

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

**THE RELATIONSHIP BETWEEN FOOD
INSECURITY AND OBESITY IN UNIVERSITY
EMPLOYEES**

MASTER THESIS
DIETITIAN SİMGE BAL

İSTANBUL, 2021

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SUPERVISOR
DR. BİNNUR OKAN BAKIR

İSTANBUL, 2021

THESIS APPROVAL

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This study have approved as a Master Thesis in regard to content and quality by the Jury.

	Title, Name-Surname (Institution)
Chair of the Jury:	Dr. Nihan ÇAKIR BİÇER (İstanbul Kültür University)
Supervisor:	Dr. Binnur OKAN BAKIR (Yeditepe University)
Member:	Dr. İrem KAYA CEBİOĞLU (Yeditepe University)

APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated 29.04.2021 and numbered 2021/04-42

Prof. Dr. Bayram YILMAZ
Director of Institute of Health Sciences

DECLARATION

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

16.03.2021

SİMGE BAL



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ABBREVIATIONS

BMI	Body mass index
Cm	Centimeter
CSFS	Center for Studies in Food Security
FAO	Food and Agriculture Organization
FIES	Food Insecurity Experience Scale
HFSSM-SF	Household Food Security Survey Module- Short Form
Kg	Kilogram
M	Meter
NHANES	National Health and Nutrition Examination Survey
SNAP	Supplemental Nutrition Assistance Program
SOFI	The State of Food Insecurity and Nutrition in the World
TEFAP	The Emergency Food Assistance Program
US	United States
USDA	United States Department of Agriculture
WHO	World Health Organization

ABSTRACT

Bal, S., The Relationship Between Food Insecurity and Obesity in University Employees. Yeditepe University, Institute of Health Science, Nutrition and Dietetics Department, Master of Science Thesis, İstanbul, 2021.

Food insecurity is the lack of availability or access to healthy food due to limited resources or insufficient money. It is a nutritional factor associated with obesity in low-income individuals. This study was conducted among 142 employees of a private university between January 2020 and October 2020 to examine the relationship between food insecurity and obesity. Data was collected with Household Food Security Survey Module- Short Form (HFSSM-SF) and anthropometric measurements were recorded as well as socio-demographic characteristics including sex, age, educational and marital status, number of children, income level, and physical activity. 39.4% of the participants were overweight and 21.8% were obese. 64.1% of the individuals were food secure and 35.9% were food insecure. There was no statistically significant relationship between body mass index (BMI) classes and both food accessibility levels and food security status. ($p > 0.05$). There was no statistically significant relationship between waist circumference categories and both food accessibility levels and food security status ($p > 0.05$). There was a weakly significant positive relationship between the BMI and HFSSM-SF score ($r: 0.219$; $p < 0.01$). There was no significant relationship between the HFSSM-SF score and waist circumference (cm) ($p > 0,05$). The findings of this study showed that there was no significant relationship between food insecurity and obesity. However, it was observed that as the BMI of the participants increased, the risk of access to food increased. In addition, food insecurity of employees was found to be substantial. It has utmost importance to carry out the necessary investigations and provide support to prevent the food insecurity experienced by the employees. Studies in larger populations are needed to better understand the level of food insecurity and the relationship between food insecurity and obesity.

Keywords: food insecurity, obesity, BMI, waist circumference, HFSSM-SF

ÖZET

Bal, S., Üniversite Personelinde Besin Güvencesizliği ile Obezite İlişkisi. Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Anabilim Dalı, Yüksek Lisans Tezi, İstanbul, 2021.

Besin güvencesizliği, para ve diğer kaynakların yetersizliği nedeniyle sağlıklı yiyeceklerin bulunamaması veya bunlara erişimin olmaması durumudur. Düşük gelirli bireylerde obezite ile birlikte görülen beslenme ile ilgili bir faktördür. Bu çalışma, besin güvencesizliği ile obezite arasındaki ilişkiyi incelemek amacıyla Ocak 2020- Ekim 2020 tarihleri arasında özel bir üniversitenin 142 idari personeli arasında gerçekleştirilmiştir. Veriler, Hane Halkı Besine Ulaşılabilirlik Ölçeği- Kısa Formu (HFSSM-SF) ile toplanmış ve antropometrik ölçümlerin yanı sıra cinsiyet, yaş, eğitim durumu, medeni durum, çocuk sayısı, gelir düzeyi ve fiziksel aktivite gibi sosyo-demografik özellikler kaydedilmiştir. Katılımcıların %39,4'ünün fazla kilolu ve %21,8'inin obez olduğu saptanmıştır. %64,1'i besin güvenceli ve %35,9'u besin güvencesizdir. Beden kütle indeksi (BKİ) sınıfı ile hem gıdaya ulaşım düzeyleri hem de gıda güvencesi durumu arasında istatistiksel olarak anlamlı bir ilişki yoktur ($p > 0.05$). Bel çevresi sınıfları ile hem gıdaya ulaşım düzeyleri hem de gıda güvenlik durumu arasında istatistiksel olarak anlamlı bir ilişki yoktur ($p > 0.05$). BKİ ile HFSSM-SF skoru arasında zayıf derecede anlamlı pozitif bir ilişki vardır ($r: 0.219$; $p < 0.01$). HFSSM-SF puanı ile Bel çevresi (cm) arasında anlamlı ilişki bulunamamıştır ($p > 0,05$). Bu çalışmanın bulguları, besin güvencesizliği ile obezite arasında anlamlı bir ilişki olduğunu göstermemiştir. Ancak katılımcıların BKİ değeri arttıkça besine ulaşım riskinin de arttığı görülmüştür. Ek olarak, idari personel çalışanın besin güvencesizliğinin azımsanmayacak düzeyde olduğu tespit edilmiştir. Çalışanların yaşadığı besin güvencesizliğini önlemek için gerekli incelemeler yapıp, destek sağlanması büyük önem arz etmektedir. Besin güvencesizliği düzeyini ve besin güvencesizliği ile obezite arasındaki ilişkiyi daha iyi anlamak için daha geniş popülasyonlarda çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: besin güvencesizliği, obezite, BKİ, bel çevresi, HFSSM-SF

1. INTRODUCTION AND PURPOSE

Food security occurs when all people always have physical and economic access to adequate, safe, and nutritious food that provides their nutritional needs and food preferences for an active and healthy life (1). Household food security is the family dimension of this definition and individuals in the household are the focus of concern (2). If food is accessible, available in both sufficient quantities and variety, and the household can use (store, cook, prepare and share) food in an appropriate nutritious way, these people become food secure (3). In contrast, food insecurity exists when healthy food is not available or there is a lack of access to healthy food due to insufficient resources and insufficient money (4). Food insecurity and obesity are public health problems that have both personal and environmental effects (5).

Obesity is basically described as a value equal to or above the 95th percentile for children, and body mass index (BMI) is equal to or above 30 kg/m² in adults. Being in the 85th and below the 95th percentile in children and having a BMI equal to or more than 25 kg/m² in adults is defined as overweight (6,7). Obesity is a significant risk factor for non-communicable diseases and a public health problem. The shift of nutrition towards high-fat and energy-dense foods with low physical activity has increased rates of obesity in many countries (8). It increases the risk of diseases including diabetes, cardiovascular disease, and cancer and adverse health consequences such as poor pregnancy outcomes (1).

