

T.C

YEDİTEPE UNIVERSITY

INSTITUTE OF HEALTH SCIENCES DEPARTMENT OF NUTRITION
AND DIETETICS

**THE EFFECT OF MEAL FREQUENCY, SLEEP
DURATION AND SLEEP QUALITY ON BODY
MASS INDEX**

MASTER THESIS

NAZİLE NUR TEMÜR

İstanbul,2023

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SUPERVISOR

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Prof. Dr. Bayram YILMAZ

Sağlık Bilimleri Enstitüsü Müdürü

DECLARATION

I declare that this thesis is my own work, that I have not acted unethically at all stages from the planning of the thesis to data collection and writing, that I have obtained all the information in this thesis within academic and ethical rules, that I have cited all information and comments that were not obtained through this thesis study, and that I have included these sources in the references list. I also declare that I have not violated any patent or copyright during the study and writing of this thesis.

Nazile Nur TEMÜR

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Teşekkür ederim..

Diyetisyen Nazile Nur TEMÜR

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ÖZET

Temür, N.Nur. (2023). Öğün Sıklığı, Uyku Süresi ve Uyku Kalitesinin Beden Kütle İndeksi Üzerine Etkisi . Yeditepe Üniversitesi , Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik , Master Tezi , İstanbul.

Bu çalışmanın amacı öğün sıklığı, uyku süresi ve uyku kalitesinin Beden Kütle İndeksi üzerine etkisini ve öğün sıklığı, fiziksel aktivite, uyku süresinin ve uyku kalitesinin konstipasyon üzerine etkisini araştırmaktır. Bu çalışma hamile olmayan ve emzirmeyen 299 kişi %82,6'sı (n=247) kadın, %17,4'ü (n=52) erkek ve son 6 ayda herhangi bir diyet uygulamamış bireyler ile gerçekleştirilmiştir. Formların verileri 2023 yılı Ocak-Mayıs ayları arasında elde edilmiştir ve bireylerin yaş aralığı 18 ile 65 yaş arasında değişmektedir. Bireylerin beslenme alışkanlıkları, kişisel özellikleri, konstipasyon ölçeği, uyku kalitesi ölçeği , uykusuzluk şiddeti Google Form aracılığı ile oluşturulmuş anket ile sorgulanmıştır. Konstipasyon ciddiyeti Konstipasyon Ciddiyet Ölçeği, uykusuzluk şiddeti Uykusuzluk Şiddeti İndeksi(UŞİ) , uyku kalitesi Pittsburg Uyku Kalitesi İndeksi (PSQI) ölçekleri ile değerlendirilmiştir. Formlar 2023 yılı Ocak ve Mayıs ayı tarihleri arasında toplanmıştır. Çalışmada elde edilen bulgular değerlendirilirken istatistiksel analizler için NCSS(Number Cruncher Statistical System) 2020 Statistical Software (NCSS,LLC,Kaysville,Utah,USA) programı kullanıldı. Olguların ağırlıkları 40 ile 167 kg arasında değişmekte olup, ortalama kilo $67,15 \pm 14,94$ kg olarak belirlenmiştir. Çalışmaya katılanların boy ölçümleri 145 ile 190 cm arasında değişmekte olup, ortalama boy $166,34 \pm 8,21$ cm'dir. Katılımcıların BKİ ölçümleri 16 ile 61 kg/m^2 arasında değişmekte olup, ortalama $24,20 \pm 4,72 \text{ kg/m}^2$ olarak belirlenmiştir. Katılımcıların %32,6'sı (n=97) düzenli olarak fiziksel aktivite yapmaktadır. Katılımcıların %42,6'sı (n=127) günde 1-2 kez ana öğün tüketmekteyken, %53,7'si (n=160) 2-3 kez, %3,7'si (n=11) 3 kezden fazla ana öğün tüketmektedir. Olguların %76,9'u (n=230) öğün atlamaktadır. Katılımcıların Konstipasyon Ciddiyet Ölçeği (KCÖ) toplamından aldıkları puanlar 0 ile 65 puan arasında değişmekte olup, ortalama $18,46 \pm 14,26$ olarak belirlenmiştir. Katılımcıların Uykusuzluk Şiddeti İndeksi (UŞİ) puanları 0 ile 20 puan arasında değişmekte olup, ortalama puan $6,05 \pm 4,68$ olarak belirlenmiştir. Pittsburg Uyku Kalitesi İndeksi(PSQI) ölçek toplamından aldıkları puanlar 7 ile 22 puan arasında değişmekte olup, ortalama puan $12,38 \pm 2,74$ olarak

belirlenmiştir. Çalışmaya katılanların Uykusuzluk Şiddeti İndeksi toplamından aldıkları puanlar ile Pittsburgh Uyku Kalitesi Ölçeği toplamından aldıkları puanlar arasında pozitif yönlü istatistiksel olarak anlamlı yüksek düzeyde ilişki saptanmıştır ($r=0,618$; $p=0,001$; $p<0,01$). Katılımcıların Konstipasyon Ciddiyet Ölçeği toplamından aldıkları puanlar ile Pittsburgh Uyku Kalitesi Ölçeği “*Uyku Latansı*” alt boyutundan aldıkları puan arasında pozitif yönlü istatistiksel olarak anlamlı zayıf düzeyde ilişki saptanmıştır ($r=0,229$; $p=0,001$; $p<0,01$). Çalışmaya katılanların öğün sıklıklarına göre Pittsburgh Uyku Kalitesi Ölçeği “*Öznel Uyku Kalitesi*” alt boyutundan aldıkları puanlar arasında istatistiksel olarak anlamlı farklılık saptanmıştır ($p=0,005$; $p<0,01$). BKİ gruplarına göre olguların Pittsburgh Uyku Kalitesi Ölçeği “*Gündüz İşlev Bozukluğu*” alt boyutundan aldıkları puanlar arasında istatistiksel olarak anlamlı farklılık saptanmıştır ($p=0,018$; $p<0,05$).

