were found to be more interested in food content distribution than other department students in terms of price, taste, nutrient content distribution, contents, package, last consumption date ( $p < 0,05$ ). Although there was no statistically significant relationship between the rates of reading the contents of the label, it was observed that the students studying in the Department of Nutrition and Dietetics paid more attention to the information of the contents than the other students of the department. In a systematic review by Spronk et al. (2014), it was reported that there was a positive relationship between nutritional information and nutrition label reading habits, and individuals with higher nutritional knowledge preferred to eat more fruits, vegetables, and foods containing more fiber and calcium. It is also reported that they consume more grains and fish, have less energy intake, and consume less sweetened drinks with less fat and less sugar (45). Mahdavi et al. (2012) reported that students studying in the health care management department looked at the nutrition label more frequently (66%) (30). In literature, a positive relationship between nutrition knowledge and the frequency of consumer self-declared nutrition label reading has been demonstrated by various studies (46–49).

Although there was no statistical significance, it was seen that Nursing Department students paid more attention to the package when buying food than the other department students.

It was determined that the students of the Department of Physiotherapy and Rehabilitation give more importance to the price in food purchase process even if there is no meaningful conclusion. This was due to the fact that male students attending the department were proportionally more and male students paid more attention to the price.

When the food purchasing processes of the participants were examined; the factors affecting the preference were given according to the order of importance, 87.6% saw the last consumption dates as very important and the taste of the food was found to be important by 63.6%, and the price was found to be important for 66.5%, the distribution of nutrient content (48.4%) and the contents (47.8%) were less important, and the package (41.1%) was less important. Jacobs et al. (2010) reported that taste and price were considered more important than food's nutrient content in the purchasing process (47). Aygen's (2012) study of consumers' attitudes and behaviors about nutrition label analysis, report that 72% of them "always" or "often" read the expiry date, 62% of them "always" or "often" read the ingredients (50). Besler et al. (2012) reported that while purchasing food, the consumer cares for the shelf life of the food by 56.2%, while the content is thought to be less important with a 47.3% percentage (11). Mahdavi et al. (2012) reported that the most important information for university students during food purchase process is with an 84%, the expiration date and with 80.4% storage conditions, while the price was paid less attention by 49.1% (30). Güneş et al. (2014) reported that the most important sections on nutrition labels were the expiration date (84%) and production date (58.2%) (51). Onurlubaş (2015) stated that consumers always consider the expiry date (53.9%) and price (53.4%) when purchasing food products (52). In the researches of Karadağ and Türközü (2017), the information that consumers always look at was reported as the consumption date by 58% and the price by 37% (38). It is understood from the studies that the expiration date is the most important factor. And it can be said that properties such as price and taste are often considered, but the information of the contents is less effective in the purchasing decision, and it is not cared about enough. The results of our study on the order of giving importance to certain features in the purchase are in parallel with the literature.

According to this study, the frequency of looking at the nutrients and information reported on the nutrition label of the participants is as follows; sugar at a very high rate, ingredients, calorie / energy, serving size, protein, carbohydrate, portion amount at a high rate. In addition, it was determined that total fat, trans fat, saturated fat,