It is known that there is a strong relationship between food insecurity and malnutrition. In food-insecure households, some members' food intake has decreased, and normal eating habits have deteriorated (9). Diet quality can be affected by food insecurity in different ways. This can potentially lead to overweight and obesity. The food people eat is an important factor that helps to explain this (10). In 1995, Dietz first stated that food-insecure people have an increased risk of obesity (11). Subsequently, many studies have confirmed that food insecurity is associated with increased negative health consequences (7). It has become increasingly evident in recent years, especially in middle and high-income countries, that food insecurity is often linked to overweight and obesity. This has shed light on issues related to diet quality in food security (12).

Especially for low-income people, food insecurity may occur together with obesity (4). One of the explanations of the relationship between food insecurity and obesity is that families with limited resources risk the quality of nutrition in response to high energy intake. Budget constraints can lead to a reduction in the consumption of healthy foods while increasing the purchase of non-nutrient-rich, low-cost, and energy-dense foods (13). Individual and household-level analyzes show that food insecurity negatively affects nutritional quality. Moderate or severe food-insecure people have less meat, less milk, and fewer fruits and vegetables than mild food-insecure people. This indicates that the price and affordability of healthy foods are important factors that affect food security and, therefore, diet quality (10). A systematic review in 2015 which aims to examine the relationship between diet quality, food prices, and dietary costs in 151 studies found that the energy intensity of the diet was inversely correlated with its cost, making fruits, vegetables, and whole grains expensive than processed foods and refined grains (14). Therefore, food insecurity can cause an increasing consumption of energy-dense foods, which may increase the risk of weight gain and potential disease (15). Other situations have also explained the relationship between food insecurity and obesity. These include eating too much when food is available, increased body fat in case of food restriction, decreased lean body muscle mass, increased fat storage in case of food shortages, and finally, psychological problems including depression (5).

In the National Health and Nutrition Examination Survey (NHANES) study conducted with 4667 people aged 18-35 to investigate the relationship between food insecurity and obesity using BMI and waist circumference measurement, food-insecure individuals had higher BMI and higher waist circumference (16). In a study conducted with 66,553 individuals in 12 states of the United States (US), food insecurity was found to be associated with obesity both in most population subgroups and in the general population (5). In another study conducted with 754 university students, the marginal and very low food security status was positively associated with BMI (17).

In the light of this information, it is thought that many interventions can be developed to reach a healthy diet and prevent obesity with the awareness of food insecurity and its relationship with obesity. The aim of this study is to investigate the possible relationship between food insecurity and obesity in university employees.

2. GENERAL INFORMATION

2.1. Food Insecurity

The definition of food insecurity has changed over time. The concept of food insecurity emerged in international food issues debates during the global food crisis in the mid-1970s. Food security was defined at the World Food Summit in 1974: “availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices”(18). Food supply issues, national and international availability of essential foodstuffs, and price stability were the main focus.

In 1983, Food and Agriculture Organization (FAO) broadened the definition to include securing vulnerable people's access to available resources: “ensuring that all people at all times have both physical and economic access to the basic food that they need”.

The World Bank's 1986 “Poverty and Hunger” report revealed the difference between chronic food insecurity resulting from long-standing poverty and low-income, and transitory food insecurity caused by natural events and economic reasons at certain times. This food security concept was developed: “All people always have access to enough food for an active and healthy life”.

Food security was identified as the main problem in the mid-1990s, both at the individual and the global level. There were concerns about protein-energy deficiency. The definition has been extended to include food composition, small nutritional requirements, and nutritional balance for an active and healthy life. Providing food security not only individually but also regionally, nationally, and globally was added to the definition (2).

In 2001, the definition of food security was changed as “Food security is a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.”. On the other hand, food insecurity occurs when there is not enough physical, social, or economic access to food, in contrast to food security (19).

According to Center for Studies in Food Security (CSFS), availability; accessibility; acceptability; adequacy; and agency are five basic food security principles. Availability is the availability of sufficient food to all at all times; accessibility is economical and physical access to food by everyone; adequacy is access to nutritious, safe, and sustainable food; acceptability is the provision of food proper for cultural characteristics in a way that does not harm human dignity and rights; and agency is the institutions that bear the responsibility of food security, determine policies and manage processes in this regard (2).

2.1.1. Factors that Cause Food Insecurity

Food insecurity can be long-term or temporary and affected by situations such as income, employment, and disability. Household income is the key determinant of household food security and has a negative relationship with food security. If food is unavailable or if money is limited to buy food, the risk of food insecurity increases. Therefore, low-income households are more likely to be food insecure than well-off households (20). The food security situation of households is also negatively affected by unemployment. It is becoming difficult to meet basic food needs with high unemployment rates among low-income populations. For example, food insecurity of children whose parents are unemployed may be higher than children with employed parents.

In addition to the financial cost, it is suggested that the cost of time can also affect eating behaviors. For example, the time required to prepare the “Thrifty Food Plan”, a menu plan from the US Department of Agriculture (USDA) that shows ways to limit costs while regulating nutrition, is more than twice the time an average American meal preparer takes (21).

Another issue that affects access to food is neighborhood conditions. An example is that residents in some rural areas and low-income neighborhoods may have difficulty accessing full-service grocery stores and supermarkets. Compared to grocery stores or supermarkets, other stores may have lower quality food and less food despite higher food prices. Long distances between residences and grocery stores or supermarkets also affect access to healthy food. Households in neighborhoods with longer distances to grocery stores and locations with fewer grocery stores are at risk of food insecurity. Limited public transport or the lack of personal vehicles can also make access to food difficult. People

with chronic diseases, disabilities, and some minority groups are also groups that have difficulty accessing healthy food sources (22).

Limited production or deteriorating access to water, land, livestock, agricultural inputs, as well as low agricultural productivity and increasing price also increase household food insecurity (3). Furthermore, the growth of sedentary agricultural societies and the further development of modern agriculture are generally thought to lead to a decrease in the total number of plant species that provide the food needed for humans. Declining diversity in crop types that contribute to food resources around the world is seen as a possible threat to food security (23).

2.1.2. Levels of Food Insecurity

The severity ranges of food insecurity were defined by the USDA in 2006. Food security is divided into two groups. The first is “high food security”, which describes situations where there is no reported problem in accessing food and any food restrictions. The second is “marginal food insecurity”, typically defined for the presence of one or two reports reporting concerns about food availability and food restriction at home, but little or no change in diet and food consumption. These two groups were previously labeled as “food security”.

Food insecurity is also divided into two groups. The first is “low food security”, formerly labeled as “food insecurity without hunger”, which is described for situations where there are few indicators of reduced variety, quality, and desirability of the diet and few or no signs of reduced food consumption. The second is “very low food security”, formerly labeled as “food insecurity with hunger”, defined for cases where there are many indicators of impaired eating patterns and reduced food consumption. Despite the introduction of new labels, the determination of households’ food security methods has not changed (24).

Two indicators based on the Food Insecurity Experience Scale (FIES) can also be used for national and global monitoring purposes. Based on various data sources and methodologies, these indicators offer two different approaches to measure progress towards achieving Sustainable Development Goal 2, which aims to end hunger, ensure food security, improve nutrition, and support sustainable agriculture. According to these

indicators, people with moderate food insecurity typically eat low-quality diets and sometimes have to reduce the amount of food they normally eat during the year. Those with severe levels of food insecurity live without food for days due to a lack of money or other resources (25).

