T.C.
YEDİTEPE UNIVERSITY
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DEPARTMENT OF NUTRITION AND DIETETICS

THE RELATIONSHIP BETWEEN CONSUMPTIONS OF DAIRY AND FERMENTED DAIRY PRODUCTS IN LACTOSE INTOLERANCE AMONG STUDENTS OF A FOUNDATION UNIVERSITY IN ISTANBUL

MASTER THESIS

ELİF NUR SAVCI

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Bu tez Yeditepe Üniversitesi Lisansüstü Eğitim-Öğretim ve Sınav Yönetmeliğinin ilgili maddeleri uyarınca yukarıdaki jüri tarafından uygun görülmüş ve Enstitü Yönetim Kurulu'nun 07./02./2020.. tarih ve 2020/02.-85...... sayılı kararı ile onaylanmıştır.

Prof. Dr. Bayram YILMAZ
Sağlık Bilimleri Enstitüsü Müdürü

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DECLARATION

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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.

06.02.2020

Elif Nur SAVCI

ACKNOWLEDGEMENTS

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ABBREVIATIONS AND SYMBOLS

BC	Before Christ
BMI	Body Mass Index
cm	centimeter
g	gram
kg	kilogram
kg/m²	kilogram/meter²
kkal	kilocalorie
LAB	Lactic acid bacteria
mcg	microgram
NCSS	Number Cruncher Statistical System
NHANES	National Health and Nutrition Examination Survey
SD	Standart Deviation
TNHS	Turkey Nutrition and Health Survey
WHO	World Health Organization

ABSTRACT

Savcı, E. (2020). The Relationship Between Consumptions of Dairy and Fermented Dairy Products in Lactose Intolerance Among Students of a Foundation University In Istanbul. Yeditepe University, Institute of Health Sciences, Department of Nutrition and Dietetics, MSc Thesis. İstanbul

This study was conduct to determine the gastrointestinal symptoms after the consumption of milk and dairy products, lactose intolerance status and knowledge with Pre-school Teaching departments students at İstanbul Aydın University. The study was carried out with 200 female students on a voluntary basis. A data information form with 22 questions was applied to the participants. NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) program was used for statistical analysis. Descriptive statistical methods were used while evaluating the study data. The suitability of quantitative data to normal distribution was tested by Shapiro-Wilk test and graphical examinations. Mann-Whitney U test was used to compare the quantitative variables that did not show normal distribution between the two groups. Pearson chi-square test and Fisher-Freeman-Halton exact test were used to compare qualitative data. Statistical significance was accepted as $p < 0.05$. General information, milk, milk products and foods that may contain lactose consumption frequencies, gastrointestinal symptoms such as abdominal pain, diarrhea, gas, bloating in the stomach, stomach cramping, vomiting and nausea after consumption of milk and fermented milk products like yogurt, kefir, cheese were obtained via data information form. Monthly consumption of milk and dairy products of the participants, total energy, calcium, lactose amounts were calculated. It was observed that the students consumed cheese and yogurt more. Among those participating in the study, the rate of those who were diagnosed with a health care provider and had lactose intolerance was found to be 1%, while those who are suspected of lactose intolerance were 36%. It was found that 76.3% of the students who thought that they had lactose intolerance started to feel the symptoms later. The rate of lactose intolerance in patients with chronic disease compared to patients without chronic disease was found to be statistically significantly higher. When evaluated according to lactose intolerance after drinking milk, the distribution of the severity of the cases of abdominal pain, diarrhea, gas passing, stomach bloating, cramping and nausea show statistically significant difference. When

the patients with and without lactose intolerance were compared, monthly calorie, lactose and calcium values from buttermilk drink and cheese were found to be statistically significantly lower in patients with lactose intolerance. It was seen that most of the students who experienced symptoms of lactose intolerance were not diagnosed and it was seen that the population should be made aware of this issue.

Keywords: lactose intolerance, milk and dairy consumption, milk consumption habits

ÖZET

Savcı, E. (2020). İstanbuldaki Bir Vakıf Üniversitesi Öğrencilerinin Süt ve Fermente Süt Ürünleri Tüketiminin Laktoz İntoleransı İle İlişkisi. Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Anabilim Dalı, Master Tezi. İstanbul

Bu çalışma İstanbul Aydın Üniversitesi Okul Öncesi Öğretmenliği bölümünde okuyan öğrencilerle, süt ve süt ürünleri tüketimi sonrası oluşabilecek gastrointestinal semptomları, laktoz intolerans durumları ve bilgilerinin belirlenmesi amacıyla yapılmıştır. Çalışma gönüllülük esasına dayalı olarak 200 kız öğrenci ile yürütülmüştür. Katılımcılara 22 soruluk veri bilgi formu uygulanmıştır. İstatistiksel analizler için NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) programı kullanıldı. Çalışma verileri değerlendirilirken tanımlayıcı istatistiksel metodlar kullanıldı. Nicel verilerin normal dağılıma uygunlukları Shapiro-Wilk testi ve grafiksel incelemeler ile sınanmıştır. Normal dağılım göstermeyen nicel değişkenlerin iki grup arası karşılaştırmalarında Mann-Whitney U test kullanıldı. Nitel verilerin karşılaştırılmasında Pearson ki-kare test ve Fisher-Freeman-Halton exact test kullanıldı. İstatistiksel anlamlılık $p < 0.05$ olarak kabul edildi. Veri bilgi formu aracılığı ile genel bilgileri, süt tüketimine ilişkin bilgiler, süt içimi sonrası oluşabilecek karın ağrısı, ishal, gaz, midede şişkinlik, midede kramp, kusma ve bulantı gibi gastrointestinal semptomlar ve şiddeti ile ilgili bilgiler, süt, süt ürünleri ve laktoz içerebilecek besinlerin tüketim sıklıkları ve miktarları, fermente süt ürünlerinden yoğurt, kefir ve peynir tüketimi sonrası oluşabilecek gastrointestinal semptomlar sorgulanmıştır. Katılımcıların aylık süt ve süt ürünleri tüketim miktarları, toplam enerji, kalsiyum, laktoz miktarları hesaplanmıştır. Öğrencilerin en çok peynir ve yoğurtu tükettikleri görülmüştür. Çalışmaya katılan kişilerden daha önce laktoz intoleransı olduğu bir sağlık kuruluşundan teşhis edilmiş ve emin olanların oranı %1 olarak bulunmuş, laktoz intoleransı belirtileri olduğu halde laktoz intoleransından şüpheli olanların oranı %36 olarak bulunmuştur. Laktoz intoleransı olduğunu düşünen öğrencilerin %76.3 oranında belirtileri sonradan hissetmeye başladığı bulunmuştur. Kronik hastalığı olan olgularda kronik hastalığı olmayan olgulara göre laktoz intoleransı görülme oranı istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur. Süt içimi sonrası laktoz intoleransına göre

değerlendirme yapıldığında olguların karın ağrısı, ishal, gaz, midede şişkinlik, kramp, ve bulantı oluşma şiddeti dağılımları istatistiksel olarak anlamlı farklılık göstermektedir. Laktoz intoleransı olan ve olmayan olgular karşılaştırıldığında ayran ve peynirden aylık alınan kalori, laktoz ve kalsiyum değerleri laktoz intoleransı olan olgularda istatistiksel olarak anlamlı olarak düşük bulunmuştur. Laktoz intoleransı belirtileri yaşayan öğrencilerin büyük bir kısmının tanı almadığı görülmüş ve toplumun bu konu hakkında bilinçlendirilmesi gerekliliği görülmüştür.

Anahtar sözcükler: laktoz intoleransı, süt ve süt ürünleri tüketimi, süt tüketimi alışkanlıkları

1. INTRODUCTION

Health is defined by World Health Organization that is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (1). In order for the physiological activities of every living thing to function normally and to lead a healthy and quality life, the place of adequate and balanced nutrition is important (2). Nutrition is a behavior that needs to be done consciously to ensure that the body gets the necessary nutrients in sufficient quantity and at the right time (3). Adequate and balanced nutrition is getting the body's energy and nutrient needs enough every day. On the basis of habits of individuals, they create in later life comes habits they acquired in childhood. Therefore, gaining adequate and balanced nutrition as a habit in childhood is important for the individual to lead a healthy life in his future life (4). Foods are divided into four basic food groups in terms of adequate and balanced nutrition (4, 5). For adequate and balanced nutrition, it is necessary to consume in the recommended amounts from all four basic food groups. These four basic food groups are milk group, meat-egg-legume group, vegetable and fruit group, bread-grain group respectively (4, 5).

The milk group, which is part of the four basic food groups, contains foods such as yogurt and cheese made from milk and dairy products (4). In our country, yogurt and buttermilk drink are the most preferred types of milk product after drinking milk with its effect in our culture (6). The consumption of milk and dairy products differs in all countries of the world (4). It is recommended that the milk group consumes enough every day, especially for children and young people (5).

Milk has an important role for balanced diet because it has macro and micronutrients in its components (7). Milk and dairy products have an important place in our diets at all ages in terms of protein, vitamins such as B2, B12 and minerals such as calcium and phosphorus (4, 8, 9). Despite having these features, not every individual can tolerate milk, especially in adulthood (8, 9). Some clinical symptoms may occur (9). The cause of these symptoms can be caused by lactose, which is milk carbohydrate (9). Lactose is a naturally occurring disaccharide in milk. Its absorption depends on the activity of the lactase enzyme in the small intestine. Lactase hydrolyzes lactose and helps it to enter the bloodstream. In mammals, lactase activity reaches its peak during breastfeeding with breast milk and decreases after weaning. In this case, it causes a

decrease in the capacity to absorb lactose (10). Lactose, which is not absorbed in the small intestine, directly passes into the large intestine. It is metabolized by the intestinal flora and converted into gases responsible for lactose intolerance such as short chain fatty acids, hydrogen, carbon dioxide and methane (11). Lactose intolerance is characterized by gastrointestinal symptoms such as bloating, abdominal pain, gas passing and diarrhea after intake of dairy products (12). These symptoms can usually occur between 30 minutes and 2 hours or more after consumption (13). Lactose intolerance is known as a common medical condition and has an impact on quality of life. Approximately 70% of the world's adult population is thought to be lactose intolerant (13). In the study of Hegar et al., the prevalence of lactose malabsorption in pre-primary (3 - 5 years), primary (6 - 11 years) and middle school (12 - 14 years) children was found to be 21.3%, 57.8%, and 73%, respectively (14). Generally, people with lactose intolerance are advised not to consume milk and dairy products. However, it is known that fermented milk products can be tolerated in people with lactose intolerance (15).

Although lactose intolerance is not a well-known issue in our population, it does not have sufficient awareness about what measures can be taken in its presence. Considering the importance of nutritional values in dairy products, it is important to raise awareness of people with digestive difficulties and draw attention to the measures they can take. This study will be carried out to determine the gastrointestinal symptoms that may occur after dairy consumption habits, milk and dairy consumption, and to determine the distribution of lactose digestive difficulties.

2.GENERAL INFORMATION

2.1.Nutrition

According to World Health Organization (WHO), "Nutrition is the intake of food, considered in relation to the body's dietary needs." (16). Living beings need nutrition to sustain their vital activities. Nutrition allows people to intake nutrients that are needed to live in a healthy and productive way. In addition, it has psychological and sociological importance in people's lives (17).

Nutrition is essential for growth, development and healthy life. (18) Recent studies show that the risk of having some disease like obesity, several types of cancer, type 2 diabetes, osteoporosis, cardiovascular disease related to diet can be reduced by healthy diet and physical activity (19, 20). "Nowadays, chronic diseases related to diet; 60% of the deaths and 46% of the patients are reported to be the main cause of death, and in 2020. 71% of total deaths in developing countries are estimated to be ischemic heart diseases, 75% are stroke, and 70% are due to diabetes." (19).

The target of nutrition, it is not just feeling satiated (21). With optimal nutrition, people may minimize risk of disease and maximize well-being. Therefore, people should consume variety of food to fulfill necessary nutrients and energy (19). Research on nutrition science has demonstrated that individuals need in excess of 50 nutrients so as to continue their growth, development and healthy life. Nutrients can separate five groups which are protein, fats, carbohydrates, minerals, vitamins and water (21).

We can meet our these nutrients by feeding every meal from four main groups of foods (19).

-Milk and milk products

-Meat and meat products, egg and legumes

-Vegetables and fruits

-Bread and cereals

2.2.Milk and Dairy Products

2.2.1.Terms of Milk and Contents

Milk, which is an important nutritional source in terms of balanced diet, contains many macro and micronutrients (7). While dairy products provide energy for the survival of the body, it is an excellent food that can be considered as a food supplement which contains about 85 different vitamins, mineral hormones and enzymes in the structure with the nutrients needed for proper functioning of vital functions (22). 100 milliliters of milk consists of about 87.2 g water, 4.9 g lactose, 3.5 g of protein, 3.5 g of fat, 0.9 g of mineral and trace amounts of vitamin, enzyme, hormone, hormone like substances and organic acid (23). Usually milk in marketing is classified into three types according to the fat content that is whole (>= 3.5g%), semi-skimmed (1.5% - 1.8%), and non-fat (<0.15 %). (13. 14) This classification is determined in accordance with the Turkish food codex (24).

It is a specific and only nourishment for mammals in the first months of life (2). Milk compositions having complex structure ranging from species to species, have an important place in their lives for young mammals, including human offspring, in most cases as a single source of food for a certain period of time (25).

Fats

%98 total fat of milk is mainly comprised of triglycerides approximately (24, 26). Milk fat is also consists of phospholipids (%0.2-1), free sterols (%0.22 - %0.41), free fatty acids, fat soluble vitamins, about 400 different fatty acids (4). %70 of total fatty acids are saturated fatty acids and it makes milk be richer in saturated fatty acids. It is poor from unsaturated fatty acids. %1.5 − 6 of the milk fats is trans fatty acid. Conjugated linoleic acid, branched-chain fatty acid and phytic acid are also odd chain fatty acids which are other specified minor fatty acids. Due to high value of saturated fatty acid, which is responsible for increasing plasma cholesterol in human, milk fat can be seen as a risk factor for cardiovascular disease (26). Although it contains about %5 of unsaturated fatty acid, milk is valuable for having conjugated linoleic acid, butyric acid, myristic acid and sphingomyelin which are important against chronic diseases (4, 27).

Proteins

Milk proteins have an important place in human nutrition (28). Since, milk proteins include all the essential amino acid which human body cannot synthesis. Therefore, it is considered that their quality is high value (29). Milk proteins consist of two different types; casein and whey protein (25). Nearly, its percentage of these types are 80 and 20 respectively. Non-protein nitrogen compounds account for 5% of the total nitrogen content of the milk (28). Caseins are grouped as α-, β-, κ- and γ-casein. Whey protein contains α-lactalbumin, β-lactoglobulin and immunoglobulin. (28).

Carbohydrates

Milk carbohydrates are mostly found in disaccharide called lactose that must broke down into glucose and galactose by lactase enzyme (30). Lactose is synthesized by mamillary gland. It constitutes %54 of dry matter except fat (27).

Minerals

Milk has a diversity of minerals such as calcium, phosphorus, potassium, magnesium, zinc and selenium (30). However, milk cannot contribute iron and has low iron bioavailability. Especially in childhood, milk cannot supply the required iron mineral alone. The mineral content of milk is affected by many conditions such as the physiological state of the animal, lactation status, environmental factors, genetic factors and some procedures applied to milk (4).

Vitamins

Milk contains all vitamins known as essential for human body. In related to fat content of milk, fat soluble vitamin that is vitamin A, D, E and K are found in milk. As the amount of fat milk decreases, content of fat-soluble vitamins decline (4,27,29). Beta carotene as precursor of vitamin A called carotenoid are found in milk fat. Yellow pigments in carotenoid give the color of butter and with riboflavin vitamin enable typical creamy color of milk (29). Not only fat-soluble vitamins but also all of the water soluble vitamins are found in milk in changing amounts required by human body (29). These vitamins are C, B1, B2, B6, B12, pantothenic acid, niacin, biotin and folic acid. During processing, storage or heat exposure can reduce vitamin content of milk (25.29).

2.3. Fermentation

2.3.1. Term of Fermentation

Fermentation is natural method that increasing nutritional value of food by synthesis essential amino acid and vitamins. It can occur naturally or with the using of starter culture. It protects food from spoilage and makes easier to digestion. It also provides detoxification and degradation of undesirable substances such as phytate, tannins and polyphenols found in raw foods. Fermented products using milk, cereals, meat, soy, fish, vegetables and fruits are produced in the world. With the help of enzymes and microorganisms like bacteria, fungi and yeast fermented beverage and food can be produced. Fermentation have an important place in human life with antioxidant, therapeutic and immunological features as well as providing food longer durability and protecting spoilage. When all these features considered, the consumption of fermented food in our country and all over the world has increased in recent years (31).

2.3.2. Fermented Milk Products

According to Turkish Food Codex, fermented milk products is that "Milk product which contains a sufficient number of live and active microorganisms that are formed as a result of the fermentation of the milk by suitable microorganisms and causing the pH value to decrease or not to cause coagulation." (32).

Generally, the production of fermented dairy products comprises the steps of heating the milk to its boiling point to kill bacteria, cooling to body temperature and adding a small amount of fermented milk to serve as a starter culture. For this purpose, the milk starter is mixed with culture and kept at room temperature overnight. The milk, which is clotted until the morning, acquires a sour taste and the typical taste and flavor of the fermented milk. Although fermented milks can be produced in traditional way, due to reasons such as urbanization they are also produced commercially (31.33).

Fermented milks are consumed worldwide. There are about 400 general named fermented milks produced industrialized and traditionally throughout the world (31, 34). However, the current list have only a few species. We can classify fermented milk by considering the dominant microorganisms and their metabolites (34).

- Lactic fermentations including mesophilic type (for example cultured buttermilk, filmjolk, langofil and tatmjolk.) thermophilic type (for example yogurt, Bulgarian butter- milk, zabadi, dahi and therapeutic or probiotic type, for example (acidophilus milk, Yakult, ABT, Onka, Vifi)
- Yeast lactic fermentations (for example kefir, koumiss and acidophilus yeast milk)
- Mold lactic fermentations (for example villi) (34).

Fermented milk products have an important place in human nutrition by centuries. There are findings showing that in B.C. about 100 – 150 years, raw milks are fermented by containing natural microorganisms' culture, and consumed this way (35). Fermented milk products are produced mostly in lactic acid fermentations (34, 35, 36).

2.3.3. Lactic Acid Fermentations

Lactic acid bacteria are basic microorganisms in milk fermentation. They are converted into lactose to lactic acid. This situation increases the acidity of the environment and prevents the growth of organisms other than lactic acid bacteria in the environment (35). Especially lactic acid bacteria of *Lactococcus, Leuconostoc, Lactobacillus, Streptococcus* and *Pediococcus* species play an important role in the production of yogurt, cheese, butter and cream that are consumed more than other dairy products (37). Starter cultures that are used producing milk products are divided into two groups; mesophilic and thermophilic. The mesophilic cultures commonly used in the dairy industry are those of *Lactococcus l actis* subsp. *l actis; L. lactis* subsp. *cremoris*; *L. lactis* subsp. *lactis biovar* are *diacetilactis* species. Thermophilic lactic acid bacteria are found in yogurt and especially in hard and cooked cheeses such as Emental, Gruyere, Parmigiano and Grana. *S. thermophilus*; *Lactobacillus helveticus*; *Lb. delbrueckii* subsp. *bulgaricus* or *lactis* are thermophilic starter cultures commonly used in the dairy industry. These lactic acid bacteria can develop at temperatures that many lactic acid bacteria cannot develop. Other than these lactic acid bacteria, *Enterecoccus faecalis* and *E. faecium* (Cheddar cheese, soft Italian cheeses, some Swiss cheeses); Propionibacterium freudenreichii (in Emmental and Gruyere cheeses); *Leuconostoc cremoris* (under sour cream and cultured churn) they are used as starter culture (37).

S. thermophilus and *Lb. bulgaricus* starter culture mixtures containing equal amounts are used in production of yogurt that are the most important dairy product in our country. Cheese that are secondly important dairy product in the world are produced

variously in different parts of world. In producing of cheese, other than lactic acid bacteria, yeast species are also used (37).

Table 1. LAB isolated from fermented dairy products (37)

Dairy Product Name	Lactic Acid Bacteria
Nonporous Hard Cheeses	*L. lactis* subsp. *lactis,*
Small Porous Cheeses	*L. lactis* subsp. *cremoris* *L. lactis* subsp. *lactis,* *L. lactis* subsp. *cremoris,* *L. lactis* subsp. *lactis var. diacetylactis,* *Leu. mesenteroides* subsp. *cremoris*
Morocco Soft White Cheese	*Lb. plantarum, Lb. rhamnosus,* *Lb. paracasei, Lb. brevis,* *Lb. bunchneri, L. lactis,* *L. garvieae, L. raffinolactis,* *Leu. pseudomesenteroides,* *Leu. mesenteroides, Leu. citreum,* *E. durans, E. faecalis, E. faecium,* *E. saccharominimus*
Swedish and Italian cheese	*Lb. delbrueckii* subsp. *lactis,* *Lb. helveticus, Lb. casei,*
Butter, Buttermilk drink (Ayran), Yogurt	*Lb. delbrueckii* subsp. *bulgaricus,* *S. thermophilus L. diacetylactis*
Greek Graviera Cheese	*Lb. casei/paracasei, Lb. plantarum,* *L. lactis, S. thermophilus, E. faecium*
Fermented Probiotic Milk	*L. lactis* subsp. *lactis,* *L. lactis* subsp. *cremoris,* *L. lactis* subsp. *lactis var.diacetylactis,* *Leu. mesenteroides subsp. cremoris*
Kephir	*Lb. kefiri, Lb. kefiranofaciens,* *Leu. mesenteroides, L. lactis*
Sour Cream	*L. lactis* subsp. *lactis, E. durans,* *E. faecium, Leu. mesenteroides,* *Leu. pseudomesenteroides, Leu. lactis*

L.: Lactococcus, Lb.: Lactobacillus, Leu.: Leuconostoc, S: Streptococcus, E.: Enterococcus

2.4. Lactose Intolerance

2.4.1. Lactose and Lactase

Lactose is a basic source of energy from milk of all mammals except sea lion. Therefore, it is significant in animal life (10). Lactose is a disaccharide only found in milk and in its products. It is formed by binding D -galactose molecule to a D - glucose molecule with a β-1,4 glycosidic bond (8,38,39).
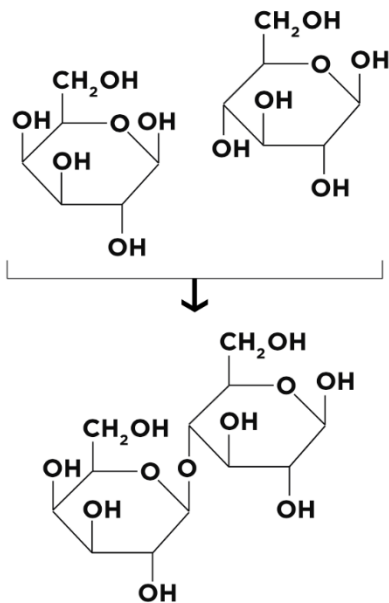
Figure 1. A molecule of the disaccharide β-D – lactose is shown. On the right, glucose and on the left, galactose is shown (39).