vitamin-mineral, fiber, type of sugar, health declaration information were paid attention at a moderate level, while cholesterol, sodium / salt, preservative content, sweetener information were paid attention at a less frequent level and allergen warning was observed at a very low level. The distribution of findings regarding the frequency of attention to what information is read on the nutrition label can be examined in detail in Table 6. In a study conducted by Kim et al. (2015) with female university students, 67.4% of them paid attention to calories, 6.5% did to fats, 6.5% to cholesterol, 5.5% to saturated fats, 5.5% to carbohydrate / sugars, 4.3% to trans fats and 3.3% paid attention to sodium amounts (35). In a study by Mahdavi et al. (2012), surprisingly, the amount of trans fat was found to be the least observed label information by only 1.9% (30). In a study by Jasti and Kovacs (2010) made to determine the factors affecting the use of trans fat information on labels, they found that 44% of university students sometimes, 38% never and 18% always used trans fat label information (23). It was reported that Kresic and Mrduljas (2016) created groups separated according to nutritional knowledge level, and they observed that the group with the highest knowledge have paid attention to the sugar and the fat content, the ingredients and additives. Aygen (2012) reported that the most read information on nutrition labels are energy / calories, protein content, vitamins, fiber content, nutritional declaration and carbohydrate amount. In the same study, it was stated that the least read information was saturated fat, cholesterol and total fat content (50). Besler et al. (2012) stated the order of giving importance to the information as vitamin (76.8%), protein (75.8%), energy (74.8%), cholesterol (71.3%), carbohydrate (66.1%), fat (65.8%), mineral (65.3%), additives (62.8%), salt / sodium (56.9%), saturated fat (52.5%), unsaturated fat (49.5%), additive sugar (48.9%), fiber (43.6%) and trans fat content (23.9%) (11). In a study by Watson et al. (2014) investigating the effect of different nutrient label formats on food choice, 61-71% of consumers reported they use the information such as the saturated fat content, sugar or fat out of the energy, fat, sodium, sugar, saturated fat quantity information stated with the amount of nutrients included per 100 grams or the daily recommended amount. It was reported that 51-63% used sodium amount information and 35-48% used energy content information in the purchasing process (54). The studies are generally parallel. It can be said that the label information, which is different in the literature, is due to the fact that the research was conducted with different sociodemographic groups, plus the difference in time of the research. In our study, it can be said that the reason for considering the amount of sugar reported on the nutrition label at a higher level than the

other label information is the scientific publications about the harms of sugar to the health in recent years and the media sharing these publications frequently. Previously, there have been a lot of news about the harmful health effects of fat, but recently the trend has been shifting towards the sugar. In Turkey, when the last 10 years of Google web searches for "sugar" and "fat" under health news is queried, we see an increase for the word sugar while we also see a decrease for the word fat (Figure 2). Since our study population is thought to be educated individuals following the media, it is concluded that more attention is paid to the amount of sugar.

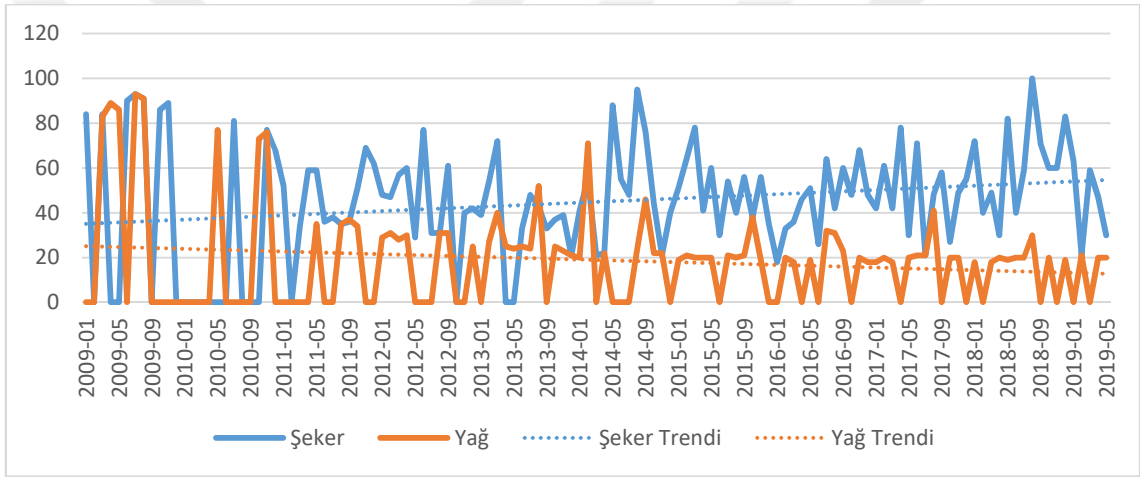


Figure 3. The search trend graph of words sugar and fat between 2009 and 2019

Looking at the participants' agreement in the statements asked about the use of nutrition labels, it was determined that 19% of the participants agree with the statement "I don't look at the nutrition label", meaning they do not read the nutrition label, while the majority (66.9%) do not agree with this statement, showing that a majority of the attendants do read the nutrition label. Guthrie et al. (1995) reported that 71% of the participants read the nutrition label (55). Rasberry et al. (2007) stated that 85% of the students use the nutrition label (24). Cooke et al. (2014) found that 63.7% of university students read the nutrition label (31). Ak and Yardımcıoğlu (2017) reported that 51.9% of university students examine the energy and nutrients table on the nutrition label (56). Christoph et al. (2015) reported the estimated prevalence of nutrition label reading as