2.1.3. Prevalence of Food Insecurity

According to 2020 The State of Food Insecurity and Nutrition in the World (SOFI) report, the number of people experiencing severe food insecurity is increasing globally, and the number reached 750 million in 2019 (one in ten people in the world). Furthermore, the number of people experiencing moderate food insecurity in 2019 was more than 1.25 billion (16.3% of the world's population). The prevalence of both severe and moderate food insecurity is estimated at %25.9 worldwide. Evaluating the total number of those who experienced severe or moderate food insecurity levels in 2019 is estimated 2 billion people.

In 2019, the prevalence of severe food insecurity in Africa was 19% and the highest among all regions of the world, in Latin America and the Caribbean were 9.6%, in Asia was 9.2%, and in North America and Europe was 1.1% (10). It was reported that an estimated 10.5% of households in the US experienced food insecurity, with a very low food security rate of 4.1% (26).

According to the 2019 Turkey Nutrition and Health Survey, in terms of food security, the frequency of individuals who are worried cannot find enough food because of the inability of the money and other resources in a year is 23.4%; the frequency of those who cannot consume healthy and nutritious food is 22.7%; the frequency of individuals experiencing a decrease in the type of food consumed is 22.8%; the frequency of individuals who have to skip meals is 13.1%; the frequency of those consuming less food than necessary is 16.5%; and the frequency of those who cannot eat despite their hunger is 8.4%. Considering the frequency of not eat due to economic reasons despite being hungry in a year, 42.6% of the individuals responded in some months but not every month. The frequency of those who did not eat a full day in a year caused by lack of money or other resources is 2.6%. The frequency of running out of food in the household is 16.2% (27).

2.1.4. Health Outputs of Food Insecurity

Food insecurity, which has become an important health problem, is a social determinant of health that is not well recognized. In food-insecure households, some members' food intake has decreased and normal eating habits have deteriorated (9). People who experience food insecurity generally do not consume nutritious diets. Dietary diversity is low, especially for young children and pregnant and breastfeeding women, and they suffer from chronic malnutrition because they do not ingest vitamins, minerals, protein and fat in their diets (3). These conditions can lead to the development of diabetes, hypertension, heart disease, obesity, and other chronic diseases (28). Mental health problems, physical health issues, depression, severe chronic illness, and poor health status can also occur among food-insecure adults (29).

Due to food insecurity, some households may find it difficult to manage chronic diet-related conditions. One example is that patients with type 2 diabetes have difficulty purchasing foods such as vegetables, whole grains, and lean proteins, and have to replace them with cheap foods, foods that contain high-calorie, and are not nutritious (for example, foods high in refined carbohydrates). Furthermore, low-income families may delay the necessary medical care to purchase food or due to budget constraints cannot take medication (30,31). This may result in hospitalizations and therefore, additional expenses (32–34). In others, there may be a decrease in calorie intake due to insufficient money. Due to this condition resulting in malnutrition, the duration of hospital stay may be prolonged, response to treatment may decrease and the risk of postoperative infection may increase (28,35).

There are also many demonstrated negative health consequences for children associated with food insecurity. Food-insecure children have a higher risk for anemia, some birth defects, lower food intake, more cognitive problems (36), a higher probability of behavioral problems, a higher possibility of asthma, a higher levels of aggression, a higher possibility of hospitalization, and more oral health problems (29). Moreover, adults and children with very low food security have shorter life expectancy than households with low food security and food security (37,38).

The food intake of the elderly with food insecurity is generally lower. They are more likely to be unhealthy and more likely to have limitations in daily living activities (29).

2.2. Food Insecurity and Obesity

2.2.1. Definition, Pathogenesis and Prevalence of Obesity

Obesity is a chronic disease that impairs health with abnormal and excessive body fat, can cause long-term health complications and shorten the life span (39). Currently, BMI and waist circumference are the two criteria used to classify obesity (40). Obesity is defined as a BMI that exceeds 30 kg/m² and is subclassed into class 1 (30–34.9 kg/m²), class 2 (35–39.9 kg/m²), and class 3 (≥ 40 kg/m²) (39) and overweight defined as BMI is equal to or greater than 25 kg/m² (7). It is stated that as BMI increases, health complications caused by excessive body fat also increase. In addition, it has been suggested that abdominal fat accumulation, measured by waist circumference, is a better indicator of obesity than BMI to examine its association with metabolic syndrome, type 2 diabetes, and cardiovascular disease. Furthermore, waist circumference has been reported to increase at a faster rate than BMI (40). For these reasons, examining both BMI and waist circumference together can better define the high-risk obesity phenotype than BMI or waist circumference alone (39).

The cause of obesity is multifactorial and complex. It develops because of chronic energy imbalance. It is then maintained by consistently high energy intake to sustain higher energy requirements acquired. The interaction of biological (including genetic and epigenetic), behavioral, environmental (including chronic stress), and social factors takes part in the energy balance and fat stores regulation. Energy-dense diets, increasing portion sizes, decreased physical activity, sedentary lifestyle, and eating disorders play an important role in the development of obesity. The presence of these factors can result in changes in the structure of adipose tissue (hypertrophy and hyperplasia of adipocytes, inflammation) and secretion. It has been reported that cultural and environmental effects have caused a large and rapid increase in obesity prevalence in the last 30 years.

According to the World Health Organization (WHO), obesity is becoming a more critical health problem than malnutrition and is the biggest chronic health problem for

adults (41). Excessive fat, location and distribution of adiposity, and genetic, biological, environmental, and socioeconomic factors can cause some complications. Diseases such as gallbladder disease, nonalcoholic fatty liver disease, type 2 diabetes, and gout can be caused by excessive fat and it can cause changes in glucose and fat metabolism, increasing the risk of cardiometabolic disease and cancer, resulting in a 6 to 14-year shortened disease-free period and life expectancy. Also, obesity increases the risk of kidney, colon, esophagus, endometrium, and post-menopausal breast cancers. Regardless of diet, it is considered that 20% of all cancers may be caused by obesity (39).

According to WHO, more than 1.9 billion adults aged 18 and over were overweight in 2016 and more than 650 million of them were obese. The worldwide prevalence of obesity nearly tripled between 1975 and 2016. In 2016, 11% of men and 15% of women in the adult population of the world, approximately 13% in total, were reported as obese.

According to the 2010 Turkey Nutrition and Health Survey data, the prevalence of obesity in the age group 19 and over is 30.3% (Men: 20.5%; Women: 41.0%) and the prevalence of morbid obesity (BMI: 40 kg/m^2) is 2.9% (Men: 0.7%, Women: 5.3%) (42).

2.2.2 Relationship Between Food Insecurity and Obesity

Although the relationship mechanisms between obesity and food insecurity are not clearly explained, one of the suggested mechanisms is that people with food insecurity still have an energy intake that exceeds their daily needs despite consuming nutritionally inadequate diets (15). In addition, the existence of a causal function of food insecurity in the development of obesity and what these mechanisms could be, if any, have not been clearly understood (9).

There are some hypotheses proposed to explain food insecurity and obesity. The first is that food insecurity is associated with obesity due to the energy-dense, delicious foods intake by populations with food insecurity, and the second is that populations with low food security have limited knowledge, time, and resources to experience healthy eating and exercise. As an explanation for the relationship between obesity and food insecurity, both hypotheses have been reported to be descriptive but not having the strength of evidence or mechanistic. Because for real weight gain, energy intake must be

longer than long-term and chronically energy expenditure. Physiologically, there is a system resistant to the weight change. Thus, increased intake of energy-dense foods in food-insecure populations or decreased physical activity documents important parts of this mechanism but is not accepted as a demonstrative mechanistic explanation (43).