Hydrolysis of the lactose into its monosaccharide for intestinal absorption necessitates the enzyme called lactase (10). Lactose molecule are digested into two constituent monosaccharide glucose and galactose by the help of lactase enzyme which synthetized in small bowel (8, 40). Lactase expression is changed in progress of time. In the eight week of pregnancy, lactase activity existing everywhere throughout the mucous surface in the small intestine. Its activity rises until week 34 and achieves its maximum level at birth. Then by a first couple of life, activity of lactase enzyme initiates to diminish (8, 10).

2.4.2. Hypolactasia

The term of hypolactasia defines that deficiency of the lactase enzyme. That means the level of brush border lactase activity is very low. Hypolactasia is also called lactase nonpersistence or lactase deficiency or lactase insufficiency. To diagnose this situation, the measurement of lactase activity is the gold standard (8, 41).

Lactase deficiency appears as:

- Congenital lactase deficiency called alactasia, is an extremely rare, shown in first Finland and not all of them but many of cases have been reported from here. This is caused by mutation at the lactase gene site. After infants are fed by breast milk or food containing milk, they rapidly start to show clinical conditions that watery diarrhea, acidosis, and hypercalcemia (8,39,41).

- Primary lactase deficiency is also called adult- type hypolactasia. The prevalence of adult-type hypolactasia vary by ethnicity. From age of $2-5$ years, lactase enzyme levels fall consistently (8).

- Secondary hypolactasia is caused by other clinical conditions in relation to intestinal tract. It is a temporary is a inadequacy of lactase that happens as an outcome of harm to the lining of the small intestine(42). Some pharmacological drugs, some disease, surgery or radiation therapy to the enterocytes can lead to this (8,39,41,42). When the primary problem affecting mucosa of small intestine has recovered, lactase enzyme activity turn back to normal again (8, 41).

    Clinical conditions causing secondary hypolactasia are ;
    - o celiac disease
    - o severe malnutrition
    - o bacterial or viral enteritis (e.g., rotavirus), and parasitic disease (e.g., giardiasis, cryptosporidiosis)
    - o actinic enteritis
    - o some pharmacological drugs (neomycin, kanamycin, tetracycline, colchicine, polymycin and other chemotherapeutic drugs)
    - o some post-surgical conditions, such as stagnant loop syndrome or short bowel syndrome
    - o inflammatory bowel diseases (Crohn's disease, ulcerative colitis) (8).

2.4.3. The Term of Lactose Maldigestion, Lactose Malabsorption and Lactose Intolerance

When lactose, disaccharide found in milk, cannot be digested efficiently due to lactase enzyme deficiency or other conditions this called as lactose maldigestion. Non-digestible lactose cannot be absorbed which is called lactose malabsorption and fermented by gut microbiota (8). Consuming large amounts of lactose containing food

can lead some gastrointestinal symptoms due to lactose malabsorption called lactose intolerance (8,39). Since the age of Hippocrates and Gallen, who realized that some gastrointestinal symptoms occur in some people after consuming milk, lactose intolerance has been described but only in the last 50 years, lactose intolerance has been identified and scientifically diagnosed (8, 43).

2.4.4. Symptoms of Lactose Intolerance

Lactose intolerance can be related diversity of clinical symptoms (40). After eating of the lactose containing food, symptoms can happen between 30 minutes and 2 hours (42).

Diarrhea, bloating, nausea, borborygmi, flatus and abdominal pain are gastrointestinal symptoms that almost always present in lactose intolerant patient (8,40). In addition to these symptoms, other gastrointestinal symptoms which are constipation, vomiting, and systemic symptoms for example, headaches, loss of concentration, light headedness, muscle pain, tiredness, joint pain can be caused (8, 40. 42).

Lactose intolerance is described as existence of clinical symptoms associated with lactose malabsorption. Nonetheless, lactose malabsorption does not consistently convert into the advancement of symptoms of lactose intolerance. In fact, only between a third and half of individual with lactose malabsorption are also intolerant (11).

2.4.5. Diagnosis of Lactose Intolerance

Lactose malabsorption and intolerance diagnosed in several ways (10). Jejunal biopsy, absorption test (overload of lactose), hydrogen breath test, genetic test, and symptoms surveys after ingestion of lactose are diagnosis methods for lactose intolerance (11). Although diagnosis of lactose malabsorption and intolerance has more than one method, there is no gold standard test for diagnosis of lactose malabsorption currently (11). The most commonly used tests for the diagnosis of lactose intolerance are lactose hydrogen breath test and lactose absorption test (lactose tolerance test) (40.44).

2.4.5.1. Hydrogen Breath Test

Hydrogen breath tests are generally used to investigate pathophysiology of practical gastrointestinal issue. Lactose hydrogen breath test, one of the types of

hydrogen breath test, is used in the diagnosis of lactose intolerance (45). Lactose hydrogen breath test can be considered gold standard test due to non-invasive, easiness, budget friendly, its high sensitivity and specificity (8). Test principle is measuring increase of hydrogen in respiratory air after ingestion of 25g – 50 g of lactose (10. 40). Hydrogen is measured every 30 minutes. When the hydrogen level is reached 20 ppm than the baseline value in 3 hours, hydrogen breath test is positive (8,45). Hydrogen breath test can give false negative results, if there is lack of hydrogen production by intestinal bacterial flora or recent using of antibiotics. In addition to this, it can give positive result, if there is existence of small intestinal bacterial overgrowth (8,10). In the first 90 minutes from starting of the hydrogen breath test, if there is rapid rise of hydrogen, this situation can help determine patients with small intestinal bacterial overgrowth (8). Before hydrogen breath test patients should not consume food for 12 hours and should not use antibiotics 2 – 4 weeks (8, 46). Consuming complex carbohydrate the day before the test, abstaining from smoking and physical activity on the day of test are recommended to improve the accuracy of the test (8).

2.4.5.2. Lactose Tolerance Test

50 grams lactose were given to patients. Blood glucose levels were measured before and after 50 grams of lactose loading. After lactose loading, if blood glucose levels increased by 20 mg /dl, patients were diagnosed (47).

2.4.6. Sources of Lactose

Milk and milk products are major sources of lactose. The lactose concentration in the milk of mammals varies. The highest lactose among mammals is in human milk with approximately 7.5g / 100 ml. In cows, goats and sheep, this rate is approximately 5g / 100 ml. It is necessary to know the amounts of lactose in the portions of milk and dairy products. Hard cheeses contain less than 1-gram lactose per 30 grams of portion (48).

Lactose has positive effects on texture. Lactose gives sweetness about half of glucose and one third of its sucrose. Because of these properties, lactose is used in processed products, confectionery, bread and desserts (13).

Some medication and food additives can also contain small amounts of lactose. The highest lactose content per capsule or tablet is about 0.075 g. Consumption of 20 such tablets per day may provide as the content of 1 serving milk (48).

Lactose is not found only milk and milk products, with these positive aspects, it is also found variety of packaged food. Therefore, individuals should know that there are many foods that may contain lactose, and they should consider the warnings accordingly (13).

2.4.7. Treatment of Lactose Intolerance

Dose of lactose, adaptation of colon, intestinal transit, and consumption of other dairy products have an important role in lactose digestion (38).

The aim of medical nutrition treatment in individuals with lactose intolerance is to reduce the amount of lactose taken by diet. Therefore, removing lactose containing food from diet, consuming lactose free product or taking lactase enzyme with lactose containing meal are some method. However, removing lactose containing food is the most using method in patient with lactose intolerance. This brings with it some nutritional problems (49). Dairy products are major source of calcium and other important nutrients like riboflavin, vitamin A and phosphorus. Therefore, they should not be removed from diet totally (40).

Studies with self-reported lactose intolerance show that small doses (up to 12 g of lactose) does not cause symptoms. 15 g – 18 g lactose can even tolerate if it taken with other nutrients (10). High doses >20 – 50 g lactose can cause symptoms (38, 50).

For minimizing symptoms from lactose maldigestion, milk can consume with other foods, so it slows the intestinal transit of lactose with the help of presence of additional food. The slow transition permits greater contact between lactose ingested in the small intestine and residual lactase, thereby improving lactose digestion (50).

Fermentation process can help tolerate lactose in some dairy foods such as yogurt and some cheeses. Yogurt is produced by fermentation with the help of bacteria example of Lactobacillus. In the process of yogurt fermentation, these bacteria break down lactose (51). 25-50% of lactose is used during fermentation, which reduces the lactose content to about 4% (42). Therefore, individual with lactose intolerance can tolerate yogurt better than milk (38). Many fermented product types produced from milk in different parts of world such as kefir, sour cream, leben, labaneh, mursik, and viili. These products similar to yogurt reduce lactose content and increase lactase

content (52). Hard maturated cheeses also can have low lactose content and so individual with congenital lactose intolerance can tolerate them (52).

It has been reported that colon bacteria can adapt to ferment lactose with long-term consumption of lactose (38). In study conducted by Hertzler and Saviaono found that there is colonic adaptation to regular lactose intake and this adaptation reduces the symptoms of lactose intolerance (53). In one double blind study, lactose intolerant subjects ingested lactose for 13 days. Colonic adaptation occurred and all symptoms except diarrhea regress. However, control group also observed clinical improvement so improved clinical tolerance may be placebo effect (54). Therefore, it is not necessary to restrict dairy products, but instead dairy products should be managed (42).

Supplement with lactase enzyme can also suggest lactose intolerant patient. In one review, when consuming 17 – 20 g lactose daily, lactase supplementation can reduce symptoms before consuming milk (38).

Figure 2. Therapeutic Management in Lactose Intolerant Patients (44,55,80)

```
                          ┌──────────────────────┐
                          │   LACTASE DEFICIT    │
                          └──────────────────────┘
                           ↙                    ↘
        ┌──────────────────────────┐    ┌──────────────────────────┐
        │ Primary Lactase Deficit  │    │ Sekonder Lactase Deficit │
        └──────────────────────────┘    └──────────────────────────┘
```

Temporary lactose free diet to obtain remission of symptoms

Temporary lactose-free diet until recovery of causative disease

⬇

Gradual re-introduction of lactose without overcoming individual threshold

⬇

(To raise threshold dose)
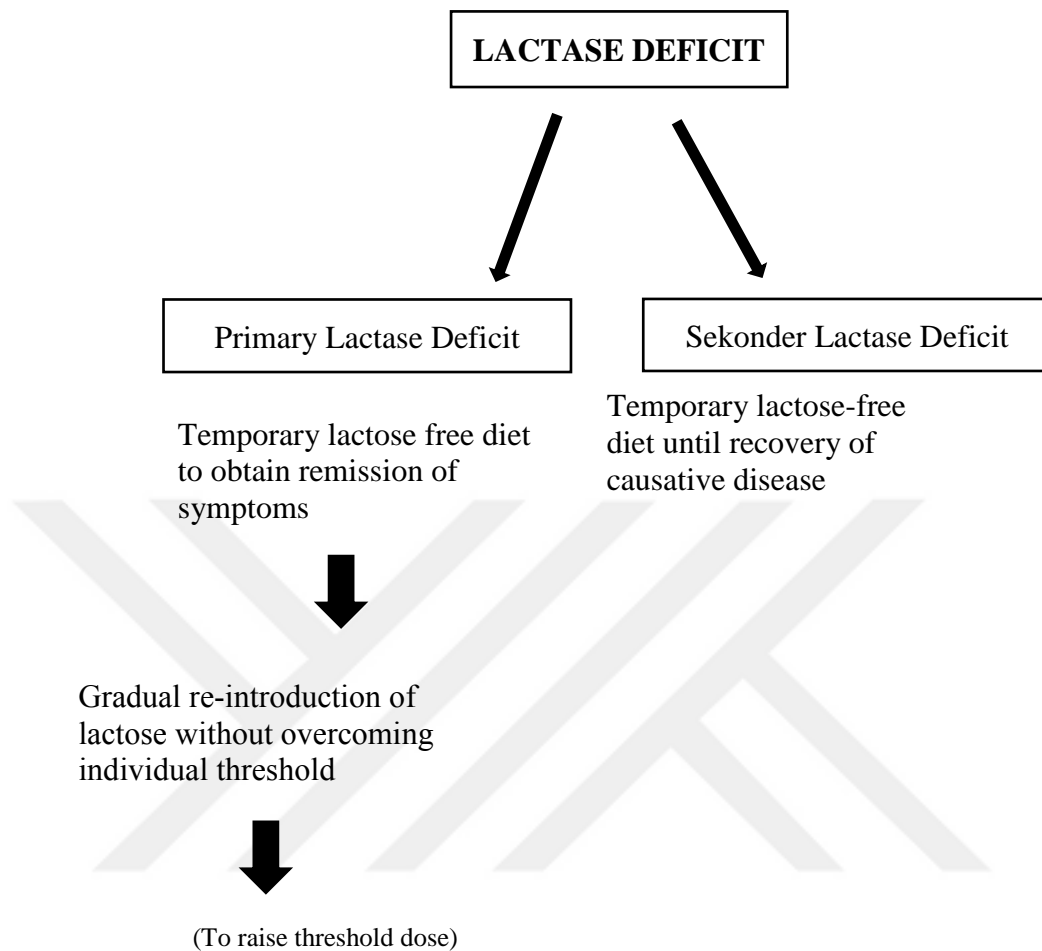
NON PHARMACOLOGICAL STRATEGIES

- ingestion of milk together with other foods
- consumption of fermented and maturated dairy products
- improvement of the adaptation
- distribution in little meals of daily milk amount

⬇

(if no effect)

PHARMACOLOGICAL STRATEGIES

- soluble exogenous lactase for milk
- lactase in tablet or capsule for solid dairy product

3. MATERIALS and METHODS

3.1. Universe and Sample of Research

Research universe consists of İstanbul Aydın University Department of Pre-school Teaching departments students between dates of 21 September and 21 October when application of the research was planned. The research was conducted by female students because male students number is not enough to compare.

3.2. Inclusion and Exclusion Criteria

Inclusion Criteria

- Participants over the age of 18
- Becoming a student at the Department of Preschool Teaching at Istanbul Aydın University
- Declare verbal and written consent to participate in the research.

Exclusion Criteria

- Not verbal consent to participate in the research
- Being outside the group designated for the research
- Inconsistent answers to surveys and conditional questions

3.3. Data Collection Tools

Data information form was used in the research. This form was prepared by using the literature research and the studies of Bıyıklı and Tutumlu who are close to the subject of the research (44,56). The form consists of 22 questions about general information of students, frequency of consumption of milk and milk products, and their lactose intolerance status and knowledge. (Appendix - 1) General information, milk, milk products and foods that may contain lactose consumption frequencies, gastrointestinal symptoms such as abdominal pain, diarrhea, gas, bloating in the stomach, stomach cramping, vomiting and nausea after consumption of milk and fermented milk products like yogurt, kefir, cheese were obtained via data information form. Monthly consumption of milk and dairy products of the participants, total energy, calcium, lactose amounts were calculated.

3.4. Evaluation of Data

After collecting the data, necessary coding was done.

NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) program was used for statistical analysis. Descriptive statistical methods were used while evaluating the study data. The suitability of quantitative data to normal distribution was tested by Shapiro-Wilk test and graphical examinations. Mann-Whitney U test was used to compare the quantitative variables that did not show normal distribution between the two groups. Pearson chi-square test and Fisher-Freeman-Halton exact test were used to compare qualitative data. Statistical significance was accepted as $p < 0.05$.

3.5. Ethical Aspect of the Research

- Approval of the institution was taken. (Appendix – 2)
- Approval of ethical board was taken. (Number: 61351342-/2019-84) (Appendix – 3)
- Voluntary participation of individuals was deemed as the principle, their permissions were taken by explaining them the volunteering form and they were told that they can quit the research any time without citing reason.

3.6. Limitations of the Research

Biochemical tests are not used about lactose intolerance in this research. The use of self-assessments of individuals regarding lactose intolerance constitutes the limitation of the study.

4. RESULTS

The study was conducted between 21 September and 21 October with a total of 200 female, who were the students of Istanbul Aydın University, Department of Pre-school Teaching, aged between 18 and 31 years old with an average age of 20.78 ± 2.26 years.

Table 2: Distribution of Demographic Characteristics

Age	*Min-Max (Median)*	18-31 (20)	
	Mean±Sd	20.78±2.26	
	≤20 years old		102 (51.0)
	>20 years old		98 (49.0)
Height (cm):	*Min-Max (Median)*	150-178 (165)	
	Mean±Sd	164.43±5.72	
Weight (kg)	*Min-Max (Median)*	40-110 (55)	
	Mean±Sd	57.30±10.44	
BMI (kg/m^2)	*Min-Max (Median)*	14.88-38.97 (20.70)	
	Mean±Sd	21.15±3.44	
Class	**1. Class**	50 (25.0)	
	2Nd Class	51 (25.5)	
	3. Class	50 (25.0)	
	4. Class	49 (24.5)	
Chronic Disease	**Yes**	45 (22.5)	
	None	155 (77.5)	
	Diabetes		1 (2.2)
	Cardiovascular Diseases		3 (6.7)
	Stomach diseases		15 (33.3)
	Renal diseases		1 (2.2)
	Intestinal diseases		0 (0.0)
	Allergy		24 (53.3)
	Other diseases		11 (24.4)
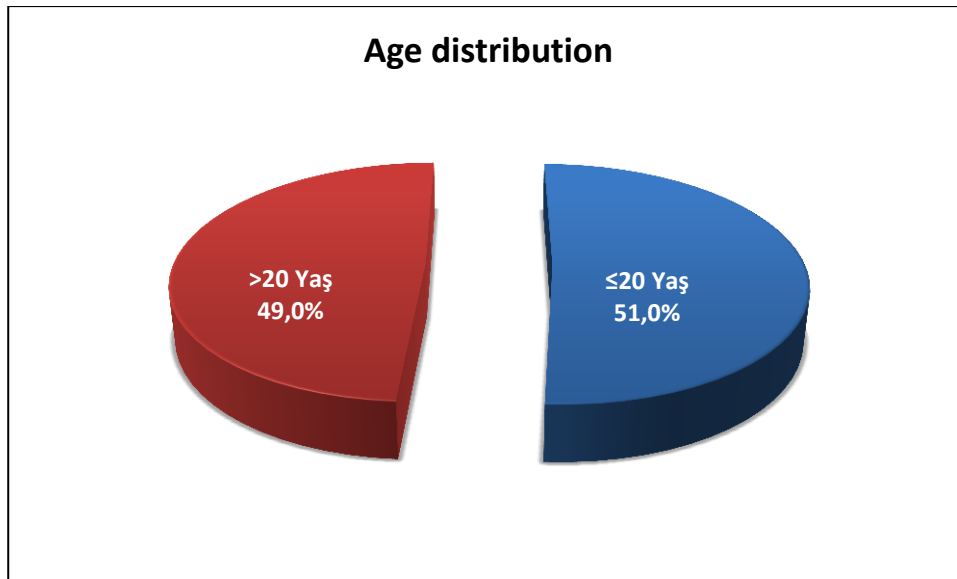
Figure 3. Age distribution

The height of the subjects participating in the study ranged from 150 to 178 cm, with an average of 164.43 ± 5.72 cm, the weight measurements varied between 40 to 110 kg, with an average of 57.30 ± 10.44 kg, and BMI measurements varied between 14.88 and 38.97 kg/m2, and the average was determined as 21.15 ± 3.44 kg / m2.