73.8% in a review of nutrition label usage status of university students and young adults (33). In the study of Karadağ and Türközü (2017), the nutrition label reading rate was reported to be 59.6% (38). The results of our research on nutrition label reading are in line with the literature. The reason for not using the nutrition label is the lack of nutrition knowledge, not knowing how to interpret the information on the nutrition label, the desire for a particular food, time limitation and negligence behavior.

It was understood that the participants disagree with the statement “I am not interested in the nutritional information on the nutrition label” (70%) and they were interested in nutritional information. A low percentage of participants (15%) were not interested in nutritional information on the nutrition label. In Aygen's (2012) research, it was stated that 69.4% disagreed with the statement “The health effects or nutritional value of the foods I purchased do not concern me” (50).

In our study, it was seen that the majority of the participants thought that they had enough information to read the nutrition label. It was determined that a high percentage (67%) of them disagreed with the statement “I do not look at the nutrition label because I do not have enough nutritional knowledge.”. Aygen (2012) reported 76.8% agreement in the statement “I am generally knowledgeable about health and nutrition.” (50). Coşkun and Kayışoğlu (2018) stated that, 80.2% of women and 71.8% of men agreed with the statement “I would like to know more about how to use nutrition labels to choose a nutritious diet.” (57). Contradictions in the results of the research can be explained by the differences in the educational level of the studied group.

In our study, it was found that (69%) did not agree with the statement “I do not look at the nutrition label because it is not interesting and confusing”. It was determined that 54% of the participants disagree with the statement, “The information on the nutrition label is not written clearly, complex and difficult.”, while 30% agreed with this statement. In their study, Campos et al. (2011) concluded that the use of nutrition labels is thought to be easy. This was explained with the fact that the studies included in the research were conducted with young consumers with high education level and individuals with high income groups and these studies were conducted in western countries with high welfare level (28). In their study, Mahdavi et al. (2012) found that 49.1% agreed with the statement “It is easy to understand the nutrition label.” (30). Aygen (2012) reported that 74.6% of the participants agreed with the statement

“Nutritional value information on nutrition labels is difficult to interpret.” (50). In the study of Coşkun and Kayısoğlu (2018), it was reported that 51.3% of women and 46% of men agreed with the statement “It is difficult to interpret nutritional information on nutrition labels.” (57). The reason for the difference in Coşkun and Kayısoğlu's study can be said to be due to low education level. The reason why the use of labels is found to be not difficult in our study can be explained by the fact that our research group is young adult individuals with high education level.

It was once again found that 69% of the participants disagreed with the statement “Reading the nutrition label takes a lot of time.” Aygen (2012) reported that 72.4% of the participants agree with the statement “Reading nutrition labels demand much more time than I can allocate.” (50). Coşkun and Kayısoğlu (2018) reported that 50.6% of men and 54.3% of women agree with the statement “Reading nutrition labels demand much more time than I can allocate.” (57).

The participants agreed with the statement “I don't look at the nutrition label because I don't have any health problems.” at a high level (74%).

Coşkun and Kayısoğlu (2018) stated that 74.1% of males and 70.7% of females agreed with the statement “Health problems in food selection are factors in nutrition label reading.” that they directed to participants (57).

In our study, it was found that 15.1% of the participants agree with the statement “I look at the nutrition label because I am allergic to certain nutrients.”, while 78% disagreed. Gül and Dikmen (2018) reported that only 6% of consumers pay attention to allergen information when buying food (39). It has been reported that there is a positive correlation between education level and knowledge of food allergy in the literature (58, 59). Further rate of reading of allergen warnings in our study can be explained by the high level of education of our participants.