In a review elucidating the conditions that could cause food insecurity to lead to obesity, five main mechanisms are presented explaining how food insecurity in low- and middle-income countries is linked to obesity and overweight. These are temporal and spatial access to nutritious food, an inappropriate amount and variety of food consumed, purchasing energy-intensive processed foods, interpersonal food selection and distribution, lack of appropriate dietary behavior. The lower cost of energy-dense, processed foods is the main cause they are consumed. Therefore, the main mechanism that food insecurity leads to obesity in low and middle-income countries has been explained as the ability to purchase high-energy, processed foods for people living in these countries. Income and food prices were cited as the crucial factors affecting the supply of those foods. It has been suggested in three ways that the amount and variety of food consumed in individuals with food insecurity are related to obesity. First, dietary changes in the intake of high-energy foods compared to nutritious foods led to weight gain. Second, overconsumption periods caused by insufficient food consumption can lead to obesity. The third suggested way is through metabolic adaptations that lead to the storage of more body fat due to differences in eating habits. It has also been reported that the factor that may limit an individual's physical access to food is being physically limited. Culturally, the attitude of food consumption is a factor that affects this situation. There is also reported that skipping meals and eating less for increasing food supply may result in overeating when food is obtainable (1). This disordered eating pattern has been associated with obesity.

The low opportunity for physical activity in food-insecure populations also indicates the link between food insecurity and obesity. One reason for the limited physical activity is that food-insecure households live in low-income neighborhoods. For this reason, the environment in those neighborhoods may not be suitable for healthy activities such as exercise.

Stress is likely to occur in households with food insecurity (9). Food-insecure households can be exposed to many stress factors. These include financial and emotional stress factors caused by food insecurity, lack of access to healthcare, and the pressure to meet financial costs due to low income. Links between obesity and financial stress have been established between young people and adults (44). Therefore, stress has been classified as a potential pathway.

Lack of access to healthcare is another mechanism that explains the relationship between food insecurity and obesity. Especially, women are less likely to seek preventive care and health education when they do not have health insurance. Lack of regular health care can increase the risk of overweight being undiagnosed and can cause BMI to reach obesity levels (9).

It is important to understand why and how weight gain occurs in cases of food insecurity and to clarify whether food insecurity will cause a chronic change in the homeostatic pattern of energy balance. Mechanisms to be explained in this way can contribute to more effective and causal interventions (43).

3. MATERIALS AND METHODS

3.1. Place and Time of the Study

This study was conducted at Yeditepe University employees between January 2020 and October 2020 to examine the relationship between food insecurity and obesity.

3.2. The Universe and the Sample of the Research

This study was conducted with 162 voluntary participants working as employee at Yeditepe University without a specific sampling method. Among the individuals participating in the study, a total of 20 individuals with chronic diseases that require dietary restriction and disease that cause obesity and who were pregnant, lactating, and menopausal were excluded from the study.

Ethical approval was obtained from the Ethics Committee of Yeditepe University for the study on 31.12.2019.

3.2.1. Inclusion Criteria for the Research

- Being volunteer
- To be affiliated to the administrative staff of Yeditepe University
- Being between the ages of 18-65
- Pre-menopause for women
- Not being pregnant/not lactating
- Not having a disease like hypothyroid that can trigger obesity
- Not having a disease like diabetes that require a specific dietary restriction

3.2.2. Exclusion Criteria for the Research

- Not being volunteer
- Not to be affiliated to the administrative staff of Yeditepe University
- To be younger than 18 and older than 65 years of age
- Menopause for women
- Being pregnant / Lactating
- Having a disease like hypothyroid that can trigger obesity
- Having a disease like diabetes that require a specific dietary restriction

3.3. General Plan of The Research

The questionnaire form was applied by the researcher through face-to-face interviews to the individuals who accepted to participate in the study. Participants' socio-demographic characteristics (sex, age, educational status, marital status, number of children, income level, physical activity status) were questioned. Physical activity level was questioned at medium intensity for 150 minutes per week recommended by the WHO (45). Household Food Security Survey Module- Short Form (HFSSM-SF) was applied to evaluate food security. Anthropometric information of individuals (height, body weight, waist circumferences) were measured. BMI was calculated as kg/m^2 .

3.3.1. Household Food Security Survey Module- Short Form (HFSSM-SF)

HFSSM-SF was developed by researchers at the National Center for Health Statistics (46). The validity and reliability studies HFSSM-SF in Turkish were obtained by Gülsüm Öztürk Emiral, Muhammed Fatih Onsuz, Selma Metintaş (47).

HFSSM-SF is consisted of 6 items questioning sufficiency of food intake in the previous 12 months, attainment of balanced meals, and occurrence of skipping meals despite being hungry because of economic deficiency. Participants were asked to answer the questions from the options: "Often True", "Sometimes True", "Never True", "Do not know" or "Refused" for items 1, 2 and 4 and "Yes", "No" or "I don't know" for items 3, 5, and 6. If the participant marked "Often True" for the items 1, 2, 4 and "Yes" for the items "3, 5, and 6", it was scored 1 point and for other options it was scored "0". The score from the scale ranged from 0 to 6. If the score was "0" it was interpreted as "high food security"; if the score was "1", it was interpreted as "marginal food security (there was a risk for accessibility to food)"; if the score was "2-4" it was interpreted as "low food security (no access to food, but this situation was not accompanied by hunger)"; and if the score was "5-6" it was interpreted as "very low food security (food was not attainable and this was accompanied by moderate hunger)" (47).

3.3.2. Evaluation of Anthropometric Measurements

The body weight(kg) of the participants was weighed as without shoes, metal items, wallets, keyrings, telephones, etc. on flat and hard ground by the researcher.

Height(cm) measurement was made while the individuals were in the upright position and the head was in the Frankfort plane, the heels, hip and back were based on the wall and their feet were adjacent to the wall from the heels by the researcher.

BMI was calculated with $\text{weight}/(\text{height})^2$. 18.5-24.9 kg/m² normal weight; 25-29.9 kg/m² overweight; ≥ 30 kg/m² obese were classified (48).

Before taking waist measurements, individuals were asked to remove clothes and clothing that would hinder the measurement. Participants' waist circumference was measured at the approximate midpoint between the bottom of the last palpable rib and the top of the iliac crest ≥ 102 cm (men) and ≤ 88 cm (women) considered as in increased risk (49).

Due to the emergence of the Covid-19 pandemic while collecting the data of the study, the height and body weight of some of the participants were taken with the statements of the people, and the waist circumference of some participants was not measured. For this reason, the waist circumference of 79 people was obtained in the study.

3.4. Statistical Evaluation of The Data

Statistical Package for the Social Sciences software 22 program was used to analyzes the data. Numerical variables were evaluated with mean, minimum-maximum (min-max) values and categorical variables with frequency (n) and percentages (%). The suitability of the numerical data for normal distribution was tested by Shapiro-Wilk test and graphical evaluations. Chi-square test was used to describe the relationship between two qualitative variables. Spearman Correlation Analysis was also used to evaluate the relationships between independent variables. The confidence interval for all analyzes were 95% and the results were considered statistically significant for $p < 0.05$.

4. RESULTS

This study was conducted with 162 employees, 82 (50.6%) women and 80 (49.4%) men, who were between the ages of 18-65 working as employee at Yeditepe University. A total of 20 participants who required dietary restriction and had chronic diseases that trigger obesity and who were pregnant, menopausal, and lactating women were excluded from the study, thus 142 individuals were evaluated from a total of 162.