Of the cases, it was observed that 25% (n=50) were 1st class students, 25.5% (n=51) were 2nd class, 25% (n=50) were 3rd class, and 24.5% (n=49) were 4th class students.
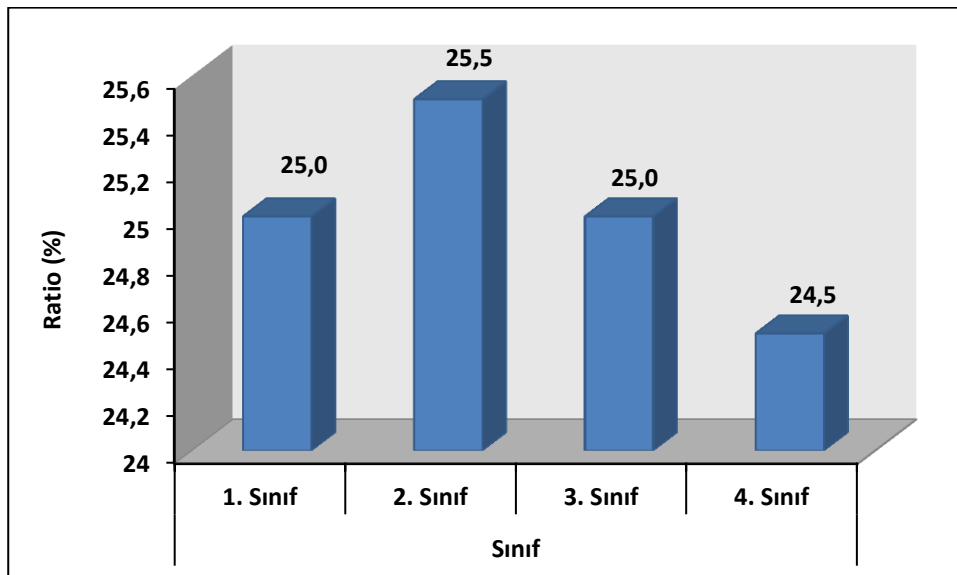
Figure 4. Class distribution

It was observed that 22.5% of the cases (n=45) had a chronic disease. Of the cases with chronic diseases, 2.2% (n=1) had diabetes, 6.7% (n=3) had cardiac diseases,

33.3% (n=15) had stomach diseases, 2.2% (n=1) had renal diseases, 53.3% (n=24) had allergy, and 24.4% (n=11) had other diseases.
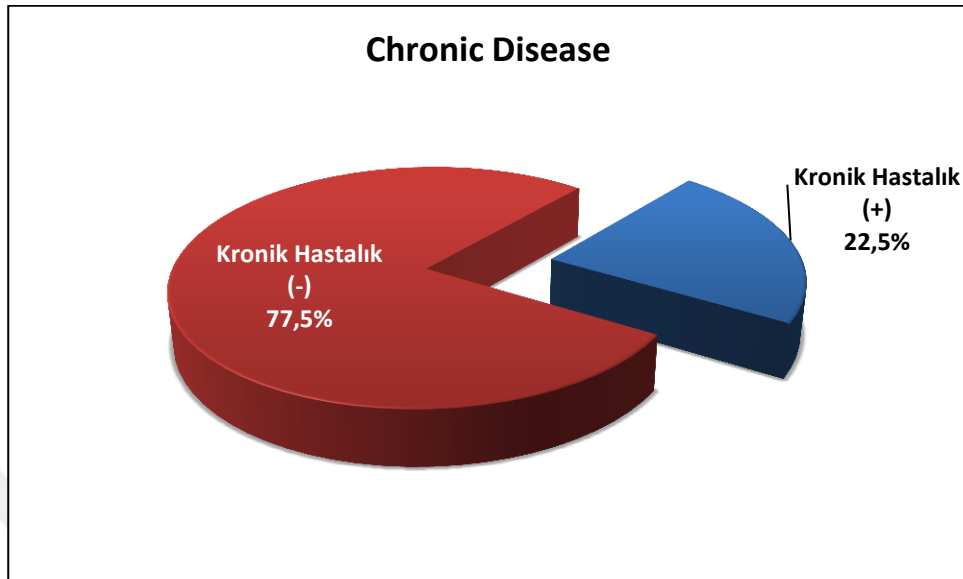
Figure 5:Distribution of Chronic Diseases

Table 3: Distribution regarding milk consumption

Status of liking to drink milk	**Likes a lot**	63 (31.5)
	Likes	72 (36.0)
	Likes less	38 (19.0)
	Doesn't like but drinks	15 (7.5)
	Doesn't like, never drinks	12 (6.0)
Reason for not liking milk (n=55)	**Odor**	26 (47.3)
	Taste	21 (38.2)
	Allergic disorders	2 (3.6)
	Nausea, vomiting, diarrhea	4 (7.3)
	Other	2 (3.6)
Period for drinking milk (n=185)	**0-1 Year**	21 (11.4)
	2-3 Years	12 (6.5)
	4-6 Years	10 (5.4)
	7-9 Years	12 (6.5)
	≥10 Years	130 (70.3)
Meal for milk consumption (n=183)	**Morning**	45 (24.6)
	Noon	11 (6.0)
	Evening	37 (20.2)
	Before bedtime	45 (24.6)
	Between the meals	45 (24.6)
Reason for milk consumption (n=186)	**Liking its taste**	58 (31.2)
	Thinking that it is nutritious	69 (37.1)
	Habit	29 (15.6)
	Thinking that it is saturating	16 (8.6)
	Other	14 (7.5)

Of the cases included in the study, 31.5% (n=63) specified that they liked to drink milk, while 36% (n=72) liked milk, 19% (n=38) liked it less, 7.5% (n=15) did not like milk but drank, and 6% (n=12) did not like and never drank it.
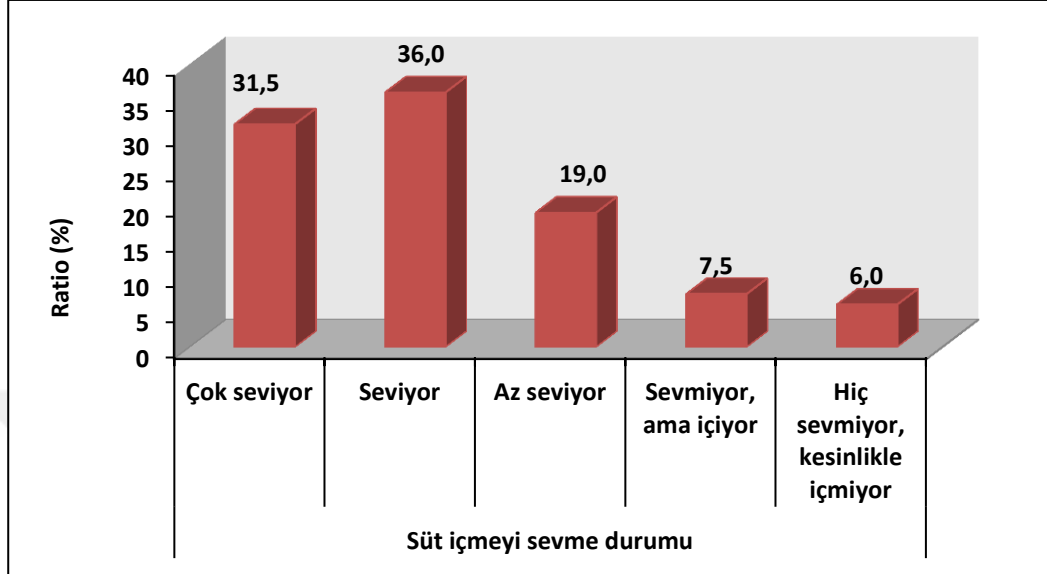
Figure 6. Distribution regarding the statuses of liking to drink milk

While 47.3% (n=26) of the cases stated that the reason for not liking milk was its odor, 38.2% (n=21) specified the reason as they didn't like its taste, 3.6% (n=2) as they didn't like it due to allergic disorders, 7.3% (n=4) due to nausea, vomiting, diarrhea, and 3.6% (n=2) due to other reasons.
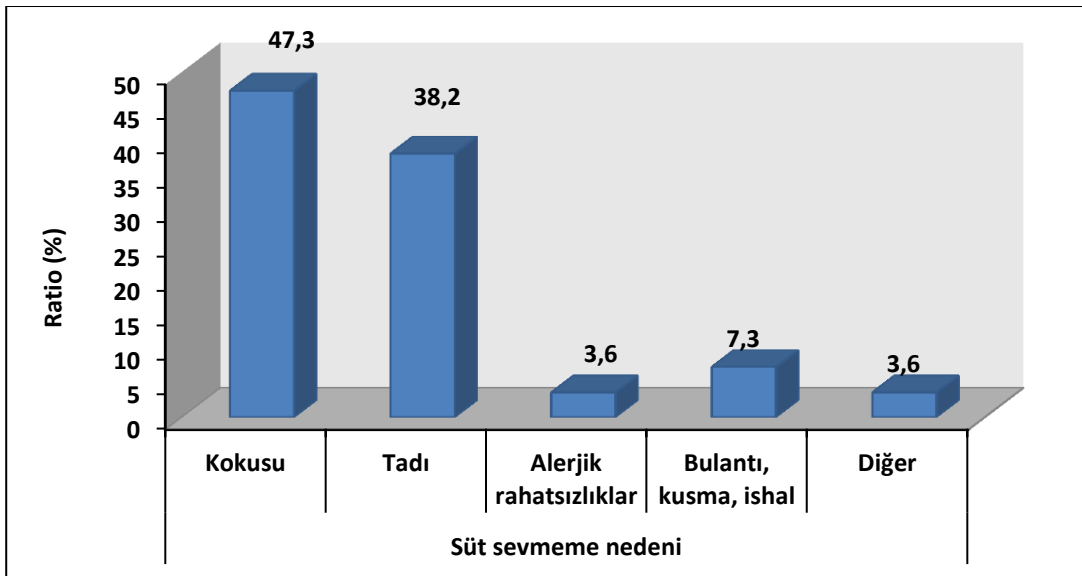
Figure 7:Distribution regarding the reasons for not liking milk

Of the cases, 11.4% (n=21) stated that they formed a habit for drinking milk between 0 and 1 year, while 6.5% (n=12) had this habit between 2 and 3 years, 5.4% (n=10) between 4 and 6 years, 6.5% (n=12) between 7 and 9 years, and 70.3% (n=130) in 10 years and more.
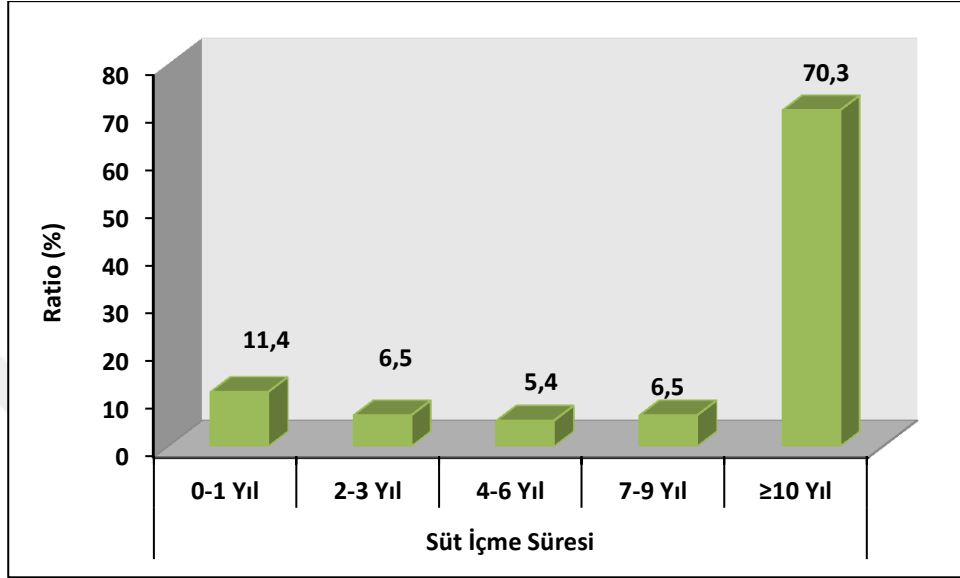
Figure 8: Distribution of the period of the habit for drinking milk

As 24.6% (n=45) of the cases specified that they consumed milk during breakfast, 6% (n=11) consumed in the lunch meal, 20.2% (n=37) in the evening, 24.6% (n=45) before bedtime, and 24.6% (n=45) between the meals.
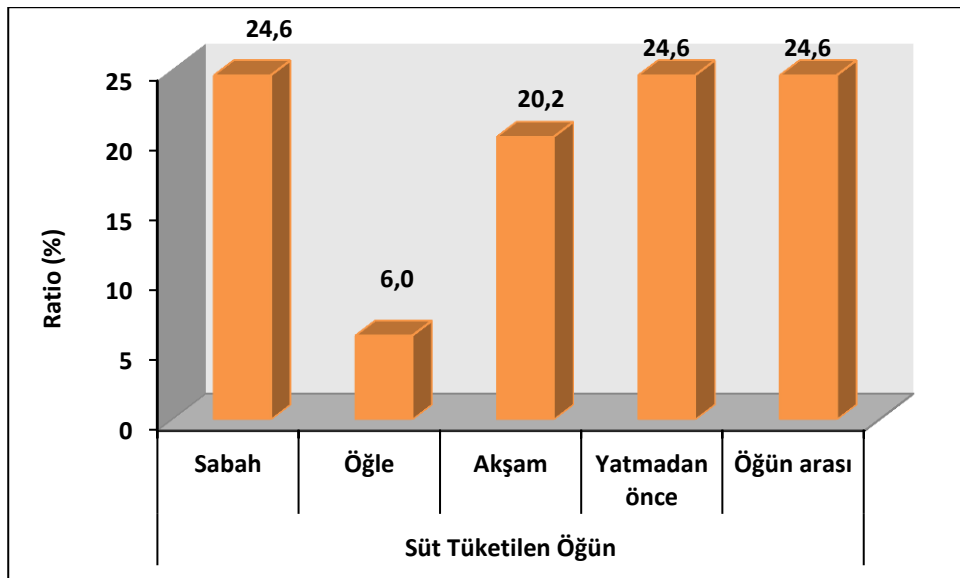
Figure 9:Distribution of the meals in which milk is consumed

Of the cases, 31.2% (n=58) stated that the reason for consuming milk was to like its taste, 37.1% (n=69) thought that it was nutritious, 15.6% (n=29) said that this was a habit, 8.6% (n=16) thought that it is saturating, and 7.5% (n=14) consumed due to other reasons.
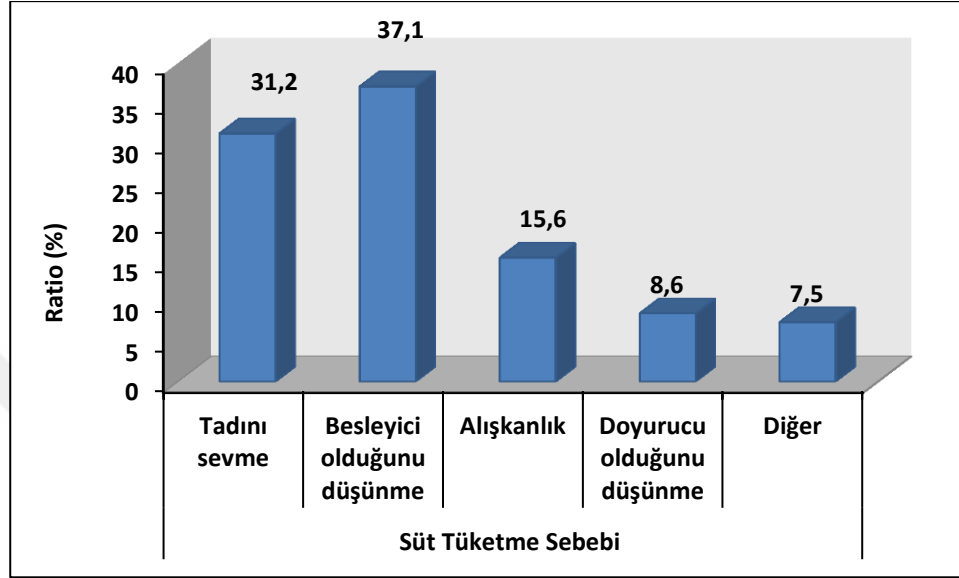
Figure 10. Distribution regarding the reasons for consuming milk

Table 4: Distribution regarding the changes in the body after drinking milk

	None	Low	Moderate	High	Excessive
	n (%)	n (%)	n (%)	n (%)	n (%)
Stomach pain	153 (78.1)	27 (13.8)	11 (5.6)	4 (2.0)	1 (0.5)
Diarrhea	178 (90.8)	10 (5.1)	6 (3.1)	2 (1.0)	0 (0.0)
Gas	112 (57.1)	44 (22.4)	20 (10.2)	18 (9.2)	2 (1.0)
Bloatedness	105 (53.6)	49 (25.0)	22 (11.2)	16 (8.2)	4 (2.0)
Abdominal cramp	169 (86.2)	12 (6.1)	8 (4.1)	3 (1.5)	4 (2.0)
Vomiting	182 (92.9)	7 (3.6)	3 (1.5)	1 (0.5)	3 (1.5)
Nausea	157 (80.1)	20 (10.2)	7 (3.6)	5 (2.6)	7 (3.6)

Among the cases, it was specified that 78.1% (n=153) had no stomach pain, 13.8% (n=27) had low, 5.6% (n=11) had moderate, 2% (n=4) had high, and 0.5% (n=1) had excessive stomach pain.

Among the cases, it was specified that 90.8% (n=178) had no diarrhea after drinking milk, 5.1% (n=10) had diarrhea at a low rate, 3.1% (n=6) at a moderate rate, and 1% (n=4) at a high rate.

Among the cases, it was specified that 57.1% (n=112) had no gas, 22.4% (n=44) had gas at a low rate, 10.2% (n=20) at a moderate rate, 9.2% (n=18) at a high rate, and 1% (n=2) at an excessive rate.

Among the cases, it was specified that 53.6% (n=105) had no bloatedness after drinking milk, 25% (n=49) had low, 11.2% (n=22) had moderate, 8.2% (n=16) had high, and 2% (n=4) had excessive bloatedness.

Of the cases, it was specified that 86.2% (n=169) had no abdominal cramp after drinking milk, 3.6% (n=7) had low, 1.5% (n=3) had moderate, 0.5% (n=1) had high, and 1.5% (n=3) had excessive abdominal cramp.

Among the cases, it was specified that 92.9% (n=182) had no vomiting after drinking milk, 3.6% (n=7) had low, 1.5% (n=3) had moderate, 0.5% (n=1) had high, and 1.5% (n=3) had excessive vomiting.

Among the cases, it was specified that 80.1% (n=157) had no nausea after drinking milk, 10.2% (n=20) had low, 3.6% (n=7) had moderate, 2.6 (n=5) had high, and 3.6 (n=7) had excessive nausea.

Table 5: Distribution regarding the frequencies of food consumption

	None	Every day	5-6 times a week	3-4 times a week	1-2 times a week	Once every 15 days	≤Once every month
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Whole-fat milk	53 (26.5)	7 (3.5)	8 (4.0)	26 (13.0)	59 (29.5)	18 (9.0)	29 (14.5)
Semi-skimmed milk	64 (32.0)	7 (3.5)	6 (3.0)	23 (11.5)	58 (29.0)	14 (7.0)	28 (14.0)
Skimmed milk	146 (73.0)	0 (0.0)	1 (0.5)	5 (2.5)	14 (7.0)	10 (5.0)	24 (12.0)
Buttermilk drink	6 (3.0)	17 (8.5)	16 (8.0)	46 (23.0)	66 (33.0)	34 (17.0)	15 (7.5)
Yogurt	13 (6.5)	47 (23.5)	26 (13.0)	43 (21.5)	56 (28.0)	10 (5.0)	5 (2.5)
Strained yogurt	52 (26.0)	11 (5.5)	8 (4.0)	23 (11.5)	47 (23.5)	26 (13.0)	33 (16.5)
Probiotic yogurt	151 (75.5)	8 (4.0)	2 (1.0)	1 (0.5)	11 (5.5)	7 (3.5)	20 (10.0)
Fruit yogurt	67 (33.5)	1 (0.5)	4 (2.0)	8 (4.0)	32 (16.0)	23 (11.5)	65 (32.5)
Kephir	150 (75.0)	3 (1.5)	0 (0.0)	3 (1.5)	9 (4.5)	5 (2.5)	30 (15.0)
White cheese	14 (7.0)	99 (49.5)	24 (12.0)	33 (16.5)	26 (13.0)	2 (1.0)	2 (1.0)
Kashar cheese	19 (9.5)	31 (15.5)	21 (10.5)	29 (14.5)	69 (34.5)	14 (7.0)	17 (8.5)
Quark cheese	92 (46.0)	7 (3.5)	6 (3.0)	10 (5.0)	25 (12.5)	17 (8.5)	43 (21.5)
Butter	37 (18.5)	36 (18.0)	14 (7.0)	37 (18.5)	38 (19.0)	21 (10.5)	17 (8.5)

While 26.5% of the cases participating in the study stated that they never drank whole-fat milk, 3.5% drank it every day, 4% drank it 5-6 times a week, 13% drank 3-4

times a week, 29.5% drank 1-2 times a week, 9% drank once in 15 days, and 14.5% drank once a month or less.

While 32% of the cases participating in the study stated that they never drank semi-skimmed milk, 3.5% drank it every day, 3% drank it 5-6 times a week, 11.5% drank 3-4 times a week, 29% drank 1-2 times a week, 7% drank once in 15 days, and 14% drank once a month or less.

While 73% of the cases participating in the study stated that they never drank skimmed milk, 0.5% drank it for 5-6 days every week, 2.5% for 3-4 days every week, 7% for 1-2 days every week, 5% for once every 15 days, 12% for once or less in a month.

While 3% of the cases participating in the study stated that they never drank buttermilk drink, 8.5% drank it every day, 8% drank it 5-6 times a week, 23% drank 3-4 times a week, 33% drank 1-2 times a week, 17% drank once in 15 days, and 7.5% drank once a month or less.

While 6.5% of the cases participating in the study stated that they never ate yogurt, 23.5% ate it every day, 13% ate it 5-6 times a week, 21.5% ate 3-4 times a week, 28% ate 1-2 times a week, 5% ate it once in 15 days, and 2.5% ate yogurt once a month or less.

While 26% of the cases participating in the study stated that they never ate strained yogurt, 5.5% ate it every day, 4% ate it 5-6 times a week, 11.5% ate 3-4 times a week, 23.5% ate 1-2 times a week, 13% ate it once in 15 days, and 16.5% ate strained yogurt once a month or less.