69% of the participants agreed with the statement “I make healthier choices when I use nutrition labels.” Aygen (2012) reported that 70% of the participants agreed with the statement “I make my food selections better when I use nutrition labels.” (50). Coşkun and Kayısoğlu (2018) reported that 65.9% of the women and 64.9% of the men agreed with the statement “I make smarter food choices when I read the nutrition labels.”. Studies show parallelism.



In our study, 67% of the participants agreed with the statement “Nutritional information on the nutrition label is useful for me.”. Mahdavi et al. (2012) reported that 77.4% of the consumers agree with the statement “Nutrition labels are useful tools for consumers.”. Aygen (2012) reported that 69.6% of the participants agreed with the statement “Nutritional value information on nutrition labels is very useful for me.” (50). In the study of Coşkun and Kayışoğlu (2018), it was reported that 75.3% of men and 73.3% of women agreed with the statement “Nutritional information on nutrition labels is very useful for me.” (57).

58% of the participants agreed with the sentence “I trust myself about how I choose healthy foods.”. Aygen (2012) reported that 76.2% of the participants agreed with the statement “I know how to use the nutrition labels to choose a healthy diet.” (50). In the study of Coşkun and Kayışoğlu (2018), it was reported that 43.1% of the men and 42.2% of the women agreed with the statement: “I feel safe because I know how to use nutrition labels to choose a healthy diet.” (57). In our study, the results about agreement to the statements are similar to the literature. Proportional differences for some items can be explained by differences in sociodemographic characteristics of the study groups.

When the meaningful relationship between the gender of the participants and the importance of paying attention to certain characteristics in the food purchasing process was examined, it was determined that there is a significant relationship between caring for price and being a male. In the study of Karadağ and Türközü (2018), it was reported that the reason for reading the label information of men is to learn the price while women read the label to learn the energy values (38).

It was found that there is a significant relationship between being a woman and caring about the contents in the purchasing process. In our study, even if no statistically significant relationship was found between the status of looking at the nutrition label and gender, women were more likely to look at the nutrition label than men. Similar results regarding gender have been reported in the literature. Nayga (1999) reported that males care less about nutritional label information than females and that they pay less attention to nutrition and health (60, 61). Satia et al. (2005) stated that women who are educated at university level have higher habit of reading nutrition label (5). Cowburn and Stockley (2005) reported that men are less interested in reading the

nutrition labels and women, high-income individuals and individuals with higher education levels look at the nutrition label more frequently (62). Rasberry et al. (2007) reported that female university students use nutrition labels more often than male students, have more information about nutrition labels, and have a more positive attitude about using nutrition labels (24). Stran and Knol (2013) reported that women use nutrient label components more frequently than males in their studies while investigating the relationship between gender and nutrition label use. It was found that women especially read label information such as the nutrition facts labels, health declarations, contents and serving size more frequently than men (63). Our study is in parallel with the literature, women using nutrition labels more frequently than men can be explained by them having higher health awareness compared to men and men seeing nutrition label reading as a feminine behavior (46, 64, 65).

In the study, when the importance of paying attention to certain characteristics when buying food and the monthly income of the participant's family were examined; no significant relationship was found between price, taste, nutrient content distribution, contents, package and last consumption date. And again, there was no significant relationship between the looking at the nutrition label and believing in making a healthier choice upon doing so and the income of the individual. The fact that income has no effect on the choices made through decision-making mechanisms in the purchasing process can be explained by the fact that the participants are studying in young, health-related departments and are educated individuals.

No significant relationship was found between the housing status and the importance of price in the process of food purchase. The lack of a meaningful relationship can be explained by the fact that most of the students live with their families and other sociodemographic reasons.