Distribution of chronic disease requiring dietary restriction, chronic disease triggering obesity and other of the individuals who were eliminated from the study shown in Table 4.1.

Table 4.1. Distribution of Chronic Disease Requiring Dietary Restriction, Chronic Disease Triggering Obesity and Other of the Individuals

	Women		Men		Total	
	n	%	n	%	n	%
Chronic Disease Requiring Dietary Restriction	3	3.7	3	3.8	6	3.7
Chronic Disease Triggering Obesity	6	7.3	1	1.3	7	4.3
Other	11	13.4	0	0.0	11	6.8

Table 4.2 shows the age distribution of the individuals participating in the study. According to these distributions, the age of the individuals varies between 21 and 63 and the mean age of the individuals is approximately 37.

Table 4.2. Distribution of the Ages of the Individuals

	Min.	Max.	Mean	Sd.
Age	21	63	37.21	7.860

Table 4.3 shows the distributions of the demographic characteristics of the individuals participating in the study. Accordingly, 31.5% of individuals were single and 68.5% were married, 47.9% of the individuals did not have children, 21.5% of individuals had 1 child, 21.5% had 2, 9.9% had 3 and more children.

16.9% of the individuals participating in the study were primary school graduates, 10.6% were secondary school graduates, 19.7% were high school graduates and 52.8% were university graduates.

According to the distribution of income level, it is seen that 11.3% of the individuals' income were more than their expenditure, 45.1% of them had less than their expenditure and 43.6% had equal to their expenditure. When examined in detail, it is seen that the majority of women's income was less than the expenditure, while the income of men was generally equal to its expenditure.

Table 4.3. Distribution of Demographic Characteristics of Individuals

		Women		Men		Total	
		n	%	n	%	n	%
Marital Status	Single	27	40.9	24	31.6	51	31.5
	Married	39	59.1	52	68.4	91	68.5
Number of children	No Child	30	45.4	38	51.3	68	47.9
	1	16	24.2	14	18.9	30	21.1
	2	18	27.3	12	16.2	30	21.1
	3 and more	2	3.0	10	13.5	14	9.9
Educational Status	Primary School Graduate	8	12.1	16	21.1	24	16.9
	Secondary School Graduate	6	9.1	9	11.8	15	10.6
	High School Graduate	7	10.6	21	27.6	28	19.7
	University Graduate	45	68.2	30	39.5	75	52.8
Income Level	Income More Than Expenditure	3	4.5	13	17.1	16	11.3
	Income Less Than Expenditure	36	54.5	28	36.8	64	45.1
	Income Equal with Expenditure	27	40.9	35	46.1	62	43.6

Table 4.4. shows the distributions whether the individuals participating in the study were physically active or not. According to these distributions, it is understood that 33.1% of individuals had physical activity and 68.9% did not have physical activity. According to the distributions of duration of physical activity, 65.3% of the individuals who do physical activity expressed that they have less than 150 minutes per week and 34.7% of them at least 150 minutes per week.

Table 4.4. Distribution of Physical Activity Status of Individuals

		Women		Men		Total	
		n	%	n	%	n	%
Doing Physical Activity	Yes	21	31.8	26	34.2	47	33.1
	No	45	68.2	50	65.8	95	68.9
Physical Activity Duration	<150 minutes per week	11	16.7	21	27.6	32	65.3
	≥ 150 minutes per week	10	15.2	7	9.2	17	34.7

According to the distributions in Table 4.5., 38.7% of the individuals had a BMI between 18.5 -24.9 kg/m², 39.4% had between 25-29.9 kg/m² and 21.8% of them had a greater BMI value than 30 kg/m². According to this information, BMI value of the majority of the individuals was between 25-29.9 kg/m². It is seen that 51.9% of the individuals participating in the study had normal waist circumference and 48.1% had high waist circumference.

Table 4.5. Distribution of BMI Classification and Waist Circumference of the Individuals

		n	%
BMI	18.5-24.9 kg/m ²	55	38.7
	25-29.9 kg/m ²	56	39.4
	≥30 kg/m ²	31	21.8
Waist Circumference	Normal	41	51.9
	High	38	48.1

Table 4.6 shows the distribution of individuals' access to food and their food security status. According to these distributions, 38.7% of individuals had access to food, 25.3% of them had a risk in access to food, 26.0% of them were not able to reach food but hunger was not accompanied and 10.1% of them cannot reach food and were in moderate hunger. According to these distributions, 64.1% of the individuals were food secure and 35.9% were food insecure.

Table 4.6. Distribution of Individuals' Access to Food and Food Security Status

		n	%
Access to Food	Food is accessible (High food security)	55	38.7
	There is a risk for accessibility to food (Marginal Food Security)	36	25.3
	No access to food, but this situation was not accompanied by hunger (Low food security)	37	26.0
	Food was not attainable and this was accompanied by moderate hunger (Very low food security)	14	10.1
Food Security Status	Food Secure	91	64.1
	Food Insecure	51	35.9

The distribution of food security status according to the demographic characteristics of the individuals is given as number and percentage values in Table 4.7. 40.7% of food-secure individuals were single, 59.3% were married; 27.5% of food-insecure individuals were single and 72.5% were married. There was no significant relationship between food security status and marital status of individuals ($p > 0.05$).

54.9% of food-secure individuals did not have children, 22% of them had 1 child and this is followed by 16.5%, 6.6% with 2 and 3 and more children, respectively. While 35.3% of food-insecure individuals had no children, 19.6% had 1 child and 29.4%, 15.7% had 2, 3 and more children, respectively. It was observed that the food security rates of

individuals decreased as their child number increased. A statistically significant relationship was found between food security and number of children ($p < 0.05$).

When the education status of individuals with food security is examined, 6.6% were primary school graduates, 11.0% were secondary school graduates, 18.7% were high school graduates, and 63.7% were university graduates. It was observed that the food security rates of individuals increased as their education level increased. 35.3% of individuals without food insecurity were primary school graduates, 9.8% were secondary school graduates, 21.6% were high school graduates, and 33.3% were university graduates. A statistically significant relationship was found between food security status and education level ($p < 0.001$).

The income of 11% of food-secure individuals was more than their expenses, the income of 52.7% was equal to their expenses, and the income of 36.3% was less than their expenses. The income of 11.8% of the food-insecure individuals was more than their expenses, the income of 27.5% was equal to their expenses, and the income of 60.8% was less than their expenses. It was observed that the food insecurity rate increased as the income level decreased. A statistically significant relationship was found between food security and income level ($p < 0.05$).

There was no significant relationship between food security status and physical activity and duration of physical activity ($p > 0.05$).

Table 4.7. The Relationship Between Demographic Characteristic and Food Security

		Food Secure		Food- Insecure		Sig.
		n	%	n	%	P*
Marital Status	Single	37	40.7	14	27.5	,115
	Married	54	59.3	37	72.5	
Number of children	No Child	50	54.9	18	35.3	,045
	1	20	22.0	20	19.6	
	2	15	16.5	15	29.4	
	3 and above	6	6.6	8	15.7	
Educational Status	Primary School Graduate	6	6.6	18	35.3	,000
	Secondary School Graduate	10	11.0	5	9.8	
	High School Graduate	17	18.7	11	21.6	
	University Graduate	58	63.7	17	33.3	
Income Level	Income More Than Expenditure	10	11.0	6	11.8	,010
	Income Less Than Expenditure	33	36.3	31	60.8	
	Income Equal with Expenditure	48	52.7	14	27.5	
Doing Physical Activity	Yes	30	33.0	17	33.3	,965
	No	61	67.0	34	66.7	
Physical Activity Duration	< 150 minutes per week	20	64.5	12	66.7	,879
	≥ 150 minutes per week	11	35.5	6	33.3	

Pearson Chi-square test.