While 75.5% of the cases participating in the study stated that they never ate probiotic yogurt, 4% ate it every day, 1% ate it 5-6 times a week, 0.5% ate 3-4 times a week, 5.5% ate 1-2 times a week, 3.5% ate it once in 15 days, and 10% ate probiotic yogurt once a month or less.

While 33.5% of the cases participating in the study stated that they never ate fruit yogurt, 0.5% ate it every day, 2% ate it 5-6 times a week, 4% ate 3-4 times a week, 16% ate 1-2 times a week, 11.5% ate it once in 15 days, and 32.5% ate fruit yogurt once a month or less.

While 75% of the cases participating in the study stated that they never drank kephir, 1.5% drank every day, 1.5% drank 3-4 times a week, 4.5% drank 1-2 times a week, 2.5% drank once in 15 days, and 15% drank kephir once a month or less.

While 7% of the cases participating in the study stated that they never ate white cheese, 49.5% ate it every day, 12% ate it 5-6 times a week, 16.5% ate 3-4 times a week, 13% ate 1-2 times a week, 1% ate it once in 15 days, and 1% ate white cheese once a month or less.

While 9.5% of the cases participating in the study stated that they never ate kashar cheese, 15.5% ate it every day, 10.5% ate it 5-6 times a week, 14.5% ate 3-4 times a week, 34.5% ate 1-2 times a week, 7% ate it once in 15 days, and 8.5% ate kashar cheese once a month or less.

While 46% of the cases participating in the study stated that they never ate quark cheese, 3.5% ate it every day, 3% ate it 5-6 times a week, 5% ate 3-4 times a week, 12.5% ate 1-2 times a week, 8.5% ate it once in 15 days, and 21.5% ate quark cheese once a month or less.

While 18.5% of the cases participating in the study stated that they never ate butter, 18% ate it every day, 7% ate it 5-6 times a week, 18.5% ate 3-4 times a week, 19% ate 1-2 times a week, 10.5% ate it once in 15 days, and 8.5% ate butter once a month or less.

Table 6: Distribution regarding the consumption amounts of food

		Consumption amount (month)	Total Kcal (Month)	Total Calcium (Month)	Total Lactose (Month)
Whole-fat milk (ml) (n=147)	*Min-Max (Median)*	200-12000 (1600)	113.8-6828 (910.4)	240-14400 (1920)	9.5-570 (76)
	Mean±Sd	2170.07±2147.10	1234.77±1221.7	2604.08±2576.53	103.08±101.99
Semi-skimmed milk (ml) (n=136)	*Min-Max (Median)*	200-16000 (1600)	87-6960 (696)	240-19200 (1920)	9.8-784 (78.4)
	Mean±Sd	2252.94±2551.54	980.03±1109.92	2703.53±3061.85	110.39±125.03
Skimmed milk (ml) (n=54)	*Min-Max (Median)*	200-4800 (400)	59.8-1435.2 (119.6)	240-5760 (480)	10-240 (20)
	Mean±Sd	1066.67±1231.04	318.93±368.08	1280±1477.25	53.33±61.55
Buttermilk drink (ml) (n=194)	*Min-Max (Median)*	200-24000 (1600)	91.4-10968 (731.2)	162.8-19536 (1302.4)	5.6-672 (44.8)
	Mean±Sd	3281.44±3575.36	1499.62±1633.94	2671.09±2910.34	91.88±100.11
Yogurt (gr) (n=187)	*Min-Max (Median)*	120-18000 (1920)	83.2-12480 (1331.2)	158.4-23760 (2534.4)	5.2-780 (83.2)
	Mean±Sd	2622.67±2253.82	1818.39±1562.65	3461.93±2975.05	113.65±97.67
Strained yogurt (gr) (n=148)	*Min-Max (Median)*	120-18000 (960)	100-15000 (800)	192-28800 (1536)	2.8-420 (22.4)
	Mean±Sd	1476.49±2340.10	1230.41±1950.08	2362.38±3744.15	34.45±54.6
Probiotic yogurt (gr) (n=49)	*Min-Max (Median)*	120-7200 (240)	80-4800 (1609)	160-9648 (321)	5.2-312 (10.4)
	Mean±Sd	1192.65±1725.35	795.10±1150.23	1598.15±2311.97	51.68±74.76
Fruit yogurt (tablespoon) (n=133)	*Min-Max (Median)*	120-10800 (240)	124.8-11232 (249.6)	152.4-13716 (304.8)	3.6-324 (7.2)
	Mean±Sd	737.14±1313.88	766.63±1366.44	936.17±1668.63	22.11±39.42
Kephir (ml) (n=50)	*Min-Max (Median)*	200-6000 (200)	154.3-4626 (154.3)	288-8640 (288)	8.6-258 (8.6)
	Mean±Sd	1008.00±1519.91	777.7±1172.6	1451.5±2188.7	43.34±65.35
White cheese (gr) (n=186)	*Min-Max (Median)*	30-4500 (900)	92.6-13890 (2778)	126.6-18990 (3798)	0.7-105 (21)
	Mean±Sd	1232.26±821.04	3803.57±2534.28	5200.13±3464.8	28.75±19.16
Kashar cheese (gr) (n=181)	*Min-Max (Median)*	30-3600 (480)	127.6-15312 (2041.6)	180-21600 (2880)	0-0 (0)
	Mean±Sd	723.98±728.91	3079.32±3100.28	4343.87±4373.44	0±0
Quark cheese (gr) (n=108)	*Min-Max (Median)*	30-4500 (120)	25.5-3825 (102)	9.6-1440 (38.4)	0-0 (0)
	Mean±Sd	361.67±594.24	307.42±505.1	115.73±190.16	0±0
Butter (gr) (n=163)	*Min-Max (Median)*	15-1800 (240)	113-13560 (1808)	2.3-276 (36.8)	0.1-12 (1.6)
	Mean±Sd	313.07±334.34	2358.44±2518.7	48±51.27	2.09±2.23

Of the cases participated in the study, it was found that monthly whole-fat milk consumption amount varied between 200 and 12000 ml and the average amount was 2170.07±2147.10 ml; monthly semi-skimmed milk consumption amount varied between 200 and 16000 ml and the average was 2252.94±2551.54 ml, monthly skimmed milk consumption amount varied between 200 and 4800 ml and the average was 1066.67±1231.04 ml, monthly buttermilk drink consumption amount varied 200 and 24000 ml and the average was 3281.44±3575.36 ml, and monthly kephir consumption amount varied between 200 and 6000 ml and the average was 1008,00±1519.91 ml.

It was specified that total calorie amount taken by the cases from whole-fat milk varied between 113.8 and 6828 kcal and the average was 1234.77±1221.7 kcal, calorie amount taken from semi-skimmed milk varied between 87 and 6960 kcal and the average was 980.03±1109.92 kcal, calorie amount taken from skimmed milk varied between 59.8 and 1435.2 kcal and the average was 318.93±368.08 kcal, and the calorie amount taken from buttermilk drink varied between 91.4 and 10968 kcal and the average was 1499,62±1633.94 kcal.

It was stated that total calcium amount taken by the cases from whole-fat milk varied between 240 and 14400 and the average was 2604.08±2576.53, calcium amount taken from semi-skimmed milk varied between 240 and 19200 and the average was 2703.53±3061.85, calcium amount taken from skimmed milk varied between 240 and 5760 and the average was 1280±1477.25, and the calcium amount taken from buttermilk drink varied between 162.8 and 19536 and the average was 2671.09±2910.34.

It was determined that total lactose amount taken by the cases from whole-fat milk varied between 9.5 and 570 and the average was 103.08±101.99, lactose amount taken from semi-skimmed milk varied between 9.8 and 784 and the average was 110.39±125.03, lactose amount taken from skimmed milk varied between 10 and 240 and the average was 53.33±61.55, and the lactose amount taken from buttermilk drink varied between 5.6 and 672 and the average was 91.88±100.11.

Of the cases participated in the study, it was found that monthly yogurt consumption amount varied between 200 and 18000 grams and the average amount was 2622.67±2253.82 grams; monthly strained yogurt consumption amount varied between 120 and 18000 grams and the average was 1476,49±2340.10 ml, monthly probiotic yogurt consumption amount varied between 120 and 7200 grams and the average was 1192.65±1725.35 grams, monthly fruit yogurt consumption amount varied between 120 and 10800 grams and the average was 737.14±1313.88 grams, and monthly butter consumption amount varied between 15 and 1800 grams and the average was 313.07±334.34 grams.

It was specified that total calorie amount taken by the cases from yogurt varied between 83.2 and 12480 kcal and the average was 1818.39±1562.65 kcal, calorie amount taken from strained yogurt varied between 100 and 15000 kcal and the average was 1230.41±1950.08 kcal, calorie amount taken from fruit yogurt varied between 124.8 and 11232 kcal and the average was 766,63±1366,44 kcal, and the calorie amount

taken from butter varied between 113 and 13560 kcal and the average was 2358.44±2518.70 kcal.

It was specified that monthly calcium amount taken by the cases from yogurt varied between 158.4 and 23760 and the average was 3461.93±2975.05, calcium amount taken from strained yogurt varied between 192 and 28800 and the average was 2362.38±3744.15, calcium amount taken from probiotic yogurt varied between 114 and 6840 and the average was 1133.02±1639,09, and the calcium amount taken from fruit yogurt varied between 152.4 and 13716 and the average was 936,17±1668.63 and the calcium amount taken from butter varied between 2.3 and 276 and the average was 48±51.27.

It was determined that total lactose amount taken by the cases from yogurt varied between 5.2 and 780 and the average was 113.65±97.67, lactose amount taken from strained yogurt varied between 2.8 and 420 and the average was 34.45±54.60. lactose amount taken from fruit yogurt varied between 3.6 and 324 and the average was 22.11±39,42. and the lactose amount taken from butter varied between 0.1 and 12 and the average was 2.09±2.23.

It was determined that monthly white cheese consumption amount of the cases varied between 30 and 4500 grams and the average was 1232.26±821.04 grams, monthly kashar cheese consumption varied between 30 and 3600 grams and the average was 723.98±728.91 grams, and monthly quark cheese consumption amount varied between 30 and 4500 grams and the average was 361.67±594.24 grams.

It was specified that monthly calorie amount taken by the cases from white cheese varied between 92.6 and 13890 kcal and the average was 3803.57±2534.28 kcal, calorie amount taken from kashar cheese varied between 127.6 and 15312 kcal and the average was 3079,32±3100.28 kcal, and the calorie amount taken from quark cheese varied between 25.5 and 3825 kcal and the average was 307.42±505.10 kcal.

It was stated that monthly calcium amount taken by the cases from white cheese varied between 126.6 and 18990 and the average was 5200.13±3464.8, calcium amount taken from kashar cheese varied between 180 and 21600 and the average was 4343.87±4373.44. and calcium amount taken from quark cheese varied between 9.6 and 1440 and the average was 3115.73±190.16.

It was determined that monthly lactose amount taken by the cases from white cheese varied between 0.7 and 105 and the average was 28.75±19,16.

Table 7: Distribution regarding the consumption frequencies of food

	None	Every day	5-6 times a week	3-4 times a week	1-2 times a week	Once every 15 days	≤Once every month
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Milk puddings	10 (5.0)	2 (1.0)	6 (3.0)	18 (9.0)	61 (30.5)	61 (30.5)	42 (21.0)
Ice cream	20 (10.0)	4 (2.0)	9 (4.5)	21 (10.5)	50 (25.0)	44 (22.0)	52 (26.0)
Cream cake	10 (5.0)	6 (3.0)	4 (2.0)	25 (12.5)	75 (37.5)	49 (24.5)	31 (15.5)
Bread	4 (2.0)	142(71.0)	20 (10.0)	17 (8.5)	16 (8.0)	0 (0.0)	1 (0.5)
Processed cereal	76 (38.0)	27 (13.5)	7 (3.5)	25 (12.5)	29 (14.5)	20 (10.0)	16 (8.0)
Dry Soup	83 (41.5)	31 (15.5)	7 (3.5)	14 (7.0)	25 (12.5)	20 (10.0)	20 (10.0)
Margarine	100 (50.0)	18 (9.0)	9 (4.5)	17 (8.5)	17 (8.5)	20 (10.0)	19 (9.5)
Salad sauce	80 (40.0)	22 (11.0)	6 (3.0)	28 (14.0)	45 (22.5)	9 (4.5)	10 (5.0)
Candy	20 (10.0)	43 (21.5)	20 (10.0)	31 (15.5)	57 (28.5)	14 (7.0)	15 (7.5)
Biscuit	20 (10.0)	35 (17.5)	22 (11.0)	33 (16.5)	60 (30.0)	17 (8.5)	13 (6.5)
Milk by-product	144 (72.0)	10 (5.0)	4 (2.0)	8 (4.0)	11 (5.5)	9 (4.5)	14 (7.0)

While 5% of the cases participating in the study stated that they never ate milk pudding, 1% ate it every day, 3% ate it 5-6 times a week, 9% ate 3-4 times a week, 30.5% ate 1-2 times a week, 30.5% ate it once in 15 days, and 21% ate milk pudding once a month or less.

While 10% of the cases participating in the study stated that they never ate ice cream, 2% ate it every day, 4.5% ate it 5-6 times a week, 10.5% ate 3-4 times a week, 25% ate 1-2 times a week, 22% ate it once in 15 days, and 26% ate ice cream once a month or less.

While 5% of the cases participating in the study stated that they never ate cream cake, 3% ate it every day, 2% ate it 5-6 times a week, 12.5% ate 3-4 times a week, 37.5% ate 1-2 times a week, 24.5% ate it once in 15 days, and 15.5% ate cream cake once a month or less.

While 2% of the cases participating in the study stated that they never ate bread, 71% ate it every day, 10% ate it 5-6 times a week, 8.5% ate 3-4 times a week, 8% ate 1-2 times a week, and 0.5% ate bread once a month or less.

While 38% of the cases participating in the study stated that they never ate processed cereals, 13.5% ate it every day, 3.5% ate it 5-6 times a week, 12.5% ate 3-4 times a week, 14.5% ate 1-2 times a week, 10% ate it once in 15 days, and 8% ate processed cereals once a month or less.

As 41.5% of the cases participating in the study stated that they never ate dry soup, 15.5% ate it every day, 3.5% ate it 5-6 times a week, 7% ate 3-4 times a week, 12.5% ate 1-2 times a week, 10% ate it once in 15 days, and 10% ate dry soup once a month or less.

While 50% of the cases participating in the study stated that they never ate butter, 9% ate it every day, 4.5% ate it 5-6 times a week, 8.5% ate 3-4 times a week, 8.5% ate 1-2 times a week, 10% ate it once in 15 days, and 9.5% ate butter once a month or less.

While 40% of the cases participating in the study stated that they never ate salad sauce, 11% ate it every day, 3% ate it 5-6 times a week, 14% ate 3-4 times a week, 22.5% ate 1-2 times a week, 4.5% ate it once in 15 days, and 5% ate salad sauce once a month or less.

As 41.5% of the cases participating in the study stated that they never ate dry soup, 15.5% ate it every day, 3.5% ate it 5-6 times a week, 7% ate 3-4 times a week, 12.5% ate 1-2 times a week, 10% ate it once in 15 days, and 10% ate dry soup once a month or less.

While 10% of the cases participating in the study stated that they never ate candies, 21.5% ate it every day, 10% ate it 5-6 times a week, 15.5% ate 3-4 times a week, 28.5% ate 1-2 times a week, 7% ate it once in 15 days, and 7.5% ate candies once a month or less.

While 10% of the cases participating in the study stated that they never ate biscuits, 17.5% ate it every day, 11% ate it 5-6 times a week, 16.5% ate 3-4 times a week, 30% ate 1-2 times a week, 8.5% ate it once in 15 days, and 6.5% ate biscuits once a month or less.

While 72% of the cases participating in the study stated that they never ate milk by-products, 5% ate it every day, 2% ate it 5-6 times a week, 4% ate 3-4 times a week, 5.5% ate 1-2 times a week, 4.5% ate it once in 15 days, and 7% ate milk by-products once a month or less.

Table 8:Distribution regarding lactose tolerance and intolerance

Lactose Tolerance	**Stomach pain**	19 (9.5)
	Diarrhea	7 (3.5)
	Gas	41 (20.5)
	Acid indigestion	27 (13.5)
	Bloatedness	50 (25.0)
	Abdominal cramp	10 (5.0)
	Vomiting	3 (1.5)
	Nausea	10 (5.0)
	No symptom	109 (54.5)
Strength of symptom	**None**	109 (54.5)
	Low	40 (20.0)
	Moderate	48 (24.0)
	High	2 (1.0)
	Excessive	1 (0.5)
Lactose Intolerance	**Previously diagnosed with lactose intolerance at a healthcare facility**	2 (1.0)
	Always experiences the specified condition every time when milk is drank, but not sure of lactose intolerance	14 (7.0)
	Said symptoms happen once in a while, but not sure of lactose intolerance	58 (29.0)
	Absolutely not have such a disorder	124 (62.0)
	Other	2 (1.0)
Lactose Intolerance Period (n=76)	**Since birth**	10 (13.2)
	Started to feel later	58 (76.3)
	Began to feel these symptoms after a microbial disease	1 (1.3)
	Began to feel these symptoms after a disease related to small intestine	0 (0.0)
	Other	7 (9.2)
Measure taken when symptoms are felt after consuming milk and dairy products (n = 139)	**No measure is taken**	94 (67.6)
	Uses drug upon medical advice	8 (5.8)
	As a precaution, does not consume milk, but consumes fermented milk products.	3 (2.2)
	Not consume any milk product as a measure	8 (5.8)
	Consumes lactose-free milk and milk products	22 (15.8)
	Other	4 (2.9)
Information about lactose intolerance	**Yes**	86 (43.0)
	None	114 (57.0)

While 9.5% of the cases stated stomach pain when they consumed lactose-containing products, 3.5% (n=7) had diarrhea, 20.5% (n=41) had gas, 13.5% (n=27) had acid reflux, 25% (n=50) had bloatedness, 5% (n=10) had abdominal cramp, 1.5% (n=3) had vomiting, and 5% (n=10) had nausea complaints, 54.5% (n=109) of the cases specified that they did not have any complaints.

When the severity of the symptoms experienced after lactose consumption was examined, 54.5% (n=109) had no symptoms, 20% (n=40) had low, 24% (n=48) had moderate, 1% (n = 2) had very severe symptoms, and 0.5% (n = 1) had extremely severe symptoms.

When lactose intolerance of the cases were examined, it was found that 1% (n=2) stated that their lactose intolerance has been diagnosed in a health institution before, 7% (n=14) expressed that they were suffering from the mentioned disorder every time when drinking milk however they were not sure about lactose intolerance, 29% (n=58) stated that they had the mention symptoms occasionally, however they were not sure about lactose intolerance, 62% (n=124) declared that they had absolutely such a disorder, and 1% (n=2) gave the "other" response.

Of the cases, it was stated that 13.2% (n=10) experienced the symptoms since birth, 76.3% (n=58) started to feel the symptoms later, 1.3% (n=1) felt the symptoms after a microbial disease, and 9.2% (n=7) answered as "other".

It was determined that 67.6% (n=94) of the cases stated that they did not take any precaution when they felt symptoms during consumption of milk and milk products, 5.8% (n=8) expressed that they took drugs upon medical advice, 2.2% (n=3) stated that as a precaution, they did not consume milk but fermented milk products, 5.8% (n=8) declared that as a precaution, they never consumed milk, 15.8% (n=22) expressed that they consumed lactose-free milk and milk products and 2.9% (n=4) stated that they took other precautions.

It was observed that 43% (n=86) of the cases had knowledge about lactose intolerance.

Table 9:Distribution regarding the changes in the body after yogurt consumption

	None	Low	Moderate	High	Excessive
	n (%)	n (%)	n (%)	n (%)	n (%)
Stomach pain	186 (95.4)	9 (4.6)	0 (0.0)	0 (0.0)	0 (0.0)
Diarrhea	192 (98.5)	2 (1.0)	0 (0.0)	1 (0.5)	0 (0.0)
Gas	167 (85.6)	23 (11.8)	4 (2.1)	1 (0.5)	0 (0.0)
Bloatedness	153 (78.5)	35 (17.9)	4 (2.1)	3 (1.5)	0 (0.0)
Abdominal cramp	188 (96.4)	6 (3.1)	0 (0.0)	1 (0.5)	0 (0.0)
Vomiting	195(100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Nausea	185 (94.9)	8 (4.1)	2 (1.0)	0 (0.0)	0 (0.0)

It was stated that while 95.4% (n=186) of the cases had no stomach pain after yogurt consumption, 4.6% (n=9) had low level of stomach pain.

Among the cases, it was specified that 98.5% (n=192) had no diarrhea after yogurt consumption, 1% (n=2) had low, and 0.5% (n=1) had extreme diarrhea.

Of the cases, it was specified that 85.6% (n=167) had no gas after yogurt consumption, 11.8% (n=23) had low, 2.1% (n=4) had moderate, and 0.5% (n=1) had extreme gas.

Among the cases, it was specified that 78.5% (n=153) had no bloatedness after yogurt consumption, 17.9% (n=35) had low, 2.1% (n=4) had moderate, and 1.5% (n=3) had extreme bloatedness.

Among the cases, it was stated that 96.4% (n=188) had no abdominal cramp after yogurt consumption, 3.1% (n=6) had low, and 0.5% (n=1) had extreme abdominal cramp. All 100% (n=195) of the cases stated that there was no vomiting after yogurt consumption. Among the cases, it was specified that 94.9% (n=185) had no nausea after yogurt consumption, 4.1% (n=8) had low, and 1% (n=2) had moderate level of nausea.