No significant differences were found between BMI, regular exercise status and attention to calorie / energy information on nutrition label. When selecting food, no statistically significant relationship was found between the distribution of nutrient contents, calorie / energy information, total fat amount information, sugar amount information and attention to the type of sugar and the BMI of the participants. Crockett et al. (2014) investigated the effect of nutrient labeling and socioeconomic status on energy intake, and there was no relationship between BMI measurements or body

weight status and nutrition label use (66). In their study to determine the relationship between the use of nutrition labels and BMI in Italy, Bonamo et al. (2018) reported that there is a negative relationship between the reading of contents and BMI levels (67). In this study, it can be said that there is particular significance due to the density of individuals with normal BMI level in the study group.



## 6. CONCLUSION

According to the results of this study, it is observed that students of the faculty of health sciences have a high percentage of nutrition label reading. It was found that the frequency of using the nutrition label was higher in the Department of Nutrition and Dietetics students than the other department students. There is a positive relationship between nutrition knowledge and nutrition label use. It has been determined that the most looked after information about food products are the expiration date, taste, price and contents while the distribution of nutrient contents are considered less important in purchasing processes. The most widely read information on the nutrition label by the participants are the sugar amount, ingredients, calorie / energy, serving size and protein. It was determined that female students cared more about the contents during the purchasing process while male students cared more about the price. Even if their nutrition label usage is not statistically low, it can be concluded that the students of the health sciences department do not pay enough attention to the label information such as allergen warnings, sodium / salt, cholesterol, preservative content, and sweeteners. Increasing the number of individuals reading the nutrition labels can be set as a goal.

## 7. RECOMMENDATIONS

The use of nutrition labels should be increased in order to ensure the healthier food preferences of individuals. The role of health professionals in raising public health awareness is high; therefore, especially university students studying in the field of health should be trained on the use of nutrition labels. Basic nutrition-related courses can be added to the curriculum of university students or trainings can be provided for the use of nutrition labels within the university.

The format of the nutrition labels can be made more interesting, easy to understand and legible. Labels can be presented in a standard format and consumers can be trained in this format accordingly. As an educational tool, the content related to the use of nutrition labels can be shared in effective communication channels such as television, internet, social media and radio.

The use of the NOVA system can be expanded in order to reduce the loss of time and confusion that consumers experience during the process of reading and interpreting the nutrition label. Thus, awareness of mobile phone applications and sites like <http://www.kliktag.co> and <https://tr.openfoodfacts.org/> that scan barcodes can be increased and database on processed foods sold in Turkey can be expanded.

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## 9. APPENDICES

### 9.1. APPENDIX 1: Ethical Approval



T.C. YEDİTEPE ÜNİVERSİTESİ

Sayı : 37068608-6100-15-1449

15/02/2018

Konu: Klinik Araştırmalar  
Etik kurul Başvurusu hk.

İlgili Makama (Merve Nur Akdemir Tüfekçilerli)

Yeditepe Üniversitesi, Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Bölümü Yrd. Doç. Dr. Arzu Durukan'ın sorumlu olduğu "**Bir Vakıf Üniversitesindeki Sağlık Bilimleri Fakültesi Öğrencilerinin Besin Etiketleri Kullanım Durumunun Değerlendirilmesi**" isimli araştırma projesine ait Klinik Araştırmalar Etik Kurulu (KAEK) Başvuru Dosyası ( **1421** kayıt Numaralı KAEK Başvuru Dosyası ), Yeditepe Üniversitesi Klinik Araştırmalar Etik Kurulu tarafından **14.02.2018** tarihli toplantıda incelenmiştir.

Kurul tarafından yapılan inceleme sonucu, yukarıdaki isimi belirtilen çalışmanın yapılmasının etik ve bilimsel açıdan uygun olduğuna karar verilmiştir ( **KAEK Karar No: 810** ).

Prof. Dr. Turgay ÇELİK

Yeditepe Üniversitesi  
Klinik Araştırmalar Etik Kurulu Başkanı

## 9.2. APPENDIX 2: Informed Consent Form

Katılımınızı talep ettiğim bu çalışma, bir araştırmadır.

İstanbul Yeditepe Üniversitesi Sağlık Bilimleri Fakültesinde eğitim görmekte olan öğrencilerde Besin Etiketleri Kullanım Durumunun incelenip yorumlanması hedeflenmektedir.