*p< 0.05 is accepted as statistically significant.

The relationship between the BMI classification and Level of Access to Food of the individuals participating in the study is examined in Table 4.8. It was found that there was no statistically significant relationship between BMI classification and food accessibility levels ($p > 0.05$)

Table 4.8. The Relationship Between BMI Classification and Level of Access to Food of Individuals

		Food is accessible	There is a risk for accessibility to food	No access to food, but this is not accompanied by hunger	No access to food and this is accompanied by moderate hunger	Sig.
		n - %	n - %	n - %	n - %	P*
BMI	18.5- 24.9 kg/m ²	23- 41.8	16- 44.4	15- 28.1	1- 7.1	,079
	25- 29.9 kg/m ²	25- 45.5	12- 33.3	11- 29.7	8- 57.1	
	≥ 30 kg/m ²	7- 12.7	8- 22.2	11- 29.7	5- 35.7	

Pearson Chi-square test.

*p< 0.05 is accepted as statistically significant.

The relationship between the BMI classification and Food Security Status of the individuals participating in the study is examined in Table 4.9. It is observed that there was no statistically significant relationship between individuals' BMI classification and their food security status (p> 0.05).

Table 4.9. The Relationship Between BMI Classification and Food Security Status of Individuals

		Food Secure	Food-insecure	Sig
		n - %	n - %	P*
BMI	18.5-24.9 kg/m ²	39- 42.9	16- 31.4	,104
	25-29.9 kg/m ²	37- 40.7	19- 37.3	
	≥30 kg/m ²	15- 16.5	16- 31.4	

Pearson Chi-square test.

*p< 0.05 is accepted as statistically significant.

The relationship between Waist Circumference Classification and Level of Access to Food of the individuals participating in the study is examined in Table 4.10. There was

no statistically significant relationship between Waist Circumference Classification and Level of Access to Food ($p > 0.05$).

Table 4.10. The Relationship Between Individuals' Waist Circumference Classification and Level of Access to Food

		Food is accessible	There is a risk for accessibility to food	No access to food, but this is not accompanied by hunger	No access to food and this is accompanied by moderate hunger	Sig.
		n - %	n - %	n - %	n - %	P*
Waist Circumference Classification	Normal	17- 60.7	10- 52.6	11- 52.4	3- 27.3	,314
	High	11- 39.3	9- 47.4	10- 57.6	8- 72.7	

Pearson Chi-square test.

* $p < 0.05$ is accepted as statistically significant.

The relationship between Waist Circumference Classification and Food Security Status of the individuals participating in the study is examined in Table 4.11. There was no statistically significant relationship between Waist Circumference Classification and Food Security Status ($p > 0.05$).

Table 4.11. The Relationship Between Individuals' Waist Circumference Classification and Food Security Status

		Food Secure	Food Insecure	Sig.
		n - %	n - %	P*
Waist Circumference Classification	Normal	27- 57.4	14-43.8	,232
	High	20- 42.6	18-56.3	

Pearson Chi-square test.

* $p < 0.05$ is accepted as statistically significant.

The relationship between the participants' HFSSM-SF Score and BMI value(kg/m^2) is examined in Table 4.12. According to the results of the analysis using

Spearman's rho correlation test, a weakly significant positive relationship was found between the BMI and HFSSM-SF score ($r: 0.219$; $p < 0.01$).

Table 4.12. The Relationship Between Participants' HFSSM-SF Score and BMI

		HFSSM-SF Score	BMI
HFSSM-SF Score	r	1.000	.219**
	p		.009
BMI	r	.219**	1.000
	p	.009	

** . Correlation is significant at the 0.01 level (2-tailed).

The relationship between the participants' HFSSM-SF Score and Waist Circumference(cm) is examined in Table 4.13. According to the results of the analysis using Spearman's rho correlation test, no significant relationship was found between the HFSSM-SF score and Waist Circumference ($p > 0,05$).

Table 4.13. The Relationship Between Participants' HFSSM-SF Score and Waist Circumference

		Waist Circumference	HFSSM-SF Score
Waist Circumference	r	.000	.156
	p		.169
HFSSM-SF Score	r	.156	1.000
	p	.169	

5. DISCUSSION

Food insecurity is a nutritional factor associated with obesity in low-income individuals (4). A limited budget reduces the consumption of healthy foods such as fruits and vegetables. Therefore, there can be an increase in the supply of less costly energy-dense foods that are not nutritious. As a description for the link between food insecurity and obesity, households with limited resources prefer the high energy they receive over their nutritional quality (13). This study was conducted to examine the relationship between food insecurity and obesity. In this study, 64.1% of the participants were food secure and 35.9% were food insecure. According to the level of food security, 38.7% of the participants have high food security (there is access to food), 25.3% have marginal food security (there is a risk in accessing food), 26% have low food security (no access to food but hunger is not accompanied.), 10.1% with very low food security (no access to food and moderate hunger accompanying).

5.1. Discussion of Findings Related to Demographic Characteristic and Food Security

It has been stated that food insecurity is associated with a lack of food as well as social problems involving a combination of socioeconomic and demographic variables (50).

In this study, a significant relationship was found between the number of children and food security ($p < 0.05$). The relationship between the number of children in the household and food insecurity may be due to the increase in the amount of food consumed by each child as much as the number of children. In addition, as the number of children increases, food costs will also increase. Therefore, food-insecure households may have difficulties in accessing food. In a study designed to determine the prevalence of food security situation and associated factors in Iran, food insecurity was associated with the number of household members. Participants with a household size of less than 3 were found to have significantly more food secure than those with a household size greater than 3 (51).

In terms of nutritious food, price and affordability are among the most critical barriers to accessing food. Better salary levels can contribute to stronger financial

resources and thus provide better access to food for families. In this study, statistically significant relationship was found between food security status and income level ($p < 0.05$). Many studies also have reported that low income levels of households living in urban and urban areas increase the risk of food insecurity (52–55). Low-income households have been found to be unable to access diets rich in healthy foods, including fresh fruit, vegetables, and legumes. Ultra-processed products have a long shelf life, most are ready-to-eat and relatively inexpensive. Therefore, they consume higher amounts of sugar, fat, and highly processed foods with high energy density, which they have more access to. This phenomenon is often described as the "nutritional transition" and it is crucial to stress that these consequences are linked to socioeconomic problems (56).

It is reported in SOFI 2020 data that diets containing healthy foods cost 60% more expensive than those that just meet the needs of basic foods and five times more than diets that meet dietary energy with raw starch supplies (10).

In this study, statistically significant relationship was found between food security and educational status ($p < 0.01$). Many studies on food insecurity also have reported a positive association between food insecurity and low educational status (50,57–61). For example, in a study conducted to examine whether neighborhood conditions affect the household food security status differently depending on the individual or family characteristics of the residents, it was observed that the food insecurity of the neighborhood education and the food security of the neighborhood spread similarly. In addition, it was determined that fewer food-insecure households' children live in neighborhoods where people with a high bachelor's degree live. As a result of the study, among the low-middle income sample, the family with a high level of education faced the lowest risk of food insecurity in the neighborhoods with the highest education. Furthermore, among families living in the same neighborhood, families with low levels of education had a significantly higher risk of food insecurity than those of more educated families (55).