Table 10:Distribution regarding the changes in the body after kephir consumption

	None	Low	Moderate	High	Excessive
	n (%)	n (%)	n (%)	n (%)	n (%)
Stomach pain	153 (92.2)	8 (4.8)	2 (1.2)	1 (0.6)	2 (1.2)
Diarrhea	158 (96.3)	4 (2.4)	1 (0.6)	1 (0.6)	0 (0.0)
Gas	144 (87.8)	12 (7.3)	6 (3.7)	1 (0.6)	1 (0.6)
Bloatedness	144 (87.8)	13 (7.9)	4 (2.4)	2 (1.2)	1 (0.6)
Abdominal cramp	152 (92.7)	5 (3.0)	4 (2.4)	1 (0.6)	2 (1.2)
Vomiting	159 (97.0)	1 (0.6)	1 (0.6)	1 (0.6)	2 (1.2)
Nausea	152 (92.7)	6 (3.7)	3 (1.8)	1 (0.6)	2 (1.2)

Among the cases, it was specified that 92.2.1% (n=153) had no stomach pain, 4.8% (n=8) had low, 1.2% (n=2) had moderate, 0.6% (n=1) had high, and 1.2% (n=2) had excessive stomach pain after drinking kephir.

Among the cases, it was specified that 96.3% (n=158) had no diarrhea after drinking kephir, 2.4% (n=4) had low, 0.6% (n=1) had moderate, and 0.6% (n=1) had high level of diarrhea.

Among the cases, it was specified that 87.8% (n=144) had no gas, 7.3% (n=12) had low, 3.7% (n=6) had moderate, 0.6% (n=1) had high, and 0.6% (n=1) had extreme level of gas after drinking kephir.

Of the cases, it was stated that 87.8% (n=144) had no bloatedness, 7.9% (n=13) had low, 2.4% (n=4) had moderate, 1.2% (n=2) had high, and 0.6% (n=4) had excessive bloatedness after drinking kephir.

Among the cases, it was stated that 92.7% (n=152) had no abdominal cramp, 3% (n=5) had low, 2.4% (n=4) had moderate, 0.6% (n=1) had high, and 1.2% (n=2) had excessive abdominal cramp after drinking kephir.

Among the cases, it was specified that 97% (n=159) had no vomiting, 0.6% (n=1) had less, 0.6% (n=1) had moderate, 0.6% (n=1) had more, and 1.2% (n=2) had excess vomiting after drinking kephir.

Of the cases, it was specified that 92.7% (n=152) had no nausea, 3.7% (n=6) had low, 1.8% (n=3) had moderate, 0.6 (n=1) had high, and 1.2% (n=2) had excessive nausea after drinking kephir.

Table 11: Distribution regarding the changes in the body after cheese consumption

	None	Low	Moderate	High	Excessive
	n (%)	n (%)	n (%)	n (%)	n (%)
Stomach pain	192 (98.0)	3 (1.5)	0 (0.0)	1 (0.5)	0 (0.0)
Diarrhea	194 (99.0)	1 (0.5)	1 (0.5)	0 (0.0)	0 (0.0)
Gas	188 (95.9)	5 (2.6)	1 (0.5)	2 (1.0)	0 (0.0)
Bloatedness	186 (94.9)	7 (3.6)	1 (0.5)	1 (0.5)	1 (0.5)
Abdominal cramp	191 (97.4)	2 (1.0)	2 (1.0)	0 (0.0)	1 (0.5)
Vomiting	192 (98.0)	2 (1.0)	1 (0.5)	0 (0.0)	1 (0.5)
Nausea	186 (94.9)	7 (3.6)	1 (0.5)	1 (0.5)	1 (0.5)

Among the cases, it was stated that 98% (n=192) had no stomach pain, 1.5% (n=3) had low, and 0.5% (n=1) had extreme stomach pain after cheese consumption.

Of the cases, it was stated that 99% (n=194) had no diarrhea, 0.5% (n=1) had low, and 0.5% (n=1) had moderate level of diarrhea after eating cheese.

Among the cases, it was specified that 95.9% (n=188) had no gas, 2.6% (n=5) had low, 0.5% (n=1) had moderate, and 1% (n=2) had extreme gas after eating cheese.

Among the cases, it was stated that 94.9% (n=186) had no bloatedness, 3.6% (n=7) had low, 0.5% (n=1) had moderate, 0.5% (n=1) had high, and 0.5% (n=1) had excessive bloatedness after cheese consumption.

Among the cases, it was specified that 97.4% (n=191) had no abdominal cramp, 1% (n=2) had low, and 1% (n=2) had moderate, and 0.5% (n=1) had extreme abdominal cramp after cheese consumption.

It was stated that 98% (n=192) of the cases had no vomiting, 1% (n=2) had less, 0.5% (n=1) had moderate, and 0.5% (n=1) had excessive vomiting after eating cheese. Of the cases, it was stated that 94.9% (n=186) had no nausea, 3.6% (n=7) had low, 0.5% (n=1) had moderate, 0.5% (n=1) had high, and 0.5% (n=1) had excessive nausea after cheese consumption.

Table 12: Assessment of the presence of lactose intolerance according to demographic characteristics

		Lactose Intolerance		Test Value
		No (n=124)	Yes (n=76)	*p*
Age	**≤20 years old**	63 (61.8)	39 (38.2)	χ^2:0.005
	>20 years old	61 (62.2)	37 (37.8)	*[b]0.944*
BMI	*Min-Max (Median)*	14.9-38.9 (20.7)	15.6-29.4 (20.5)	Z:-0.485
	Mean±Sd	21.34±3.76	20.85±2.82	*[c]0.628*
Chronic Disease	**Yes**	21 (46.7)	24 (53.3)	χ^2:5.794
	None	103 (66.5)	52 (33.5)	*[b]0.016**

[b]*Pearson Chi-Square Test*   [c]*Mann Whitney U Test*   **p<0.05*

There was no statistically significant difference between the rates of lactose intolerance in the patients according to age groups (p> 0.05).

No statistically significant difference was detected between the BMI distributions of the cases according to the presence of lactose intolerance (p> 0.05).

The rate of lactose intolerance in the patients with chronic diseases was found to be statistically significantly higher than the patients without any chronic diseases (p = 0.016; p <0.05).
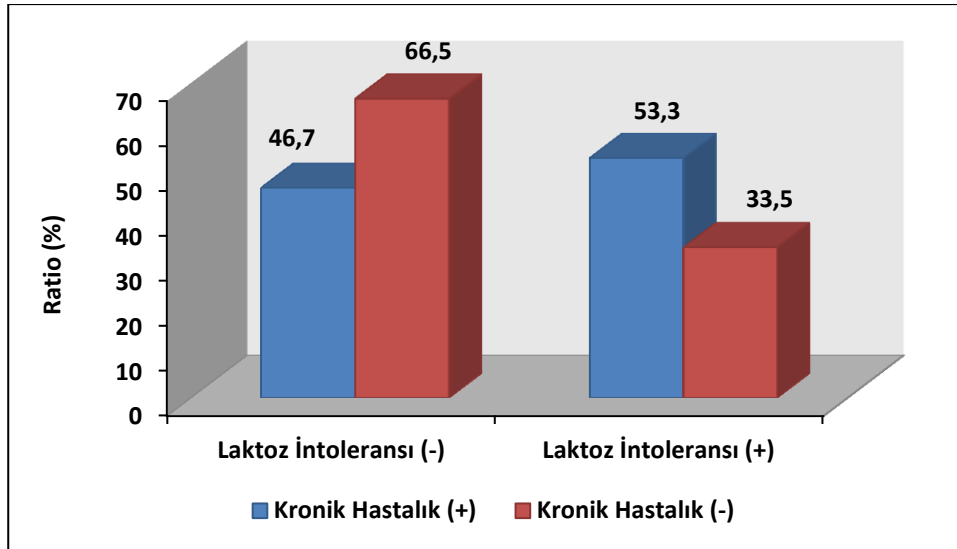
Figure 11. Distribution of Lactose Intolerance according to the presence of Chronic Diseases

Table 13: Assessments according to Lactose Intolerance

Changes in the body after drinking milk		Lactose Intolerance		
		None	Yes	Test Value
		n (%)	n (%)	p
Stomach pain	None	107 (88.4)	46 (61.3)	χ^2:24,037
	Low	12 (9.9)	15 (20.0)	[a]0.001**
	Moderate	1 (0.8)	10 (13.3)	
	High	1 (0.8)	3 (4.0)	
	Excessive	0 (0.0)	1 (1.3)	
Diarrhea	None	116 (95.9)	62 (82.7)	χ^2:10.143
	Low	3 (2.5)	7 (9.3)	[a]0.009**
	Moderate	1 (0.8)	5 (6.7)	
	High	1 (0.8)	1 (1.3)	
Gas	None	88 (72.7)	24 (32.0)	χ^2:41.632
	Low	24 (19.8)	20 (26.7)	[b]0.001**
	Moderate	6 (5.0)	14 (18.7)	
	High	3 (2.5)	15 (20.0)	
	Excessive	0 (0.0)	2 (2.7)	
Bloatedness	None	78 (64.5)	27 (36.0)	χ^2:31.161
	Low	30 (24.8)	19 (25.3)	[b]0.001**
	Moderate	11 (9.1)	11 (14.7)	
	High	2 (1.7)	14 (18.7)	
	Excessive	0 (0.0)	4 (5.3)	
Abdominal cramp	None	116 (95.9)	53 (70.7)	χ^2:24,155
	Low	3 (2.5)	9 (12.0)	[a]0.001**
	Moderate	1 (0.8)	7 (9.3)	
	High	0 (0.0)	3 (4.0)	
	Excessive	1 (0.8)	3 (4.0)	
Vomiting	None	116 (95.9)	66 (88.0)	χ^2:5.176
	Low	3 (2.5)	4 (5.3)	[a]0.221
	Moderate	1 (0.8)	2 (2.7)	
	High	0 (0.0)	1 (1.3)	
	Excessive	1 (0.8)	2 (2.7)	
Nausea	None	103 (85.1)	54 (72.0)	χ^2:10.685
	Low	13 (10.7)	7 (9.3)	[a]0.021*
	Moderate	2 (1.7)	5 (6.7)	
	High	1 (0.8)	4 (5.3)	
	Excessive	2 (1.7)	5 (6.7)	

[a]*Fisher Freeman Halton Test*   [b]*Pearson Chi-Square Test*

*p<0.05   **p<0.01

The distribution of the severity of abdominal pain in the patients after drinking milk showed a statistically significant difference in terms of lactose intolerance ($p = 0.001$; $p < 0.01$). In the patients with lactose intolerance, the rate of low and moderate abdominal pain after drinking milk was higher than those without lactose intolerance.
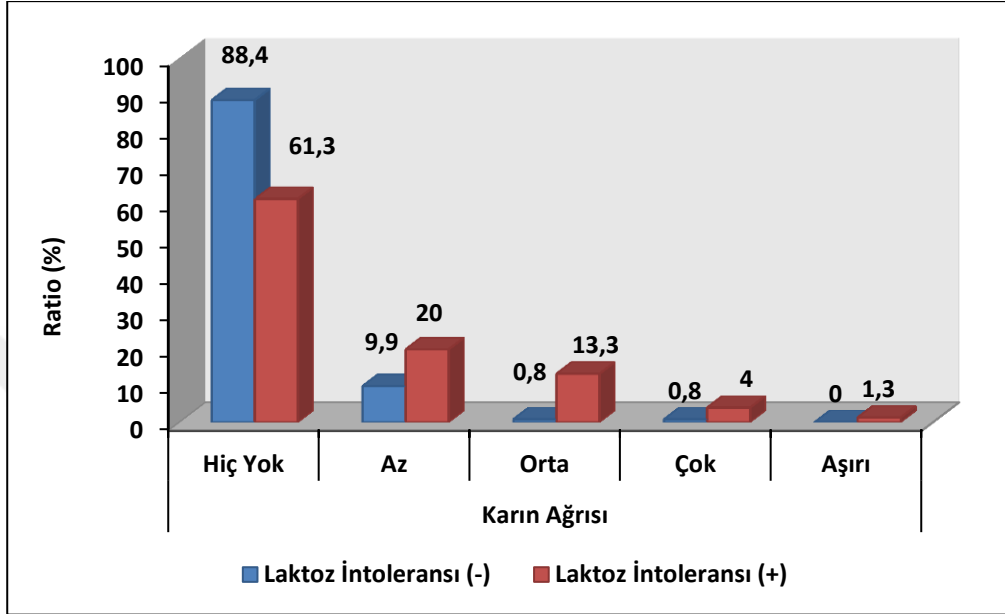
Figure 12. Distribution of Abdominal Pain After Drinking Milk According to Lactose Intolerance

The distribution of the severity of diarrhea in the patients after drinking milk showed a statistically significant difference in terms of lactose intolerance ($p = 0.009$; $p < 0.01$). In the patients with lactose intolerance, the rate of low and moderate diarrhea after drinking milk was higher than those without lactose intolerance.

Figure 13. Distribution of Diarrhea After Drinking Milk According to Lactose Intolerance

The distribution of the severity of gas in the patients after drinking milk showed a statistically significant difference in terms of lactose intolerance (p = 0.001; p <0.01). In the patients with lactose intolerance, the rate of moderate and extreme gas after drinking milk was higher than those without lactose intolerance.
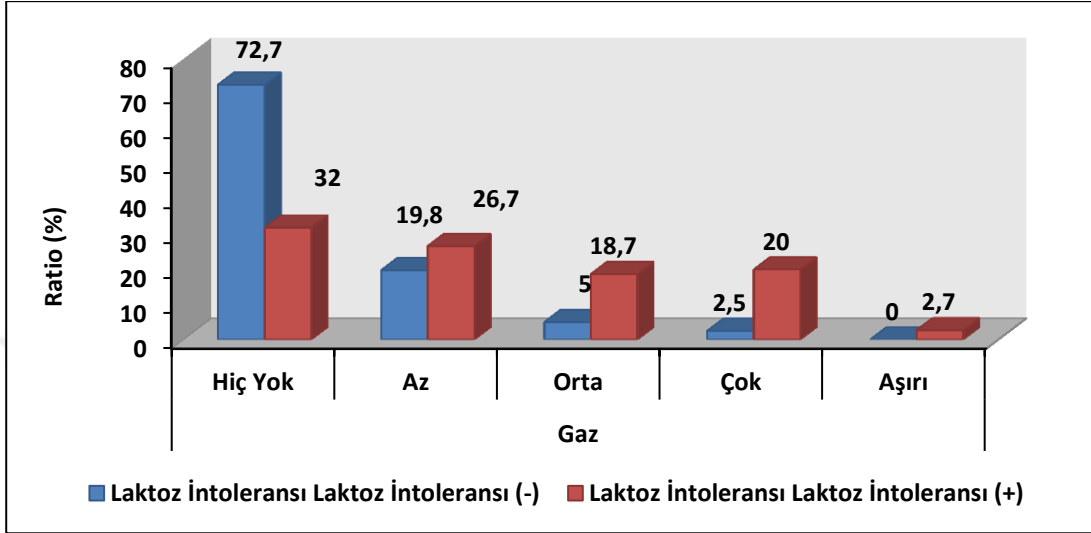
Figure 14. Distribution of Gas After Drinking Milk According to Lactose Intolerance

The distribution of the severity of bloatedness in the patients after drinking milk showed a statistically significant difference in terms of lactose intolerance (p = 0.001; p <0.01). In the patients with lactose intolerance, the rate of extreme bloatedness after drinking milk was higher than those without lactose intolerance.

Figure 15. Distribution of Bloatedness After Drinking Milk According to Lactose Intolerance

The distribution of the severity of abdominal cramp in the patients after drinking milk showed a statistically significant difference in terms of lactose intolerance ($p = 0.001$; $p < 0.01$). In the patients with lactose intolerance, the rate of low and moderate abdominal cramp after drinking milk was higher than those without lactose intolerance.

Figure 16:Distribution of Abdominal cramp After Drinking Milk According to Lactose Intolerance

The distribution of the severity of diarrhea in the patients after drinking milk did not show a statistically significant difference in terms of lactose intolerance ($p>0.05$).

The distribution of the severity of nausea in the patients after drinking milk showed a statistically significant difference in terms of lactose intolerance ($p = 0.021$; $p < 0.05$). In the patients without lactose intolerance, the rate of the absence of nausea after drinking milk was found higher than those with lactose intolerance.
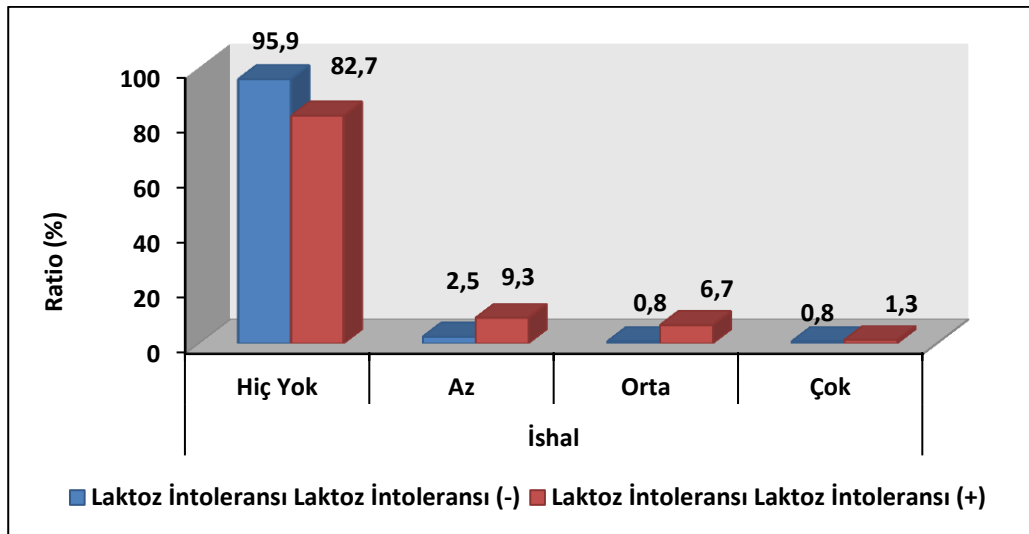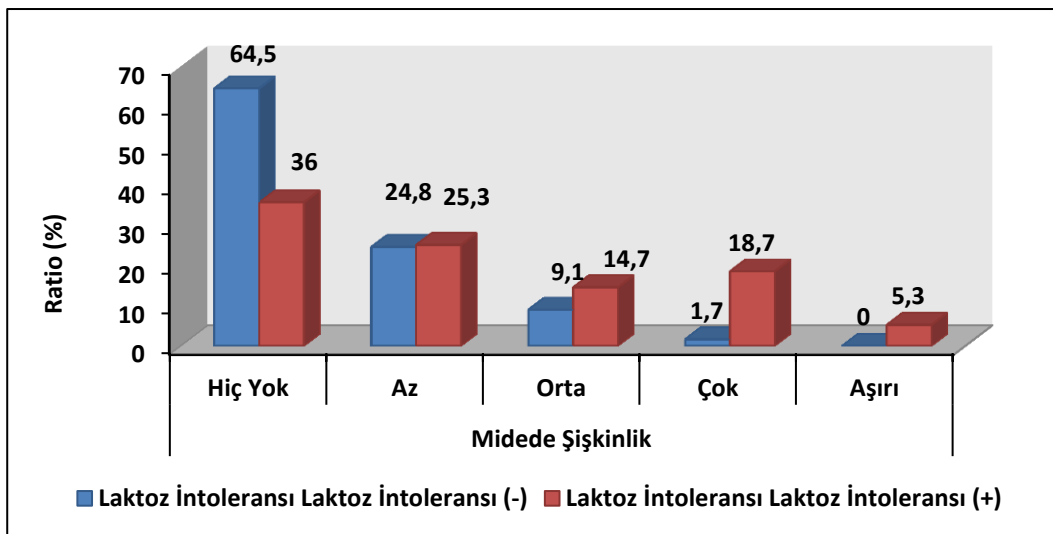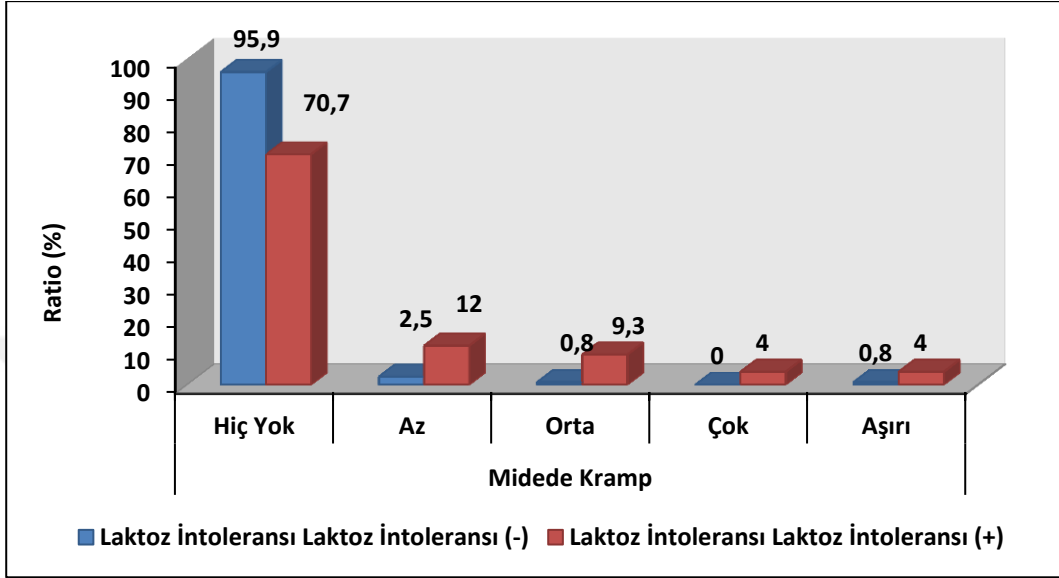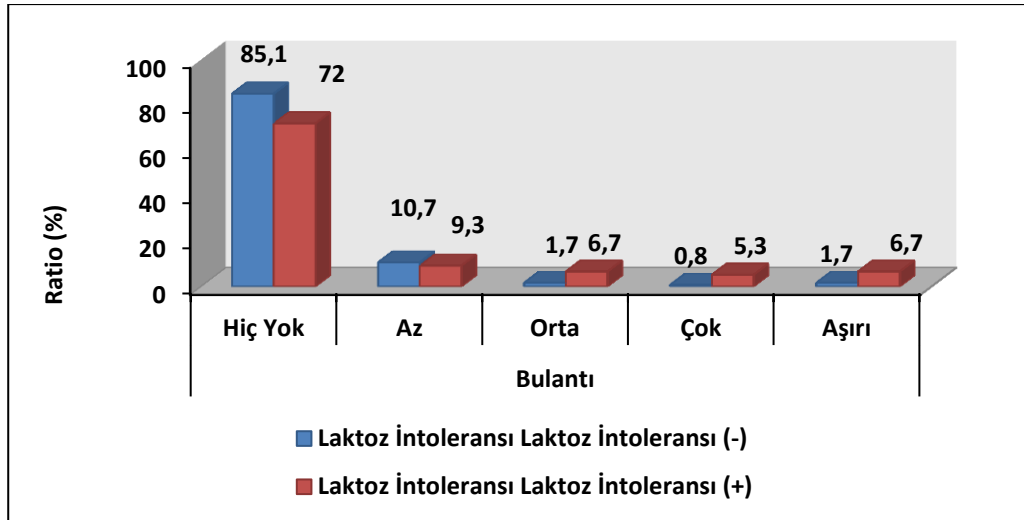
Figure 17. Distribution of Nausea After Drinking Milk According to Lactose Intolerance