Çalışmada kesinlikle yaşadıklarınız (özeliniz) sorulmayacaktır. Genel olarak besin etiketleri kullanımı ile ilgili durumunuz, yaklaşımlarınız, düşünceleriniz ile alakalı sorular yönlendirilecektir.

Araştırmada alınacak yaş, eğitim durumu gibi bilgiler araştırma kapsamı dışında hiçbir kişiyle kesinlikle paylaşılmayacaktır. Elde edilecek olan bilgiler, Etik Kurul, kurum ve diğer sağlık otoritelerinin orijinal tıbbi kayıtlarına doğrudan erişimleri olacaktır. Fakat bu gönüllü onam formunun imzalanmasıyla bu bilgiler gizli tutulacaktır.

Bu çalışmaya katılmayı reddedebilirsiniz. Çalışmanın herhangi aşamasında da katılım onayınızdan vazgeçebilirsiniz.

Araştırmaya katılımınız için sizden herhangi bir ücret istenmeyecek ve katılımınız karşılığında size herhangi bir ücret ödenmeyecektir. Sizden beklenen, bilgilendirilmiş onam formunu doldurup, bu araştırmaya katkı sağlamayı kabul ettikten sonra, doldurmanızı talep edilecek olan anketlerin doldurulmasıdır.

Elde edilen veriler ile besin etiketleri kullanımı konusunda farkındalıkların ölçülmesi ve bunu etkileyen faktörlerin belirlenmesi hedeflenmektedir.

Araştırmacı: Dyt. Merve Nur AKDEMİR TÜFEKÇİLERLİ  
Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü  
Beslenme ve Diyetetik Yüksek Lisans Programı Öğrencisi  
Danışman: Yrd. Doç. Dr. Arzu DURUKAN  
Yeditepe Üniversitesi Sağlık Bilimleri Enstitüsü Beslenme ve Diyetetik Bölümü Öğretim Üyesi

Bilgilendirilmiş Gönüllü Olur Formundaki tüm açıklamaları okudum. Bana, yukarıda konusu ve amacı belirtilen araştırma ile ilgili açıklamalar, yukarıda adı belirtilen diyetisyen tarafından yapıldı. Araştırmaya gönüllü olarak katıldığımı, istediğim zaman gerekçeli veya gerekçesiz olarak araştırmadan ayrılabileceğimi biliyorum. Söz konusu araştırmaya, hiçbir baskı ve zorlama olmaksızın kendi rızamla katılmayı kabul ediyorum.

Ad, Soyad:

Tarih:

İmza:

**9.3. APPENDIX 3: Data Form**  
**ÜNİVERSİTE ÖĞRENCİLERİNİN BESİN ETİKETİ KULLANIM DURUMU**  
**DEĞERLENDİRME VERİ FORMU**

<b>1. Adınız Soyadınız:</b>	
<b>2. Hangi bölümde öğrenim görüyorsunuz?</b>	<input type="checkbox"/> Beslenme ve Diyetetik <input type="checkbox"/> Fizyoterapi ve Rehabilitasyon <input type="checkbox"/> Hemşirelik
<b>3. Kaçınıcı Sınıftasınız?</b>	<input type="checkbox"/> Birinci (1.) <input type="checkbox"/> İkinci (2.) <input type="checkbox"/> Üçüncü (3.) <input type="checkbox"/> Dördüncü (4.)
<b>4. Lütfen doğum tarihinizi YIL olarak belirtiniz.</b>	
<b>5. Cinsiyetiniz:</b>	<input type="checkbox"/> Kadın <input type="checkbox"/> Erkek
<b>6. Lütfen çekirdek ailenizin (anne, baba, evlenmemiş çocuklar) toplam aylık gelirine en yakın seçeneği işaretleyiniz.</b>	<input type="checkbox"/> < 1500 TL <input type="checkbox"/> 1500-4999 TL <input type="checkbox"/> 5000-9999 TL <input type="checkbox"/> 10000-19999 TL <input type="checkbox"/> 20000 TL ve üzeri
<b>7. Nerede kalıyorsunuz?</b>	<input type="checkbox"/> Üniversite öğrenci yurdu <input type="checkbox"/> Kamuya ait yurt <input type="checkbox"/> Özel yurt <input type="checkbox"/> Aile ile birlikte <input type="checkbox"/> Arkadaşlarla birlikte evde <input type="checkbox"/> Tek başına evde
<b>8. Düzenli egzersiz yapar mısınız? (Haftada 3 gün, en az 30 dak.)</b>	<input type="checkbox"/> Hayır <input type="checkbox"/> Evet <b>Not:</b> Yanıtınız EVET ise egzersiz yaptığınız toplam süreyi belirtiniz. <input type="checkbox"/> Haftalık: ..... / Günlük: .....