Improvements in education also provide opportunities for better employment and therefore increase the level of food security (61). As cognitive abilities develop due to higher education levels, access to information that can improve the quality of life of all family members may increase (50).

5.2. Discussion of Findings Related to Anthropometric Measurements and Food Security

BMI is the most commonly used tool in determining obesity. However, this method cannot distinguish between fatty and lean mass. Waist circumference, a way of assessing abdominal obesity, has been cited as a more accurate method for measuring body composition and predicting obesity-related health risk (16). Therefore, both BMI and waist circumference measurements were used in the present study for the assessment of obesity.

In many studies, it has been determined that individuals with food insecurity have high BMI and waist circumference values (15,57,59,61–63). For example, a significant relationship was found between food insecurity and obesity in a cross-sectional study conducted to examine obesity and food security with 683 second year students from 8 different universities. In the study, food insecurity was specified as a significant predictor of obesity, and the trend of obesity increased with the degree of food security (15). In another study investigated the relationship between obesity and food security with 250 people in Netherland, food insecurity was associated with obesity. The prevalence of obesity was 23.6% in those with high food security and 57.9% among those with very low food security. 25.1% of food secure participant, and 42.9% of food insecure participants were obese (57). In a study conducted to examine the relationship between health and nutritional status and food insecurity, it was determined that individuals with food insecurity have higher waist circumference values compared to individuals with food security (61). In another study examining food insecurity and adiposity, a significant relationship was found between food security and waist circumference (63).

In addition, there are studies reporting that there is no relationship between food insecurity and BMI (61,64,65). In this study, there was no statistically significant relationship between BMI and both food accessibility levels and food security status ($p > 0.05$). Furthermore, there was no significant relationship was found between the HFFSM-SF score and Waist Circumference ($p > 0.05$) and no statistically significant relationship between Waist Circumference Classification and Food Security Status ($p > 0.05$). This result is consistent with some recent studies. For example, in a study, food security was not associated with obesity as a result of a study conducted with 212 food

pantry clients, in which BMI classification also was used as an obesity assessment, and wanted to investigate the relationship between obesity and food security (59). In another study investigating whether the prevalence of chronic disease and obesity increases in households with food insecurity, no significant relationship was found between obesity and food security (64). The reason for the lack of a significant relationship between BMI and food security in this study may be the low number of participants. In addition, during the Covid-19 pandemic, the BMI classification made with these data may be inaccurate, as people themselves report their body weight and height. This may have caused an underestimation of the true prevalence of obesity determined according to BMI classification. Since the waist circumference measurement could not be continued due to covid-19, the waist circumference of a small number of people was taken and analyzed. This also may have affected the relationship between waist circumference measurements used for the assessment of obesity and food security status. Additionally, because some participants consume meals free of charge at the university cafeteria, the assessment of access to food may not have given an accurate result.

In this study, the percentage of obesity and overweight according to BMI measurements in food-insecure individuals was 31.4% and 37.4%, respectively. When evaluated according to waist circumference measurements, the rate of obese individuals among food-insecure people is 56.3%. Although there was no relationship between food insecurity and obesity, these findings highlight the coexistence of food insecurity with obesity in low-income households. Moreover, a weakly significant positive relationship was found between the BMI and HFFSM-SF score ($r: 0.219$; $p < 0.01$). This shows that as people experience risks in accessing food increases, their BMI values increase. It has been suggested that in households with risk of access to food, weight gain may occur in several ways. Insufficient consumption and food loss when resources are limited can lead to compensatory overconsumption and lubrication when resources are sufficient. High-calorie, low-cost foods consumed by those who are food-insecure are generally more accessible foods (66). In addition to these, insufficient physical activity, low education level and stress factors can cause an increase in body weight in individuals who are food insecure.

Recently, people living in households who have marginal food security (risk of access to food) but generally classified as food security also face malnutrition. In the

survey conducted in this study, those with marginal food security in compliance with the guidelines were accepted as food secure (67). However, some studies show that individuals with marginal food security may also have obesity and other health problems resulting from this situation (17,22,68). It is therefore essential to have a clear understanding of marginal food security. Without a clear understanding of marginal food security, the possibility of underestimating the negative health consequences associated with the lack of regular access to adequate food resulting from marginal food insecurity may increase (67).

There are many nutritional assistance programs implemented in the world in order to increase people's food access and prevent food insecurity. For instance, the Supplemental Nutrition Assistance Program (SNAP), the most comprehensive support program in the US aims to supplement households with the money they need to buy food. People who want to benefit from this program must be below a certain income level. With the cards given to those who are eligible to participate in the program, those people can buy food and plants for both home use and production (69). It was reported that the food insecurity rate of households participating in this program was 30% less than those who did not (28). Another example of assistance program is The Emergency Food Assistance Program (TEFAP). This program aimed to support the diet of low-income or unemployed Americans for free. The State Distribution Agencies distribute nutritious food to those who are eligible to participate in the program (70).

Although no relationship was found between food insecurity and obesity in this study, the high level of food security among employees, regardless of obesity, indicates that these people need nutritional assistance. In order to prevent food insecurity of such employees, the food security status of the people working in institutions and the factors that cause food insecurity should be determined. To achieve this, the first thing to do should be to provide information about food insecurity in the institutions. For this reason, experts should be informed about food insecurity, the factors causing food insecurity and the negative consequences of food insecurity, and awareness on this issue should be increased, at both institutional and individual levels. Then, depending on the underlying cause of food insecurity, support should be provided by the state or institution to prevent food insecurity. If people are eating in the canteen during their working hours, the meals should be nutritious, safe and in sufficient quantity. In addition, each institution or the

state must provide nutritional assistance to employees according to their household characteristics and needs or provide adequate financial assistance to meet their nutritional needs. Such supports can contribute to preventing food insecurity in institutions and the society.

There are several limitations in this study. First, it was not possible to work with all Yeditepe University staff due to Covid-19 and time constraints. Therefore, due to the nature of the sample, it may have affected the findings on the relationship between food insecurity and obesity. Secondly, the questions in the questionnaire are questions that some participants have difficulty in answering. Some participants answered hesitantly, while others refrained from giving the correct answer, especially when examining the cases of reducing the amount of meals, skipping meals and not eating despite being very hungry, especially because of the lack of money.

In conclusion, the results of this study show that there is no significant relationship between food insecurity and obesity. However, it was observed that as the BMI of the participants increased, the risk of access to food increased. In addition, food insecurity and the percentage of obese among food-insecure individuals of administrative staff was found to be substantial. It has utmost importance to carry out the necessary investigations and provide support to prevent the food insecurity experienced by the employees. Studies in larger populations are needed to better understand food insecurity and its relations with obesity.

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7. APPENDICES

APPENDIX 1: Ethical Approval

APPENDIX 2: Informed Consent Form

APPENDIX 3: Questionnaire Form

APPENDIX 4: Household Food Security Survey Module- Short Form



APPENDIX 1: Ethical Approval



Sayı: 37068608-6100-15- 1796
Konu: Klinik Araştırmalar
Etik kurul Başvurusu hk.

31/12/2019

İlgili Makarna (Simge Bal)

Yeditepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Dr. Öğr. Üyesi Binnur Okan Bakır'ın sorumlu araştırmacı olduğu “Üniversite Personelinde Besin Güvencesizliği İle Obezite İlişkisi” isimli araştırma projesine ait Klinik Araştırmalar Etik Kurulu (KAEK) Başvuru Dosyası (1780) kayıt Numaralı KAEK Başvuru Dosyası, Yeditepe Üniversitesi Klinik Araştırmalar Etik Kurulu tarafından 30.12.2019 tarihli toplantıda incelenmiştir.