Table 14:Assessment of Monthly Calories Taken From Milk and Dairy Products According to the presence of Lactose Intolerance

Calories (kcal)		Lactose Intolerance		Test Value
		None	Yes	p
Whole-fat milk	n	92	55	Z:-0.771
	Min-Max (Median)	113.8-5462.4 (910.4)	113.8-6828 (910.4)	c0.441
	Mean±Sd	1131.82±1038.53	1406.98±1472.96	
Semi-skimmed milk	n	87	49	Z:-1.067
	Min-Max (Median)	87-6960 (696)	87-5220 (696)	c0.286
	Mean±Sd	883±1013.42	1152.31±1255.93	
Skimmed milk	n	30	24	Z:-0.570
	Min-Max (Median)	59.8-1435.2 (119.6)	59.8-1435.2 (89.7)	c0.596
	Mean±Sd	334.88±375.46	299±365.67	
Buttermilk drink	n	121	73	Z:-2.243
	Min-Max (Median)	91.4-10968 (1462.4)	91.4-5484 (731.2)	c0.025*
	Mean±Sd	1703.36±1840.83	1161.91±1150.34	
Yogurt	n	116	71	Z:-0.432
	Min-Max (Median)	166.4-9984 (1331.2)	83.2-12480 (1331.2)	c0.665
	Mean±Sd	1843.31±1470.61	1777.67±1712.51	
Strained yogurt	n	87	61	Z:-0.481
	Min-Max (Median)	100-15000 (800)	100-15000 (800)	c0.631
	Mean±Sd	1189.66±1835.31	1288.52±2117.32	
Fruit yogurt	n	84	49	Z:-0.930
	Min-Max (Median)	124.8-5990.4 (124.8)	124.8-11232 (249.6)	c0.352
	Mean±Sd	753.26±1171.12	789.55±1661.99	
White cheese	n	118	68	Z:-2.364
	Min-Max (Median)	92.6-13890 (2963.2)	185.2-11112 (2778)	c0.018*
	Mean±Sd	4102.65±2580.94	3284.58±2381.33	
Kashar cheese	n	112	69	Z:-1.530
	Min-Max (Median)	127.6-12249.6 (2041.6)	127.6-15312 (1020.8)	c0.126
	Mean±Sd	3382.54±3287.26	2587.14±2721.44	
Quark cheese	n	68	40	Z:-0.865
	Min-Max (Median)	25.5-3825 (76.5)	25.5-1224 (153)	c0.387
	Mean±Sd	319.88±584.76	286.24±334.35	
Butter	n	101	62	Z:-0.848
	Min-Max (Median)	113-10170 (1808)	113-13560 (1356)	c0.396
	Mean±Sd	2430.06±2427.93	2241.77±2676.12	

cMann Whitney U Test   *p<0.05

According to the presence of lactose intolerance, the monthly calories taken by the patients from whole-fat milk, semi-skimmed milk, skimmed milk, yogurt, strained yogurt, fruit yogurt, kashar cheese, quark cheese, and butter consumption did not show a statistically significant difference (p> 0.05).

The calories taken by the patients with lactose intolerance from monthly buttermilk drink consumption was found to be statistically significantly lower than those without lactose intolerance (p=0.025; p<0.05).
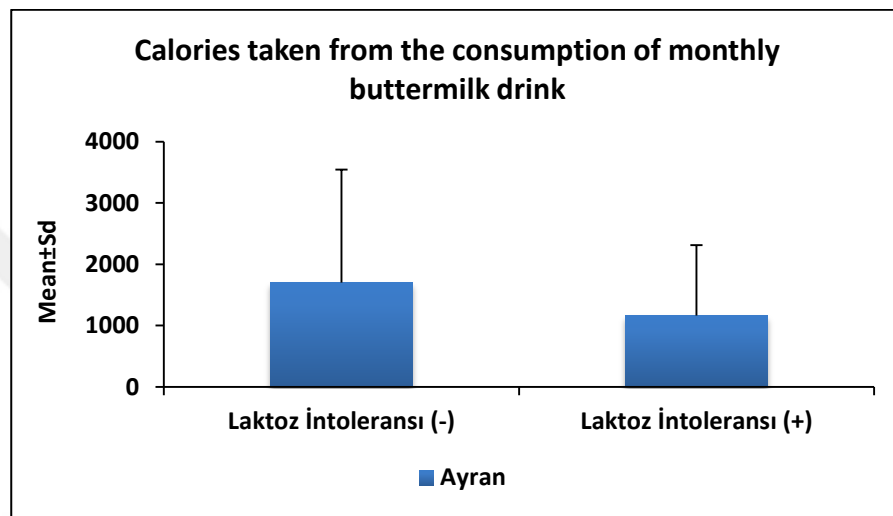
Figure 18. Amount of Calories Taken After Monthly Consumption of Buttermilk Drink According to the presence of Lactose Intolerance

The calories taken by the patients with lactose intolerance from monthly white cheese consumption was found to be statistically significantly lower than those without lactose intolerance (p=0.018; p<0.05).

Figure 19. Amount of Calories Taken After Monthly Consumption of White Cheese According to the presence of Lactose Intolerance

Table 15: Assessment of Monthly Calcium Amounts Taken From Milk and Dairy Products According to the presence of Lactose Intolerance

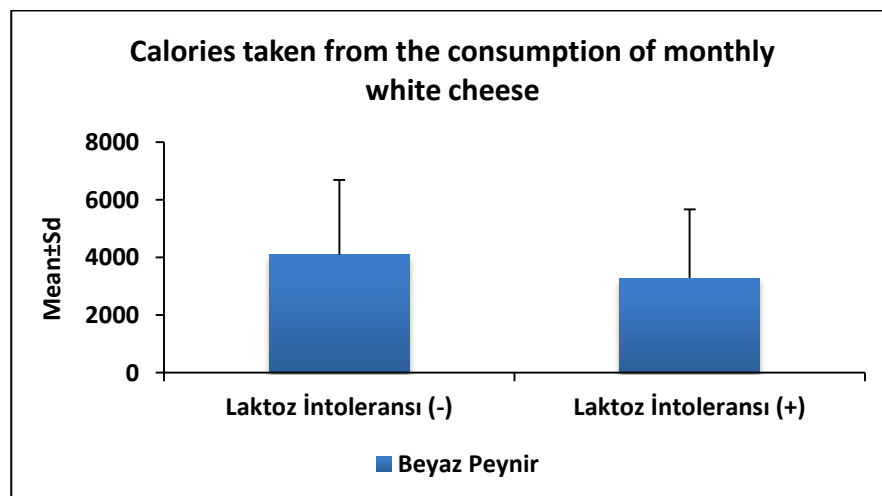| Calcium		Lactose Intolerance		Test Value
		None	Yes	*p*
Whole-fat milk	*n*	92	55	Z:-0.771
	Min-Max (Median)	240-11520 (1920)	240-14400 (1920)	^c*0.441*
	Mean±Sd	2386.96±2190.22	2967.27±3106.42	
Semi-skimmed milk	*n*	87	49	Z:-1.067
	Min-Max (Median)	240-19200 (1920)	240-14400 (1920)	^c*0.286*
	Mean±Sd	2435.86±2795.63	3178.78±3464.63	
Skimmed milk	*n*	30	24	Z:-0.570
	Min-Max (Median)	240-5760 (480)	240-5760 (360)	^c*0.569*
	Mean±Sd	1344±1506.86	1200±1467.56	
Buttermilk drink	*n*	121	73	Z:-2.243
	Min-Max (Median)	162.8-19536 (2604.8)	162.8-9768 (1302.4)	^c*0.025**
	Mean±Sd	3034±3278.85	2069.57±2048.97	
Yogurt	*n*	116	71	Z:-0.432
	Min-Max (Median)	316.8-19008 (2534.4)	158.4-23760 (2534.4)	^c*0.665*
	Mean±Sd	3509.38±2799.82	3384.41±3260.36	
Strained yogurt	*n*	87	61	Z:-0.481
	Min-Max (Median)	192-28800 (1536)	192-28800 (1536)	^c*0.631*
	Mean±Sd	2284.14±3523.8	2473.97±4065.25	
Probiotic yogurt	*n*	25	24	Z:-0.853
	Min-Max (Median)	114-6840 (228)	114-6840 (570)	^c*0.394*
	Mean±Sd	770.64±1392.05	1510.5±1814.76	
Fruit yogurt	*n*	84	49	Z:-0.930
	Min-Max (Median)	152.4-7315.2 (152.4)	152.4-13716 (304.8)	^c*0.352*
	Mean±Sd	919.84±1430.12	964.16±2029.55	
White cheese	*n*	118	68	Z:-2.364
	Min-Max (Median)	126.6-18990 (4051.2)	253.2-15192 (3798)	^c*0.018**
	Mean±Sd	5609.02±3528.59	4490.58±3255.68	
Kashar cheese	*n*	112	69	Z:-1.530
	Min-Max (Median)	180-17280 (2880)	180-21600 (1440)	^c*0.126*
	Mean±Sd	4771.61±4637.21	3649.57±3839.02	
Quark cheese	*n*	68	40	Z:-0.865
	Min-Max (Median)	9.6-1440 (28.8)	9.6-460.8 (57.6)	^c*0.387*
	Mean±Sd	120.42±220.14	107.76±125.87	
Butter	*n*	101	62	Z:-0.848
	Min-Max (Median)	2.3-207 (36.8)	2.3-276 (27.6)	^c*0.396*
	Mean±Sd	49.46±49.42	45.63±54.47	

^c*Mann Whitney U Test*   **p<0.05*

According to the presence of lactose intolerance, the monthly calcium amount taken by the patients from whole-fat milk, semi-skimmed milk, skimmed milk, yogurt, strained yogurt, fruit yogurt, kashar cheese, quark cheese, and butter consumption did not show a statistically significant difference (p> 0.05).

The calcium amount taken by the patients with lactose intolerance from monthly buttermilk drink consumption was found to be statistically significantly lower than those without lactose intolerance (p=0.025; p<0.05).

Figure 20. Amount of Calcium Taken After Monthly Consumption of Buttermilk Drink According to the presence of Lactose Intolerance

The calcium amount taken by the patients with lactose intolerance from monthly white cheese consumption was found to be statistically significantly lower than those without lactose intolerance (p=0.018; p<0.05).
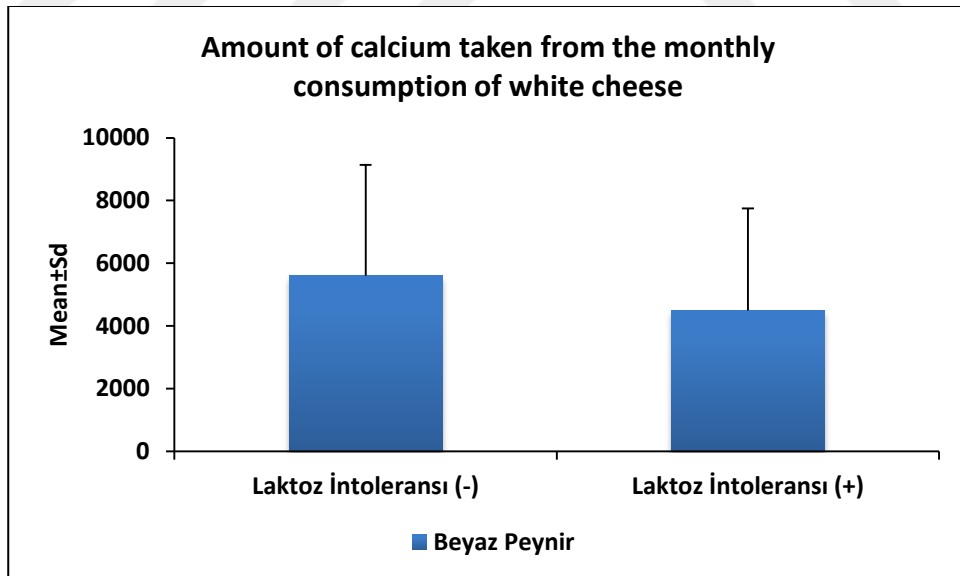
Figure 21. Amount of calcium Taken After Monthly Consumption of White Cheese According to the presence of Lactose Intolerance

Table 16: Assessment of Monthly Lactose Amounts Taken From Milk and Dairy Products According to the presence of Lactose Intolerance
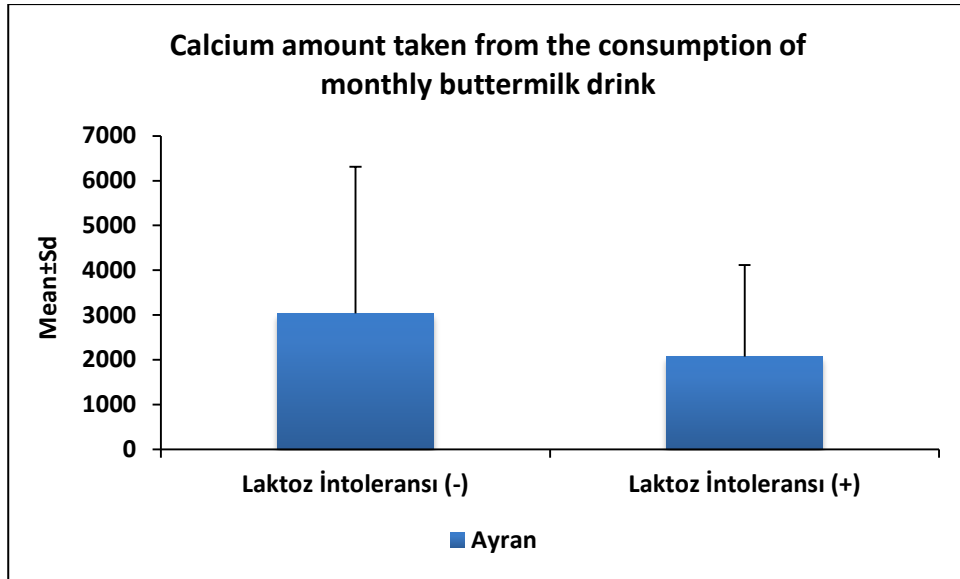
Lactose		Lactose Intolerance		Test Value
		None	Yes	*p*
Whole-fat milk	*n*	92	55	Z:-0.771
	Min-Max (Median)	9.5-456 (76)	9.5-570 (76)	*e***0.441**
	Mean±Sd	94.48±86.7	117.45±122.96	
Semi-skimmed milk	*n*	87	49	Z:-1.067
	Min-Max (Median)	9.8-784 (78.4)	9.8-588 (78.4)	*e***0.286**
	Mean±Sd	99.46±114.15	129.8±141.47	
Skimmed milk	*n*	30	24	Z:-0.570
	Min-Max (Median)	10-240 (20)	10-240 (15)	*e***0.569**
	Mean±Sd	56±62.79	50±61.15	
Buttermilk drink	*n*	121	73	Z:-2.243
	Min-Max (Median)	5.6-672 (89.6)	5.6-336 (44.8)	*e***0.025***
	Mean±Sd	104.36±112.79	71.19±70.48	
Yogurt	*n*	116	71	Z:-0.432
	Min-Max (Median)	10.4-624 (83.2)	5.2-780 (83.2)	*e***0.665**
	Mean±Sd	115.21±91.91	111.1±107.03	
Strained yogurt	*n*	87	61	Z:-0.481
	Min-Max (Median)	2.8-420 (22.4)	2.8-420 (22.4)	*e***0.631**
	Mean±Sd	33.31±51.39	36.08±59.28	
Fruit yogurt	*n*	84	49	Z:-0.930
	Min-Max (Median)	3.6-172.8 (3.6)	3.6-324 (7.2)	*e***0.352**
	Mean±Sd	21.73±33.78	22.78±47.94	
White cheese	*n*	118	68	Z:-2.364
	Min-Max (Median)	0.7-105 (22.4)	1.4-84 (21)	*e***0.018***
	Mean±Sd	31.01±19.51	24.83±18	
Butter	*n*	101	62	Z:-0.848
	Min-Max (Median)	0.1-9 (1.6)	0.1-12 (1.2)	*e***0.396**
	Mean±Sd	2.15±2.15	1.98±2.37	

*e*Mann Whitney U Test   **p<0.05*

According to the presence of lactose intolerance, the monthly lactose amount taken by the patients from whole-fat milk, semi-skimmed milk, skimmed milk, yogurt, strained yogurt, fruit yogurt, kashar cheese, quark cheese, and butter consumption did not show a statistically significant difference (p> 0.05).

The lactose amount taken by the patients with lactose intolerance from monthly consumption of buttermilk drink was found to be statistically significantly lower than those without lactose intolerance (p=0.025; p<0.05).
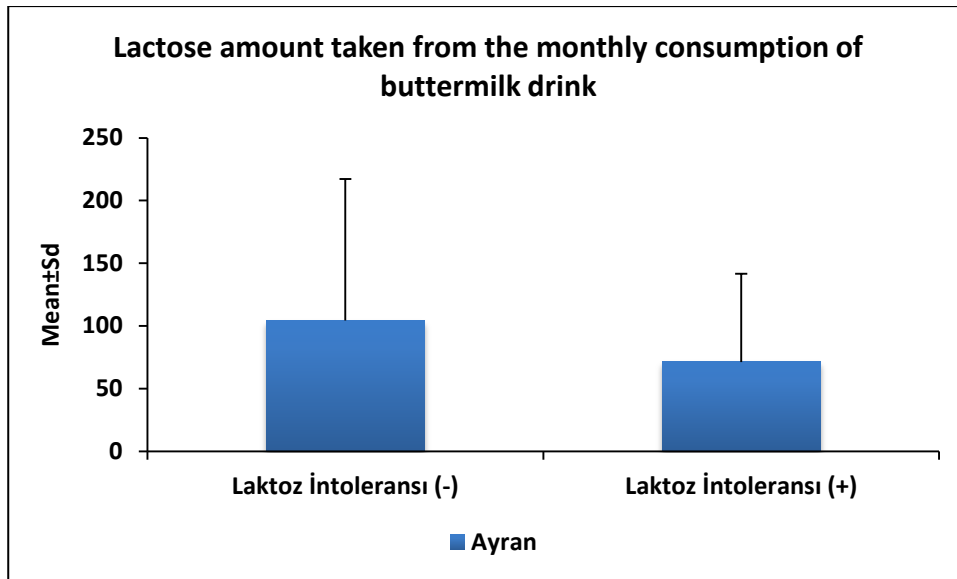
Figure 22. Amount of Lactose Taken After Monthly Consumption of Buttermilk Drink According to the presence of Lactose Intolerance

The lactose amount taken by the patients with lactose intolerance from monthly consumption of white cheese was found to be statistically significantly lower than those without lactose intolerance (p=0.018; p<0.05).
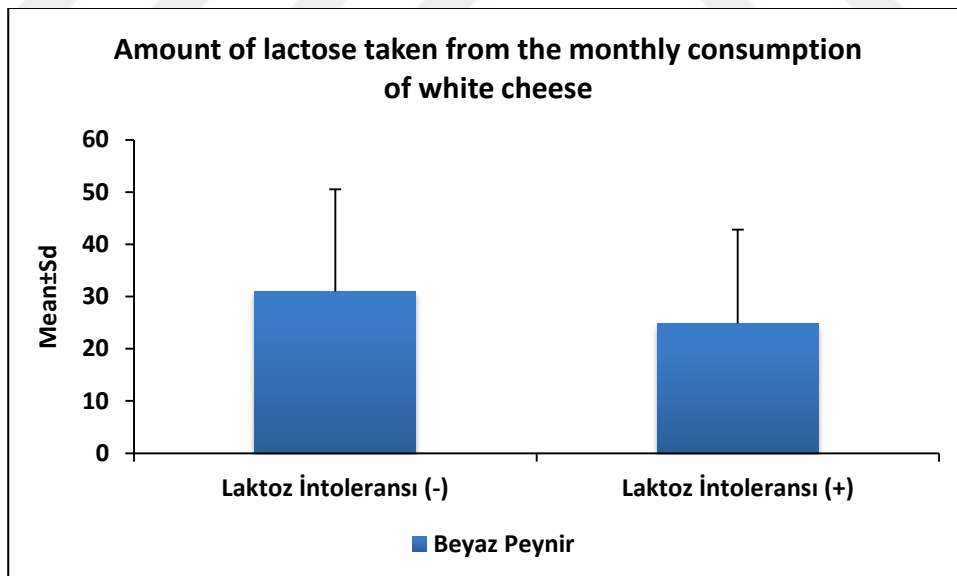
Figure 23. Amount of lactose Taken After Monthly Consumption of White Cheese According to the presence of Lactose Intolerance

Table 17: Assessments regarding the Changes in the Body After Milk Consumption According to the Age Groups

Changes in the body after drinking milk		Age		
		≤20 years old	>20 years old	Test Value
		n (%)	n (%)	*p*
Stomach pain	**None**	82 (80.4)	71 (75.5)	χ^2:2.521
	Low	14 (13.7)	13 (13.8)	[a]*0.704*
	Moderate	5 (4.9)	6 (6.4)	
	High	1 (1.0)	3 (3.2)	
	Excessive	0 (0.0)	1 (1.1)	
Diarrhea	**None**	94 (92.2)	84 (89.4)	χ^2:5.892
	Low	3 (2.9)	7 (7.4)	[a]*0.084*
	Moderate	5 (4.9)	1 (1.1)	
	High	0 (0.0)	2 (2.1)	
Gas	**None**	62 (60.8)	50 (53.2)	χ^2:4,585
	Low	19 (18.6)	25 (26.6)	[b]*0.333*
	Moderate	12 (11.8)	8 (8.5)	
	High	9 (8.8)	9 (9.6)	
	Excessive	0 (0.0)	2 (2.1)	
Bloatedness	**None**	60 (58.8)	45 (47.9)	χ^2:7.740
	Low	23 (22.5)	26 (27.7)	[b]*0.102*
	Moderate	9 (8.8)	13 (13.8)	
	High	10 (9.8)	6 (6.4)	
	Excessive	0 (0.0)	4 (4.3)	
Abdominal cramp	**None**	93 (91.2)	76 (80.9)	χ^2:4,976
	Low	5 (4.9)	7 (7.4)	[a]*0.277*
	Moderate	2 (2.0)	6 (6.4)	
	High	1 (1.0)	2 (2.1)	
	Excessive	1 (1.0)	3 (3.2)	
Vomiting	**None**	93 (91.2)	89 (94.7)	χ^2:2.745
	Low	5 (4.9)	2 (2.1)	[a]*0.669*
	Moderate	2 (2.0)	1 (1.1)	
	High	1 (1.0)	0 (0.0)	
	Excessive	1 (1.0)	2 (2.1)	
Nausea	**None**	77 (75.5)	80 (85.1)	χ^2:8.436
	Low	11 (10.8)	9 (9.6)	[a]*0.067*
	Moderate	6 (5.9)	1 (1.1)	
	High	5 (4.9)	0 (0.0)	
	Excessive	3 (2.9)	4 (4.3)	

[a]*Fisher Freeman Halton Test*　　　　[b]*Pearson Chi-Square Test*

The distribution of the severity of abdominal pain, diarrhea, gas, bloatedness, abdominal cramps, vomiting, and nausea in the cases did not show any statistically significant difference in terms of the age groups (p> 0.05).