<b>ANTROPOMETRİK ÖLÇÜMLER:</b>	
<b>9. Boyunuz (metre):</b>	
<b>10. Kilonuz (kilogram):</b>	
<b>11. Beden Kitle İndeksi:</b> Not: Bu bölüm araştırmacı tarafından doldurulacaktır.	

<b>BESLENME BİLGİSİ:</b>	<b>(Lütfen yalnızca bir cevap seçiniz.)</b>
<b>12. Sağlıklı bir diyet hangi besin öğelerini içermelidir?</b>	<input type="checkbox"/> Karbonhidrat ve yağ <input type="checkbox"/> Vitamin ve mineraller <input type="checkbox"/> Karbonhidrat, yağ, protein ve mineral <input type="checkbox"/> Karbonhidrat, yağ, protein, mineral ve vitamin <input type="checkbox"/> Bilmiyorum
<b>13. Hangi besin en fazla enerjiyi sağlar (kalori yönünden)?</b>	<input type="checkbox"/> Protein <input type="checkbox"/> Vitamin ve mineral <input type="checkbox"/> Yağ <input type="checkbox"/> Karbonhidrat <input type="checkbox"/> Bilmiyorum
<b>14. Hangi hazırlama yöntemi sizce en sağlıklı yöntemdir?</b>	<input type="checkbox"/> Buharda pişirme <input type="checkbox"/> Kızartma <input type="checkbox"/> Fırınlama <input type="checkbox"/> Haşlama <input type="checkbox"/> Bilmiyorum
<b>15. Gıdalardaki hangi yağ çeşitlerinden en sağlıksız olanı hangisidir?</b>	<input type="checkbox"/> Doymuş yağlar (katı, hayvansal yağlar) <input type="checkbox"/> Doymamış yağlar (sıvı, bitkisel yağlar) <input type="checkbox"/> Trans yağlar <input type="checkbox"/> Margarin <input type="checkbox"/> Bilmiyorum
<b>16. Sağlıklı bir bireyin diyetinde en fazla bulunması gereken enerji verici besin ögesi hangisidir?</b>	<input type="checkbox"/> Proteinler <input type="checkbox"/> Yağlar <input type="checkbox"/> Karbonhidratlar <input type="checkbox"/> Vitaminler <input type="checkbox"/> Bilmiyorum

**BESİN ETİKETİ KULLANIMI:****17. Bir gıda satın alacağınız zaman önem sırası aşağıdakiler için nasıl olur?**

	Çok Önemli	Önemli	Daha Az Önemli	Önemli değil
a. Fiyat				
b. Tat				
c. Besin içeriği dağılımı (Karbonhidrat, Protein, Yağ Miktarları)				
d. İçindekiler				
e. Paketi				
f. Son Tüketim Tarihi				