Kurul tarafından yapılan inceleme sonucu, yukarıdaki isimi belirtilen çalışmanın yapılmasının etik ve bilimsel açıdan uygun olduğuna karar verilmiştir (KAEK Karar No: 1140).

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

APPENDIX 2: Informed Consent Form

	KLİNİK ARAŞTIRMALAR ETİK KURULU BİLGİLENDİRİLMİŞ GÖNÜLLÜ OLUR FORMU	TARİH: VERSİYON:
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Sayın Katılımcı,

Aşağıdaki detayları verilen çalışmaya katılmayı kabul ettiğiniz takdirde kabul ettiğinize dair imzalayarak lütfen
ekteki anketi doldurup araştırmacıya teslim ediniz.

Dyt. Simge Bal

Araştırmanın Adı: Üniversite Personelinde Besin Güvencesizliği ve Obezite İlişkisi

Araştırmanın Konusu: Bu çalışmada üniversite personelinin besin güvencesizliği varlığı ve varsa obezite ile ilişkili olup olmadığı araştırılacaktır.

Araştırmanın Kapsamı: Obezite ve besin güvencesizliği, hem bireysel hem de çevresel seviyede etkili bir halk sağlığı konusudur(Pan, L. Ve ark.,2012) Besin güvencesi tüm insanların aktif ve sağlıklı bir yaşam için diyet gereksinimlerini ve besin tercihlerini karşılayan yeterli, güvenli ve besleyici gıdalara her zaman fiziksel ve ekonomik açıdan erişebilmesi durumudur (Farrell P. Ve ark., 2017). Buna karşılık, besin güvencesizliği, para ya da diğer kaynakların yetersizliği nedeniyle sağlıklı besinin bulunmaması ya da sağlıklı besine erişilememesidir. (Hernandez, D.C., ve ark., 2017).

Obezite temel bir halk sağlığı problemi ve bulaşıcı olmayan hastalıklar için önemli bir risk faktörüdür. Düşük fiziksel aktivite ile birlikte yüksek yağ ve enerji yoğunluklu gıdalara kayan beslenme değişiklikleri birçok ülkede obezite oranlarının artmasına katkıda bulunan faktörlerden bazılarıdır (Nikniz L., ve ark., 2017)

Besin güvencesizliği düşük gelirli bireyler arasında obezite ile bir arada bulunan beslenme ile ilişkili bir faktördür(Hernandez, D.C., ve ark., 2017).Besin güvencesizliği ve obezite arasındaki ilişkinin olası bir açıklaması, sınırlı kaynaklara sahip ailelerin besin kalitesinden ödün vererek enerji alımını tercih etmesi yönündedir. Bütçe kısıtlamaları; düşük maliyetli, besinsel açıdan zengin olmayan ve yüksek enerjili gıdaların alımının artmasına , meyve ve sebzeler gibi sağlıklı gıdaların tüketiminin ise azalmasına neden olabilmektedir.(Vedovato, G. M., ve ark.,2016)

Bu çalışmanın amacı Yeditepe Üniversitesi personelinde besin güvencesizliği ve obezite arasındaki ilişkiyi incelemektir.

Araştırmanın Yöntemi: Çalışmada kesinlikle kişisel kimlik bilgileriniz sorulmayacaktır. Araştırmaya katılımanız için sizden herhangi bir ücret istenmeyecek ve katılımanız karşılığında size herhangi bir ücret ödenmeyecektir. Girişimsel hiçbir işlem uygulanmayacaktır. Araştırmacı tarafından katılımcıların beden ağırlığı, boy uzunluğu ve bel çevresi ölçülecek ve Hane Halkı Besine Ulaşılabilirlik Ölçeği-Kısa Formu kullanılarak yüz yüze görüşme yöntemiyle veri toplanacaktır.

Araştırma süresince 24 saat Ulaşılabilirlik kişi adı/ Soyadı / Telefonu: Simge BAL 0535 283 61 20

Bilgilendirilmiş Gönüllü Olur Formundaki tüm açıklamaları okudum. Söz konusu araştırmaya, hiçbir baskı ve zorlama olmaksızın kendi rızamla katılmayı kabul ediyorum.

Adı Soyadı:

İmzası:

Tarih:

Açıklamaları Yapan Kişinin Adı/Soyadı/İmzası/Tarih

Sorumlu Araştırmacı
Binnur Okan BAKIR

Yardımcı Araştırmacı
Simge BAL

APPENDIX 3: Questionnaire Form

GENEL BİLGİLER

1) Cinsiyet:

☐ Kadın ☐ Erkek

2) Yaş:

3) Eğitim Durumu:

☐ Okur-yazar değil ☐ İlkokul ☐ Ortaokul mezunu ☐ Lise Mezunu ☐ Üniversite
Mezunu

4) Medeni Hali:

☐ Bekar ☐ Evli ☐ Çocuk Sayısı:.....

5) Gelir Düzeyi:

☐ Gelirim giderimden fazla ☐ Gelirim giderimden az ☐ Gelirim giderimle eşit

6) Fiziksel Aktivite Düzeyi:

Haftadagündk ☐ Yok

7) Diyet Kısıtlaması Gerektiren Kronik Hastalığınız var mı? (Diyabet vb.)

8) ~~Obeziteyi~~ tetikleyecek hastalığınız var mı? (~~Hipotroid~~ vb.)

9) Diğer (Menopoz, gebelik, emziliklik vb.)

10) Boy Uzunluğu:

11) Vücut Ağırlığı:

12) BMI:

13) Bel Çevresi:

APPENDIX 4: Household Food Security Survey Module- Short Form

HANE HALKI BESİNE ULAŞILABİLİRLİK ÖLÇEĞİ- KISA FORMU

1. "Son 12 ay içerisinde aldığım gıda yetmiyordu ve daha fazla alacak param yoktu."

☐ Sıklıkla Doğru ☐ Bazen Doğru ☐ Doğru Değil ☐ Bilmiyor

2. "Dengeli öğünlere ulaşamıyorum" (dengeli öğün şu öğelerden oluşur; Süt grubu: süt, yoğurt, peynir, çökelek, Et yumurta grubu: et, tavuk, balık, yumurta, kuru baklagil, taze sebze-meyve grubu, Tahıl grubu: ekmek, pirinç, bulgur, un, makarna, Günlük yağ şeker grubu: katı sıvı yağ, bal, reçel, pekmez)

☐ Sıklıkla Doğru ☐ Bazen Doğru ☐ Doğru Değil ☐ Bilmiyor

3. Son 12 ay içerisinde (siz ya da ev halkındaki diğer erişkinler) paranız olmadığı için hiç öğün miktarını azalttığınız ya da öğün atladığınız oldu mu? (Bu soruya cevap Evetse 4. Soruyu yanıtlayın, Hayır ise 5. Soruya geçin.)"

☐ Evet ☐ Hayır ☐ Bilmiyor

4. 3. Sorudaki durum ne sıklıkta olur?

☐ Her ay ☐ Bazı aylar ☐ 1 veya 2 ay ☐ Bilmiyor

5. Yiyecek için yeterli paranız olmadığı için istediğinizden daha az yediğiniz oldu mu?

☐ Evet ☐ Hayır ☐ Bilmiyor

6. Paranız az olduğu için çok aç olduğunuz halde yiyemediğiniz oldu mu?

☐ Evet ☐ Hayır ☐ Bilmiyor