5. DISCUSSION and CONCLUSION

While the research limited to departments of Pre-school Teaching students were included. Students in the other department were excluded from the study. 50 from 1st grade students, 51 from 2nd grade students, 50 from 3rd grade students and 49 from 4th grade students were participated in the research. A total number of participants were 200 students. In this part, findings from the survey was discussed.

All 200 participants of the study are female. Most of the students studying in the department of pre-school teaching were female thus male students were excluded from the study since there were not enough participants to compare them in terms of gender. The age of 200 female students participating in the study are between 18 and 31 years old. Average age is 20.78 ± 2.26. $\leq$The number of 20 years old participants is 102 and they constitute 51% of the participants and 98 participants, who are >20 years old, constitute 49% of the participants.

Weights of the students participated in the study vary between 40 kg and 110 kg and the average is 57.30 ± 10.44 kg. Heights vary between 150 and 178 cm and the average height is $164,43 \pm 5.72$. Body mass index of the people varies between 14,88 and 38.97 kg/m^2 and the average is 21.15 ± 3.44 kg/m^2. According to the WHO indices, the average body mass index (BMI) of the participants is normal (57). In the study of Özkurucuklu on the consumption of milk and dairy products among the university students, the average BMI of the students, who participated in the study, was similar to 21.07 ± 2.74 kg/m^2 (27).

Of the cases, 22.5% had chronic diseases. Allergy was in the first rank in 53.3% and stomach diseases were the most common seen chronic diseases in 33.3%. In the study conducted by Tutumlu, allergy and chronic diseases took the first place and stomach diseases the second place among the chronic diseases (56). In the study of Bıyıklı, the results were similar (44). Unlike the research of Yücemen, stomach diseases took the first place. As Yücemen also stated in his study, high rate of gastro-intestinal diseases makes it difficult to conduct the research of lactose intolerance (9).

In the present study, when the distributions regarding milk consumption were considered, 31.5% of the participants stated that they liked to drink milk, while 6% did not like and never drink it. In the study conducted by Tutumlu, 27.3% stated that they liked drinking milk, while 3.4% never drank (56). In the study of Bıyıklı, 34.2% loved

drinking milk very much but 2.7% never drank it. In another study, 73.6% of the students participated in the study stated that they liked drinking milk (58).

Considering the reason for people who do not like to drink milk, it was determined that 47.3% didn't like its odor and 38.2% didn't like the taste. In another study, taste (47.6) took the first place as the reason for not liking to drink milk as odor (36.6%) was in the second place (58). In another study, 28% did not drink milk due to its taste and 20.6% due to its odor (56).

When examining how long the participants were continuing their habit of drinking milk, it was observed that 70.3% had the habit of drinking milk for more than 10 years. Diversely, in the study of Yücemen, 46.3% stated that they had the habit of drinking milk for more than 9 years (9). When the studies were compared, it was determined that the majority of the group in which the study was conducted had a higher level of milk drinking period than other study groups. The level of consciousness is considered to be higher due to the fact that the people participating in the study are university students.

Considering the meals during which milk was consumed by the people participating in the study, it was observed that consumption was higher in the morning (24.6%), before bedtime (24.6%), and between the meals (24.6%). It is determined that milk was at least consumed in the lunch meals with a rate of 6%. Likewise, in another study, it was found that milk was at least consumed in the lunch meals with a rate of 5.3% (58). According to the study of Durmaz et al., 37.06% of the students consumed milk in the morning, 26.18% before bedtime, 21.47% in the evening, 10.88% between the meals, and 4.41% at lunchtime (59). Similar to the study conducted according to these results, the most preferred meals for drinking milk are morning, before bedtime and between meals, and lunch is the least preferred meal time.

The participants stated that they consumed milk since they considered milk nutritious (37.1%), they liked its taste (31.2%), it was a habit (15.6%), they considered milk filling (8.6%) and they had other reasons (7.5%). In another study, 51.2% stated that they thought it was nutritious and 14.3% liked it due to its taste (56). In the study conducted by Ayhan et al., 55.2% drank milk for healthy nutrition, 40.9% for liking milk, and 3.9% for fullness (60). When the studies conducted are considered, it can be seen that people consuming milk in parallel with the study mostly consume it due to its nutritiveness.

According to Turkey Nutrition and Health Survey (TNHS-2010), the rate of not consuming milk throughout Turkey is 44.6% as stated in the survey of the food consumption frequency of the individuals of 20 years of age and older (61). Considering the milk consumption frequency of the students in the present study, 26.5% never consumed whole-fat milk, 32% never consumed semi-skimmed milk, and 73% never consumed skimmed milk. When the frequency of milk consumption of the cases participating in the study, it can be revealed that approximately one fourth of them do not consume milk. If a comparison is done according to the fat content of the milks, the most preferred is the whole-fat milk. Similarly, in another study conducted with the university students, whole-fat milk was the most preferred type (27).

In Turkey, yogurt is preferred and consumed more than milk (9). In the study, the most preferred dairy products were white cheese and yogurt. Among the students participated in the study, 49.5% stated that they regularly consumed cheese every day. Also, 23.5% consumed yogurt every day regularly. Similarly, in the study of Yücemen, cheese was the more consumed food then yogurt (9). It can be considered that the consumption of cheese more regularly than yogurt may be caused by the breakfast habits of the people. In a study conducted by Selçuk et al. with the university students, it was found that students consumed cheese and yogurt regularly (62). In the study conducted to determine the milk and dairy consumption habits of the students of Bayburt University, 44.9% of the students, who participated in the study, stated that they preferred cheese and 40% preferred yogurt (63). According to TNHS-2010 data, 55.1% of people aged 20 and over consume yogurt, buttermilk drink, and kephir every day. Cheese is consumed every day with a rate of 76%. In TNHS-2010 data, the most consumed dairy product is found to be cheese (61).

Fermented milk products that were not mostly consumed by the students participating in the study were probiotic yogurt and kephir at the ratios of 75.5% and 75%, respectively. The most consumed fermented milk product was cheese with a ratio of 49.5% cheese and yogurt of 23.5%. Students stated that they consumed kephir at a ratio of 15% and probiotic yogurt at a ratio of 10% as less than once a month. In the study conducted at Selçuk University for the milk and dairy products consumption habits of the students, it was found that the students consumed kephir (75%) and probiotic dairy products (67.8%) among the fermented dairy products at the least (58).

While adult individuals should consume 3 portions of milk and milk products every day, children, adolescents, pregnant women, breastfeeding women, and

menopausal women should consume 2-4 portions of milk and milk products every day (64). According to TNHS-2010 data, the daily average consumption amounts of the foods in milk and dairy products is found as 135.9 g in women between 19 and 30 years old throughout Turkey (61). Such data is lower than the daily amounts recommended. According to Statistics of Turkish Dairy Industry, individual annual consumption amounts in drinking milk and other dairy products are calculated as estimated amounts although there is no clear data on the consumption of milk and dairy products in our country due to the informality in milk production. Besides, other than the consumption values calculated over the registered milk production amounts, the share of self-consumption of the manufacturer, the amount it shares with his/her relatives and immediate surroundings, and the amount of raw milk that the manufacturer markets on his own are the difficulties encountered in the calculation of individual annual milk and dairy products in Turkey (6). Considering the statistics of dairy industry in Turkey, it is estimated that the individual consumption of milk in 2018 is 41.5 kg. One of the most intensively consumed dairy products in Turkey is cheese. White cheese is the most preferred type of cheese in which consumption has increased parallel to its production over the years. It is estimated that individual annual cheese consumption in 2018 is 18.4 kg. Yogurt and buttermilk drink, which have an important place in our culture, are the dairy products where the amount of milk collected by integrated dairy enterprises is processed after drinking milk. With a similar calculation to drinking milk and cheese consumption figures, individual yogurt consumption in 2018 was 30.6 kg, while buttermilk consumption was calculated as 18.4 kg (6). In the present study, monthly whole-fat milk is found as 2170.07 ± 2147.10 ml, monthly buttermilk drink consumption is 3281.44 ± 3575.36 ml, monthly yogurt consumption is 2622.67 ± 2253.82 gr, monthly white cheese consumption is 1232.26 ± 821.04 gr. Consumption of other dairy products excluding monthly buttermilk drink consumption shows similarities with the statistics of Turkish dairy industry.

When the frequency of consumption of the products containing small amount of lactose, bread and its derivatives are consumed every day with a rate of 71% . This is followed by milk puddings with a consumption frequency of 30.5% 1-2 times a week and biscuit consumption frequency of 30% 1-2 times a week. In the study conducted by Tutumlu, bread and other bakery products were the most consumed product with a rate of 84.6% 1-2 times a day among the findings of the consumption frequency of the

products containing small amounts of lactose. Whey, milk by-products and skimmed milk powder were the least consumed products with a rate of 15.8% (56). In the study conducted by Bıyıklı, bread and other bakery products were the most consumed products with a rate of 91.7%, while whey, milk by-products and skimmed milk powders were the least consumed products with 51%. Biscuit and cake mixtures are consumed at a rate of 35.2% 1-2 times a day and of 35% 1-2 times a week (44).

When the distributions related to lactose intolerance are considered, no symptom was found in 54.5% of 109 people. The most common complaint is bloatedness with 25% and gas with 20.5%. The severity of the symptoms is moderate with a rate of 24% and low with 20%. In the study conducted by Bıyıklı, the most common complaint is gas with a rate of 56.5% and bloatedness with 23.9%. The severities of the symptoms are low with 43.2%, moderate with 44.9%, very high with 7.7%, and extreme with 4.2% (44). Bloatedness and gas complaints are much seen in lactose intolerance studies (65). In the study conducted by Tutumlu, it was found that 31% of the patients had no symptoms, 15.9% had stomach pain, and 7.8% had bloatedness. The severities of the symptoms are low with 47.7%, moderate with 38%, high with 9.5%, and extreme with 4.8% (56).

Considering the state of complaining about lactose intolerance, there are 2 people with lactose intolerance, who were diagnosed at a health institution with a ratio of 1%. Among the participants, 7% experienced the aforementioned disorders every time they drink milk and were unsure of lactose intolerance, 29% experienced the said symptoms occasionally and were not sure about lactose intolerance, and 62% did not have such a disease. In the previous studies, it was determined that while 1.5% of the participants stated that they were sure about lactose intolerance, 8.7% expressed that they were not sure about lactose intolerance even though they felt the symptoms every time. The rates are similar with the study (56). In the study conducted by Bıyıklı, 1% were sure about lactose intolerance, 7.5% felt the symptoms all the time but were not sure about lactose intolerance, 29.1% experienced the symptoms occasionally but were not sure about lactose intolerance, and 62.4% stated that they had absolutely no such disease. The rates found in the study of Bıyıklı show almost exactly the same results in the current study (44). When the studies are examined, it can been seen that the ratio of people, who are sure of lactose intolerance, is very low. It can be thought that people, who feel the symptoms, are not suspected of lactose intolerance and do not apply to a health institution.

Before 2 years of age, lactase activity is sufficiently high for the infants to digest milk. After 2 years of age, lactase production gradually decreases, and it can later cause various symptoms. Primary lactase deficiency developing over time is the most commonly seen lactase deficiency. At least, it is known that congenital lactase deficiency is seen rarely (13). In the study, the period of the symptoms of lactose intolerance have been examined, it was found that 76.3% felt the symptoms later. It was found that 13.2% felt since birth and they took the second place and 9.2% stated as "other" and they took the third place. Unlike the study conducted by Tutumlu, those who experienced symptoms after microbial discomfort were in the first place with 42.8%, those who experienced symptoms later were 36.2%, and those who experienced symptoms after a disorder in the small intestine were 11.1% (56). In the study of Bıyıklı, those who started to feel symptoms later take place in the first rank with a rate of 61.7%. Those who felt symptoms after another disease were 20.8% and those who felt the symptoms as of the birth were 15.5% (44). When the results of the studies were examined, it was observed that the symptoms were not congenital but they were felt mostly later.

When the measures taken by people, who feel the symptoms after consumption of milk and dairy products, are examined, it is seen that 67.6% do not take any measures. Consumption of lactose-free dairy products at the rate of 15.8% is the leading measure taken. As a precaution, not consuming any dairy products and using drugs with the advice of a doctor are found equal with a rate of 5.8%. As a precaution, it is found that consumption of milk instead of fermented milk is 2.2%. When the measures taken are considered, it can be seen that more than half of the people feeling the symptoms do not care about them and also do not take any measures. In the study of Bıyıklı, 46.2% of the participants stated that they did not take any measures and recovered on their own. It was stated that 30.1% stopped drinking milk, 12.5% consumed fermented milk products, 9.8% consumed lactose-free milk, and 1.4% used medicine with the recommendation of a doctor (44). In the study conducted by Tutumlu, 39.5% did not use drugs, 19.6% used drugs, 10.5% consumed .% did .not consume lactose-containing products, and fermented dairy products, 10.2% stopped to drink milk, those who did not consume lactose products, 8.5% and 7.9% did not consume any dairy product (56). When studies are examined, it is seen that mostly people do not take any measures. According to a study conducted in Canada in order to determine the distribution of adult population thinking that they have lactose intolerance (self-reported lactose

intolerance), 9.4% of individuals did not make any change in their milk consumption, 36.1% of them stopped to consume milk but continued to consume the products such as yogurt and cheese, 14.9% greatly reduced the consumption of dairy products, 12.9% lowly reduced the consumption of dairy products, 12.5% eliminated lactose-free products or lactase capsules or drugs, 9.4% eliminated others, and 4.7% eliminated all the dairy products (66).

When the participants in the study were asked whether they had any knowledge about lactose intolerance, it can be observed that 43% (n = 86) had knowledge, and 57% did not have any knowledge previously. Considering that the people participating in the study are students of the Department of Preschool Teaching, when it is handled out that they will work with children between the ages of 3 and 6 after graduation, it is important that people working with this age group should be aware of intolerances, thinking that children consuming milk and dairy products may show signs of lactose intolerance after consumption.

After the participants drank milk, 53.6% had no bloatedness, 57.1% had no gas, 78.1% had no stomach pain, 80.1% had no nausea, 86.2% had no abdominal cramps, and 90.8% had no diarrhea. According to the findings, it was found that the most encountered complaint after drinking milk was bloatedness. Second complaint is gas. According to the findings of the study conducted by Yücemen, 52.4% of those who felt discomfort after drinking milk reported stomach pain, 60.6% nausea, and 80.4% diarrhea (9). According to the study conducted by Tutumlu, those who felt discomfort mostly complained about stomach pain (16.6%) and bloatedness (7.8%) (56). In the study of Bıyıklı, gas was the most disturbing complaint, while bloatedness and stomach pain were found to be the second most disturbing complaint (44). In the study conducted by Adibi et al., gas and stomach pain were reported as the most common complaints in parallel with the study (67). When the studies are examined, it can be seen that stomach pain, bloatedness, and gas complaints are the most common complaints.

When we look at the changes in the body after yogurt consumption, bloatedness and gas complaints take place among the most commonly seen complaints. Nausea, stomach pain, and diarrhea are seen at different rates, respectively. Vomiting complaint is not encountered. Similarly, in the study conducted by Yücemen, gas and bloatedness are the most common complaints with the rates of 26.3% and 25%, respectively (9). In

the study conducted by Adibi et al., bloatedness, gas, and stomach pain take place among the most common symptoms (67).

Kephir is an important functional milk product (68). Kephir is produced from grains in the special and complex mixture of yeast and bacteria living in a symbiotic relationship. Nutritional content varies according to milk content, microbiological composition of the grains used, and the fermentation conditions. Its regular consumption is associated with increasing lactose digestion and tolerance (69). It has health benefits such as reducing the symptoms of lactose intolerance, stimulating the immune system, lowering cholesterol, and antimutagenic and anticarcinogenic properties (68,70). When the changes in the body after consumption of kephir are observed, gas and bloatedness are the most common complaints. In the study conducted with Hertzler et al. on 15 individuals with lactose maldigestion, the participants were given milk products such as milk, yogurt, flavored yogurt, kephir, and flavored kephir each day, and the severity of symptoms was asked to the participants. Milk increased the gas (flatus) intensity when compared to four other dairy products. There was no difference between kephir and yogurt in terms of gas (flatus) intensity. There was no difference between dairy products in terms of the symptoms of stomach pain and diarrhea (65). In the study of Hertzler, similar to the findings of the research, the most common complaint in kephir consumption was gas. When the results in the present study are considered, it can be concluded that, after kephir consumption, the participants had more discomfort when compared to yogurt. However, unlike Hertzler et al., the consumption amounts of the individuals were ignored in the current study. It is thought that kephir shows more complaints in people when compared to yogurt, due to complaints of individuals such as gastritis and reflux, except lactose intolerance.

When the changes in the body are considered after cheese consumption, it can be seen that the most common complaint that is different from yogurt and kephir is bloatedness and nausea. In the study conducted by Yücemen, it is found that diarrhea and stomach pain are the most comon complaints with the ratios of 3.9% and 3.0%, respectively (9). In the study conducted by Adibi et al., the complaint of bloatedness was found to be similar to the current study, but differently, gas and stomach pain took place among the most common complaints (67).

It is not known whether these symptoms, which are learned by asking people, are directly related to lactose, because biochemical testing is not used in the study. Considering that people consume during the day, the specified findings should not be

combined with the consumption of milk and dairy products without making any research (9).

The presence of lactose intolerance symptoms depends on many factors. These factors are influenced by the colonic processes of lactose, such as small intestine lactase activity, passage rate, and the fermentation of lactose via the colonic microbiota. Therefore, it is thought that the modulation of the metabolism or composition of the colonic microbiota may affect lactose intolerance. Prebiotic, probiotic, and symbiotic food supplements can be used to regulate the colonic microbiota (71). In a study conducted with 11 Chinese lactose-intolerant participants supplemented with yogurt enriched with *Bifidobacterium animalis* and *Bifidobacterium animalis* capsules for 2 weeks, it was showed that the symptoms of lactose-intolerant subjects were alleviated by regulating the metabolic activities of the colonic microbiota (71). In another study, it was found that probiotic (especially *Bifidobacteria*) and yogurt supplementation may have an effect on colonic bacteria and decrease the symptoms of lactose intolerance (72).

In the study, when milk and dairy products are compared according to the complaints, it can be seen that fermented milk products cause less discomfort than milk. Fermented dairy products are used as a strategy to overcome lactose intolerance (65). Fermented milk products can be considered in the diets of people with lactose intolerance. In a study conducted with 8 lactose-intolerant individuals, 500 ml of low-fat milk consumption caused complaints such as abdominal stress and diarrhea. No symptoms were observed after consuming the same amount of yogurt or milk with acidophilus (cultured with *Lactobacillus acidopbilus*) (73). In the study conducted by Yücemen, lactose intolerance was found to be developed in 57.7% of 322 people after milk consumption, in 20.8% after milk pudding consumption, in 17.9% after yogurt consumption, and 3.4% after cheese consumption. Similarly, it was found that the complaints were at maximum level in milk consumption, and complaints decreased after the consumption of fermented milk products.