<b>BESİN ETİKETİ KULLANIMI:</b>					
<b>18.</b>	<b>Besin etiketi kullanım durumunda aşağıdakilerden hangilerine ne sıklıkla dikkat edersiniz?</b>				
	<b>Her Zaman</b>	<b>Sıklıkla</b>	<b>Bazen</b>	<b>Nadiren</b>	<b>Hiçbir Zaman</b>
a. İçindekiler					
b. Porsiyon Miktarı					
c. Kaloriler/ Enerji (kkal)					
d. Toplam Yağ (g)					
e. Trans Yağ (g)					
f. Doymuş Yağ (g)					
g. Kolesterol (mg)					
h. Karbonhidrat (g)					
i. Protein (g)					
j. Vitamin ve Mineral (mg)					
k. Lif (g)					
l. Şeker (g)					
m. Şekerin Türü (Glikoz-fruktoz şurubu vs.)					
n. Sodyum/ Tuz					
o. Tatlandırıcı İçeriği (Asesülfam-K, Stevia vs.)					
p. Koruyucu İçeriği					
r. Alerjen Uyarısı (yerfıstığı, laktoz vs.)					
s. Sağlık Beyanı (düşük yağ içerir, düşük yağ kalp ve damar sağlığının korunmasına yardımcıdır vs.)					



<b>19.Aşağıdaki ifadelere ne kadar katılıp katılmadığınızı lütfen birer cevap seçerek belirtiniz.</b>					
	<b>Kesinlikle Katılıyorum</b>	<b>Katılıyorum</b>	<b>Kararsızım</b>	<b>Katılmıyorum</b>	<b>Kesinlikle Katılmıyorum</b>
<b>a. Besin etiketine bakmam.</b>					
<b>b. Besin etiketindeki beslenme bilgisi ile ilgilenmem.</b>					
<b>c. Besin etiketine bakmam çünkü yorumlamak için yeterli beslenme bilgisine sahip değilim.</b>					
<b>d. Besin etiketine bakmam çünkü ilgi çekici değil ve kafa karıştırıcı.</b>					
<b>e. Besin etiketi okumak çok zaman alır.</b>					
<b>f. Besin etiketindeki bilgiler anlaşılır yazılmıyor, karmaşık ve zor.</b>					
<b>g. Besin etiketine bakmam çünkü herhangi bir sağlık problemim yok.</b>					
<b>h. Besin etiketine bakarım çünkü besin alerjim var.</b>					
<b>i. Besin etiketi kullandığım zaman daha sağlıklı tercihler yaparım.</b>					
<b>j. Besin etiketindeki beslenme bilgisi benim için kullanışlıdır.</b>					
<b>k. Sağlıklı gıdaları nasıl seçtiğim konusunda kendime güvenirim.</b>					

Bilimsel çalışmamıza katkı verdiğiniz için TEŞEKKÜR EDERİZ.

## 10. CURRICULUM VITAE

### Kişisel Bilgiler

<b>Adı</b>	Merve Nur	<b>Soyadı</b>	Akdemir Tüfekçilerli
<b>Doğum Yeri</b>	Siirt	<b>Doğum Tarihi</b>	24.11.1989
<b>Uyruğu</b>	T.C.	<b>TC Kimlik No</b>	23836996354
<b>E-mail</b>	mervenur_akdemir@hotmail.com	<b>Tel</b>	05302818212

### Öğrenim Durumu

Derece	Alan	Mezun Olduğu Kurumun Adı	Mezuniyet Yılı
<b>Yüksek Lisans</b>	Beslenme ve Diyetetik	<b>Yeditepe Üniversitesi</b>	2019
<b>Lisans</b>	Beslenme ve Diyetetik	<b>Yeditepe Üniversitesi</b>	2014
<b>Lisans</b>	Hemşirelik (Çift Anadal)	<b>Yeditepe Üniversitesi</b>	2014
<b>Lise</b>	Fen Bilimleri	<b>Siirt Fen Lisesi</b>	2007

Bildiği Yabancı Dilleri	Yabancı Dil Sınav Notu (#)
İngilizce	85 - YÖKDİL

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

### İş Deneyimi (Sondan geçmişe doğru sıralayın)

Görevi	Kurum	Süre (Yıl - Yıl)
Diyetisyen	Ege Özel Sağlık Hizmetleri Ve Tic. Ltd. Şti.	2017 – 2018
Uzman	Yeditepe Üniversitesi – Sağlık Bilimleri Fakültesi – Beslenme ve Diyetetik Bölümü	2015 – 2017

### Bilgisayar Bilgisi

Program	Kullanma becerisi
Microsoft Office Programları	İyi
SPSS	Orta

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