Yogurt has been shown to increase lactose digestion and tolerance in the individuals with lactose maldigestion (65). Yogurt is digested more efficiently thanks to the bacteria in it, when compared to lactose in other dairy products (74). It is observed that yogurt is related to the β-galactosidase in the starter bacteria cultures (*Streptococcus salivarius* subsp. *thermophilus* and *Lactobacillus del- brueckii* subsp.*Bulgaricus*) (65). Fermented milk products were recommended to the individuals

with lactose intolerance due to their low lactose content. Subsequent studies conducted on experimental animals have shown that bacteria in yogurt, besides the lactose dose, also help to digest lactose (74). In a study conducted to show that lactase-deficient individuals can better tolerate lactose in yogurt than in milk, hydrogen breathing test was used. According to the hydrogen breath test results, yogurt containing 18 g lactose yielded one third lower results than milk and water with the same amount of lactose. In addition, diarrhea and gas complaints were observed less than milk and lactose water. According to this study, it was concluded that lactose in yogurt was better absorbed. It has been observed that increased absorption of lactose in yogurt is caused by intraintestinal digestion of lactose by lactase released from the yogurt organisms. This automatic digestion feature makes yogurt a well-tolerated milk source for people with lactase deficiency (75). In a double-blind study conducted by Lerebours et al., it was performed to evaluate lactose absorption after long-term intake of yogurt and fermented and pasteurized milk (FPM), and to evaluate the modification of lactase activity of the intestinal mucosa. In a study with 16 lactase-deficient individuals, it wa found that yogurt improves lactose digestion, and this effect was lost by pasteurization. There was no difference between 24-hour and 8-day consumption. It has been found that enhanced lactose absorption in yogurt does not change after eight days (long-term use). In the individuals with lactase deficiency, yogurt consumption has not been associated with increased lactase or beta-galactosidase activity of the third duodenum in the intestinal mucosa. The consumption of yogurt and fermented and pasteurized milk did not significantly change mucosal lactase and beta-galactosidase activity. Therefore, it has been thought that increased lactose absorption in yogurt may be related to the intraluminal process (76). In the study of Rosado et al., it was stated that yogurt was significantly lower in lactose autodigestion capacity, pasteurized yogurt, and was also affected by the type and amount of microorganism added to milk, and the presence of fat. Yogurt is an important food alternative for people with lactase deficiency (77). In a study conducted on 10 healthy adults (20 - 25 years old) with lactose intolerance, a dose of yogurt that could be consumed in one meal was tried to be found. No gastrointestinal symptoms were observed in any of the participants after 100 ml yogurt consumption. Consequently, according to the breath test evaluations, it is suggested that consumption of 100 ml yogurt should not be exceeded in each meal (78). Considering the distribution of discomfort symptoms according to the amount of yogurt consumed by Yücemen, 94% of the people with yogurt intolerance consumed 160 g or less. Of the individuals,

89.8% with gas complaints and 93.7% with bloatedness complaints consumed 160 g or less amount of yogurt (9).

When the presence of lactose intolerance according to demographic characteristics is considered, the frequency of lactose intolerance in the individuals with chronic diseases was found to be statistically significantly higher than those without any chronic diseases. (p=0.016) When we look at the chronic disorders of the patients participating in the study, it can be seen that the frequency of allergies and stomach diseases is higher. Under the light of these findings, more complaints related to lactose intolerance have become meaningful. When we look at the distribution of age and BMI distributions of the cases participating in the study according to the presence of lactose intolerance, no statistically significant difference was found.

Individuals with lactose malabsorption may generally not experience any symptoms after drinking one portion of milk. Individuals with lactose intolerance may experience complaints such as stomach pain, bloatedness, abdominal cramps after consuming lactose-containing products. However, lactose remaining undigested in the small intestine leads to osmotic retention of water. The osmotic load in the colon is increased eight times as the lactose is converted in short-chain fatty acids by the intestinal microbiota. Diarrhea will occur if the lactose load exceeds the capacity of the colonic microbiota for fermentation or if the resulting short-chain fatty acid load exceeds the column capacity for absorption (79). The presence and severity of the patients participated in the study, such as stomach pain, diarrhea, gas, bloatedness, abdominal cramps, vomiting, and nausea, were investigated after milk consumption. When the changes in the body after drinking milk are considered according to the presence of lactose intolerance, distribution of stomach pain intensity (p = 0.001; p <0.01), distribution of diarrhea intensity (p = 0.009), distribution of gas formation intensity (p = 0.001), distribution of bloatedness severity (p = 0.001), distribution of abdominal cramp intensity (p = 0.001), distribution of nausea formation intensity (p = 0.021) show significant differences in lactose intolerance. Differently, the distribution of severity of vomiting after milk drinking in the cases does not show a statistically significant difference in terms of lactose intolerance.

In cases with lactose intolerance, low and moderate stomach pain, abdominal cramps, and diarrhea were higher than the cases without lactose intolerance. Likewise, the rate of moderate and very extreme gas and very severe bloatedness was found to be higher than those without lactose intolerance. Unlike the study, in the study conducted

by Adibi et al., diarrhea, stomach pain, bloatedness, and gas, had 3 or more score levels respectively (67).

Generally, low calcium intake occurs among the people considering to be lactose-intolerant (self-reported lactose-intolerant people) (66). In a study, participants, who thought that they had lactose intolerance, were found to be significantly statistically lower ($p < 0.05$) than those who thought that they did not have any lactose intolerance (85). Participants who thought they had lactose intolerance consumed less ($p < 0.05$) milk, yogurt, dry soup, milk pudding, cheese, quark cheese, and ice cream. People who think they usually have lactose intolerance tend to eliminate milk and dairy products from their diet (85). Participants who think they have lactose intolerance consume less cheese, although most hard cheese contains negligible amounts of lactose (66). In the present study, the calorie, calcium, and lactose levels of the patients with lactose intolerance were found to be statistically significantly lower than those without lactose intolerance. According to the result, it can be considered that the individuals suffering from lactose intolerance have consumed less cheese than those without lactose intolerance. Likewise, the calorie, calcium, and lactose levels of the patients with lactose intolerance were statistically significantly lower than those without lactose intolerance. Since fermented milk products are darker than milk, they can be digested better because their passage through the gastrointestinal tract is slower (80). Because buttermilk drink is more consistent in density than other fermented milk products, it may cause more complaints similar to milk. According to a study conducted in Canada in order to determine the distribution of lactose-intolerant adults (self-reported lactose intolerance), people who stated that they have lactose intolerance consumed less milk, yogurt, and cheese in their daily consumption than those without lactose intolerance (66). Similarly, in the present study, when the monthly consumptions are considered, it is found that the cheese consumption of the participants is lower than those without lactose intolerance.

In a recent review, based on available evidence, dietary lactose or lactase deficiency did not have a significant effect on calcium absorption in adult humans. However, lactose intolerance is thought to cause low bone density and bone fractures, especially in children, since the consumption of milk and dairy products is avoided (81). In a study including 76 participants between the ages of 5 and 12 years, hydrogen breathing test was applied and they were divided into two groups as those with lactose malabsorption (n = 47) and those who can absorb lactose. There was no difference

between the two groups in terms of total calcium, milk calcium, milk, cheese, yogurt, ice cream, and calcium density in the diet. In addition, there was no difference in bone mineral content and bone mineral density of the lumbar spine. Bone mineral content, density, and calcium intake were not associated with lactose malabsorption (82). Although lactose malabsorption is not associated with calcium intake and bone mineral density changes, the presence of lactose intolerance symptoms and low calcium intake and bone mineral density may be observed. In a study conducted with 103 healthy participants, 55 people were proved to have lactose malabsorption via the hydrogen breath test. Of the said individuals, 29 showed lactose intolerance symptoms. Lumbar and femoral bone mineral density, calcium intake, and mineral metabolism do not differ between those with and without malabsorption. Intolerant participants showed significant changes in parameters compared to tolerant individuals. A tight correlation was found between bone mineral density values and severity of symptoms and calcium intake, and between calcium intake and severity of symptoms. It has been thought that lactose intolerance may prevent reaching sufficient bone mass (83).   In a study conducted with 58 women with an average age of 57±7 years, who were post-menopausal, no difference was found between bone mineral density or calcium intake between the positive and negative hydrogen breath test, but those with lactose malabsorption and no symptoms of intolerance compared to those without symptoms. It was found to be significantly statistically lower between mineral density and calcium intake. As a result, although calcium intake and bone mineral density are not directly affected by lactose malabsorption, the presence of lactose intolerance symptoms may affect bone mineral density with low calcium intake (84).

When the cases are divided into two groups, including 20 years old and under 20 years old, and older than 20 years old individuals, the distribution of the severity of complaints such as stomach pain, diarrhea, gas, bloatedness, abdominal cramps, vomiting, and nausea were not found statistically significant in terms of age groups. According to age groups, diarrhea (p = 0.084) and nausea (p = 0.067) complaints were found close to their significance value. If the study was made to a larger sample group, these complaints were thought to be significant. In the study of Yücemen, when the distribution of complaints about milk consumption by age is examined, it is found that the said complaints occur between the ages of 21 and 25 years old with a ratio of 54.3%. This value is followed by the 26-30 age group with a ratio of 14.6% (9). When we look at the number of individuals in the age group distributions of the people

participating in the study that is conducted by Yücemen, it can be seen that 52.9% were between 21-25 years old, 14.2% were under 20 years old, and 12.9% were between 26-30 years old. In the study carried out by Yücemen, it can be considered that the reason for the excessive results in the 21-25 age group is related to milk consumption and the unequal distribution among the age groups.

Fermentation is one of the most important functions of the intestinal flora, resulting in the production of essential fatty acids, lactic acid and gases such as hydrogen, carbon dioxide, and methane. Disorders in bacterial flora and excessive bacterial metabolism can lead to the production of compounds that promote chronic inflammation. It is known that diet will have effects on intestinal mucosa and microbiota. Other compounds, such as lactose, which cannot be absorbed in the small intestine, can cause the production of toxic metabolites by intestinal bacteria as a result of anaerobic degradation, and may alter the balance of microflora in the intestine. It has also been reported that it can cause various symptoms in people with food intolerance (13). It has been reported that excessive bacterial fermentation in the intestines of the individuals with lactose intolerance may affect the intestinal microbiota that may be associated with many diseases. On the other hand, microbial strains in fermented dairy products have been shown to reduce the concentration of fecal enzymes contained in the colon carcinogen. Studies are needed for the net effect of individuals with lactose intolerance to consume milk and dairy products (78).

As a result, among those who participated in the study, the rate of those diagnosed with a healthcare provider and those with lactose intolerance was found to be 1%, and 36% of those suspected to have lactose intolerance. It was observed that most of the students experiencing the symptoms of lactose intolerance were not diagnosed and 57% of the participants in the study did not know about lactose intolerance. It was seen that the population should be informed about the said issue. Moreover, it was observed that 67.6% of the participants did not take any precautions when they felt the symptoms after milk and dairy product consumption. It is seen that the population should be informed about what measures to be taken when they feel the symptoms. Hertzler et al. showed that fermented milk products such as kephir and yogurt improve lactose digestion when compared to milk (65). In this study, the participants reported more severe symptoms after the consumption of fermented milk products such as yogurt, kephir and cheese after milk consumption. Therefore, the individuals, who feel gastrointestinal symptoms after milk consumption, can be directed to fermented milk

products. In a recently conducted study, although the distribution of lactase deficiency in Turkey was about 70%, it was reported that there is an exact need for further detailed studies using the diagnostic method for determination of lactose intolerance distribution in Turkey (13). It is very important to identify people with symptoms of lactose intolerance and take the precautions accordingly in order to maintain a healthy and quality life. Population should be informed about this issue.

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7.APPENDICES

7.1.Questionnaire

THE RELATIONSHIP BETWEEN CONSUMPTIONS OF DAIRY AND FERMENTED DAIRY PRODUCTS IN LACTOSE INTOLERANCE AMONG STUDENTS OF A FOUNDATION UNIVERSITY IN ISTANBUL

PERSONAL INFORMATION

1.Age and class

2.Gender
☐Male   ☐Female

3.Height: …. Cm

4.Weight: …. Kg

5.Do you have any chronic disorders?
☐Yes   ☐No   ☐Don't know

6.If Yes, mark if you have any of the below mentioned chronic diseases (You can mark more than one).

A☐Diabetes
B☐Cardiac diseases
C☐Diseases related to stomach (ulcer, reflux, gastritis)
D☐Renal diseases
E☐Intestinal diseases (Ulcerative colitis, Chron, irritable intestinal syndrome etc.)
F☐Allergy
G☐Other:

QUESTIONS RELATED TO THE CONSUMPTION OF MILK AND DAIRY PRODUCTS

7.Do you like to drink milk?
☐A.Yes, very much   ☐B.Yes   ☐C.Yes but less
☐D.No, but I drink.   ☐E.No, never drink.

8.If you do not like to drink milk, which of the following can be reason?
☐A.Odor
☐B.Taste
☐C.Allergic diseases
☐D.Nausea, vomiting, diarrhea
☐E.Other

9.How many years have you been drinking milk?

☐A.0-1 year   ☐B.2-3 years   ☐C.4-6 years   ☐D.7-9 years   ☐E.10 years and more

10.In which meals do you consume milk?

☐A.Morning　　☐B.Lunch　　☐C.Evening　　☐D.Before bedtime　　☐E.Between the meals

11.What is your reason for consuming milk?

☐A.I like its taste

☐B.I think it is nutritious.

☐C.Habit

☐D.I think it is saturating

☐E.Other reasons…..

12.Which changes do you feel in your body after drinking milk?

	Never	Low	Moderate	High	Excessive
Stomach pain					
Diarrhea					
Gas					
Bloatedness					
Abdominal cramp					
Vomiting					
Nausea					

13.Fill in the below mentioned food consumption frequency table.

Foods		Never	Every day	1-2 times a week	3-4 times a week	5-6 times a week	Once every 15 days	Once every month or less	Quantity
		CONSUMPTION FREQUENCY							
Fermented dairy products	Milk-whole-fat								
	Milk-semi-skimmed								
	Milk-skimmed								
	Buttermilk drink								
	Pasteurized yogurt								
	Strained yoghurt								
	Probiotic yogurt								
	Fruit yogurt								
	Kephir and kumiss								
	White cheese								
	Kashar cheese								
	Cheese…								
	Quark, cottage etc.								
	Rice pudding, pudding, kazandibi etc. milk puddings								
Other dairy products	Ice cream								
	Cream cake, cake etc. desserts..								

	Bread and other bakery products			73					
	Processed breakfast cereals								
	Dry soup and breakfast drinks								
	Margarine, butter								
	Salad sauces								
	Candies and package snacks								
	Biscuits and cake mixtures								
	Whey, milk by-products, milk powder								

14. If you consume the foods specified in the above-mentioned tables, specify which of the following occurred after consuming these foods.

☐Stomach pain   ☐Diarrhea   ☐Gas
☐Acid reflux   ☐Bloatedness   ☐Abdominal cramp
☐Vomiting   ☐Nausea   ☐None

15. What is the strength of the above-mentioned symptoms?
☐A.Never   ☐B.Low   ☐C.Moderate   ☐D.High   ☐E.Excessive

16. What do you feel when you eat yogurt?

	Never	Low	Moderate	High	Excessive
Stomach pain					
Diarrhea					
Gas					
Bloatedness					
Abdominal cramp					
Vomiting					
Nausea					

17. What do you feel when you consume kephir?

	Never	Low	Moderate	High	Excessive
Stomach pain					
Diarrhea					
Gas					
Bloatedness					
Abdominal cramp					
Vomiting					
Nausea					

18. What do you feel when you eat cheese?

	Never	Low	Moderate	High	Excessive
Stomach pain					
Diarrhea					
Gas					
Bloatedness					
Abdominal cramp					
Vomiting					
Nausea					

19.Lactose intolerance is a carbohydrate absorption disorder that is either congenital or formed as a result of the deficiency of lactate enzyme in the body. It has symptoms such as stomach pain, bloatedness, abdominal cramp, gas, and diarrhea after the consumption of lactose-containing foods such as milk and dairy products. According to this definition, can you say that you have lactose intolerance?

☐A.My lactose intolerance was diagnosed at a health institution previously.
☐B.Yes, I experience the symptoms whenever I drink milk. However, I'm not sure about lactose intolerance.
☐C.The said symptoms sometimes occur. However I'm not sure about lactose intolerance.
☐D.No, I do not have such a disorder.
☐E.Other.

20.If you have the symptoms specified in the above-mentioned definition, how long have you been experiencing their presence?

☐A.Since birth
☐B.Started to feel later
☐C.Started to feel these symptoms after a microbial disease.
☐D.Started to feel these symptoms after a disease related to small intestine.
☐E.Other

21.How do you take precautions when you feel these symptoms when you consume milk and dairy products?

☐A.I don't take any precautions.
☐B.I use drugs upon the recommendation of a doctor.
☐C.I do not consume milk as a precaution but I consume fermented dairy products.
☐D.I never consume any dairy product as a precaution.
☐E.I consume lactose-fee milk and dairy products.
☐F.Other: ……

22.Did you have any knowledge above lactose intolerance previously?

☐A.Yes   ☐B.No

7.2.Approval of Institution

REPUBLIC OF TURKEY
PRESIDENCY OF ISTANBUL AYDIN UNIVERSITY
Directorate of Personnel Department

No: 54167746-903.07.02
Issue: About the Questionnaire permit of Elif Nur SAVCI

TO THE PRESIDENCY OF YEDITEPE UNIVERSITY

Concern: a)Notification dated 08.10.2018 with no. E.180
             b) Notification dated 01.04.2019 with no. 34

Within the scope of the thesis with the title "**The Relationship between Consumptions of Dairy and Fermented Dairy Products in Lactose Intolerance among Students of a Foundation University in Istanbul**" of Elif Nur SAVCI, post-graduate student of Department of Nutrition and Dietetics, Institute of Health Sciences of your University; your request to conduct a questionnaire at our University is found suitable.

Kindly submitted for your information.

e-signed
Prof. Dr. Yadigar İZMİRLİ
Rector

Sayı : 54167746-903.07.02
Konu : Elif Nur SAVCI'nın Anket İzni Hk.

YEDİTEPE ÜNİVERSİTESİ REKTÖRLÜĞÜNE

İlgi : a) 08/10/2018 tarihli ve E.180 sayılı yazı.
b) 01/04/2019 tarihli ve 34 sayılı yazı.

Üniversiteniz Sağlık Bilimleri Enstitüsü Beslenme ve Diyetetik Anabilim Dalı Yüksek Lisans Programı öğrencisi **Elif Nur SAVCI'nın, "İstanbul'daki Bir Vakıf Üniversitesi Öğrencilerinin Süt ve Fermente Süt Ürünleri Tüketiminin Laktoz İntoleransı Üzerine Etkisi"** konulu tezi kapsamında Üniversitemizde anket çalışması yapması talebiniz uygun görülmüştür.
Bilgilerinize saygı ile arz ederim.

e-imzalıdır
Prof. Dr. Yadigar İZMİRLİ
Rektör

7.3.Ethical Approval

REPUBLIC OF TURKEY
USKUDAR UNIVERSITY
DIRECTORATE OF ETHICS COMMITTEE OF
NON-INTERVENTIONAL RESEARCHES

No: 61351342-/2019-84   27.02.2019

Dr. Acad. Hülya DEMİR
(Elif Nur SAVCI)

In the meeting no. 02 of Uskudar University Directorate of Ethics Committee of Non-interventional researches conducted on 27.02.2019, your research project with the title "**The Relationship between Consumptions of Dairy and Fermented Dairy Products in Lactose Intolerance among Students of a Foundation University in Istanbul**" is decided as suitable in terms of ethics.

Kindly submitted for your information.

Assoc. Prof. Cumhur TAŞ
Chairman
of the Directorate of Ethics Committee
of Non-interventional researches

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T.C.
ÜSKÜDAR ÜNİVERSİTESİ
GİRİŞİMSEL OLMAYAN ARAŞTIRMALAR
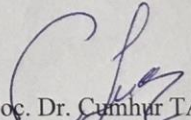**ETİK KURULU BAŞKANLIĞI**

SAYI: 61351342-/ 2019-84   27/02/2019

Sayın Dr.Öğr.Üyesi Hülya DEMİR
(Elif Nur SAVCI)

Üsküdar Üniversitesi Girişimsel Olmayan Araştırmalar Etik Kurulunun 27/02/2019 tarihinde yapılan 02 No.lu toplantısında **"İstanbuldaki Bir Vakıf Üniversitesi Öğrencilerinin Süt Ve Fermente Süt Ürünleri Tüketiminin Laktoz İntoleransı İle İlişkisi"** adlı araştırma projenizin etik açıdan uygun olduğuna karar verilmiştir.

Bilgilerinize rica ederim.

Doç. Dr. Cumhur TAŞ
Girişimsel Olmayan Araştırmalar Etik
Kurulu Başkanı

8.CURRICULUM VITAE

Personal Information

Name	Elif Nur	Surname	Savcı
Place of birth	İSTANBUL	**Birth date**	05.07.1992
Nationality	TR	**TR ID No**	10274257468
E-Mail	dyt.elifnursavci@gmail.com	**Tel**	0555 225 02 31

Educational status

Grade	Area	Graduated from	Year of graduation
Post graduate		Yeditepe University Institute of Health Sciences Department of Nutrition and Dietetics	-
Undergraduate		Yeditepe University Institute of Health Sciences Department of Nutrition and Dietetics	2016
High School	Computational	Maltepe Orhangazi High School	2010

Computer Knowledge

Program	Use skills
Microsoft Office Programs	Good