BKİ gruplarına göre olguların Uykusuzluk Şiddeti İndeksi toplamından aldıkları puanlar arasında istatistiksel olarak anlamlı farklılık saptanmamıştır ($p>0,05$). BKİ gruplarına göre katılımcıların öğün sıklıkları, öğün atlama durumları, probiyotik gıda düzenli tüketme durumları, diyet posasının ne anlama geldiğini bilme ve en sık hangi çeşit ekmeği tükettikleri istatistiksel olarak anlamlı farklılık göstermemektedir ($p>0,05$). Alkol kullanımına göre katılımcıların Pittsburgh Uyku Kalitesi Ölçeği alt boyutlarından ve ölçek toplamından aldıkları puanlar istatistiksel olarak anlamlı farklılık göstermemektedir ($p>0,05$). Düzenli fiziksel aktivite yapanların Konstipasyon Ciddiyet Ölçeği toplamından aldıkları puanlar istatistiksel olarak anlamlı düzeyde daha düşük saptanmıştır ($p=0,002$; $p<0,01$). Öğün atlama durumlarına göre katılımcıların Konstipasyon Ciddiyet Ölçeği alt boyutlarından ve ölçek toplamından aldıkları puanlar istatistiksel olarak anlamlı farklılık göstermemektedir ($p>0,05$). Çalışma şekillerine göre katılımcıların Konstipasyon Ciddiyet Ölçeği “*Kalın Bağırsak Tembelliği*” ve “*Dışkı Tıkanıklığı*” alt boyutlarından ve ölçek toplamından aldıkları puanlar istatistiksel olarak anlamlı farklılık göstermemektedir ($p>0,05$).

Anahtar Kelimeler: Öğün sıklığı , Beden Kütle İndeksi , Uyku Kalitesi,Konstipasyon, Fiziksel Aktivite

ABSTRACT

Temür, N.Nur. (2023). The Effect of Meal Frequency, Sleep Duration and Sleep Quality on Body Mass Index. Yeditepe University, Institute of Health Science, Department of Nutrition and Dietetics, MSc Thesis, İstanbul.

The aim of the present study was to investigate the effect of meal frequency, sleep duration and sleep quality on body mass index and the effect of meal frequency, physical activity, sleep duration and sleep quality on constipation. The present study was conducted on 299 non-pregnant and non-breastfeeding individuals, of whom 82.6% (n=247) were female and 17.4% (n=52) were male and had not followed a diet in the previous 6 months. Data from the forms were collected between January and May 2023 and the age range of the individuals was between 18 and 65 years. Dietary habits, personal characteristics, constipation scale, Sleep Quality Index, insomnia severity of the individuals were questioned with a questionnaire created through Google Form. Constipation severity was assessed using the Constipation Severity Scale, insomnia severity using the Insomnia Severity Index (ISI), and sleep quality using the Pittsburgh Sleep Quality Index (PSQI). Forms were collected between January and May 2023. NCSS (Number Cruncher Statistical System) 2020 Statistical Software (NCSS, LLC, Kaysville, Utah, USA) was used for statistical analysis in the evaluation of the results obtained in the study. Subjects ranged in weight from 40 to 167 kg, with a mean weight of 67.15 ± 14.94 kg. The height of the participants ranged from 145 to 190 cm, with a mean height of 166.34 ± 8.21 cm. Participants' BMI ranged from 16 to 61 kg/m², with a mean of 24.20 ± 4.72 kg/m². 32.6% (n=97) of the participants engaged in regular physical activity. While 42.6% (n=127) of the participants ate 1-2 main meals, 53.7% (n=160) ate 2-3 main meals and 3.7% (n=11) ate more than 3 main meals per day. Of the subjects, 76.9% (n=230) skipped meals. Participants' total scores on the Constipation Severity Scale (CSS) ranged from 0 to 65 points, with a mean score of 18.46 ± 14.26 . Participants' Insomnia Severity Index (ISI) scores ranged from 0 to 20 points, with a mean score of 6.05 ± 4.68 . Pittsburgh Sleep Quality Index (PSQI) scores ranged from 7 to 22 points, with a mean score of 12.38 ± 2.74 . There was a statistically significant positive correlation between the Insomnia Severity Index scores and the Pittsburgh Sleep Quality Index scores ($r=0.618$; $p=0.001$; $p<0.01$). There was a

statistically significant weak positive correlation between participants' total score on the Constipation Severity Scale and their score on the Sleep Latency subscale of the Pittsburg Sleep Quality Index ($r=0.229$; $p=0.001$; $p<0.01$). There was a statistically significant weak positive correlation between participants' total score on the Constipation Severity Scale and their score on the Sleep Latency subscale of the Pittsburg Sleep Quality Index ($r=0.229$; $p=0.001$; $p<0.01$). A statistically significant difference was found between the scores obtained from the “Subjective Sleep Quality” sub-dimension of the Pittsburg Sleep Quality Index according to the meal frequency of the study participants ($p=0.005$; $p<0.01$). A statistically significant difference was found between the scores obtained from the Daytime Dysfunction subscale of the Pittsburg Sleep Quality Index according to BMI groups ($p=0.018$; $p<0.05$).

There was no statistically significant difference between the Insomnia Severity Index scores according to BMI groups ($p>0.05$). There was no statistically significant difference between the participants' meal frequency, skipping meals, regular consumption of probiotic foods, knowledge of the importance of fibre, and the type of bread they eat most often according to BMI groups ($p>0.05$). According to alcohol consumption, the participants' scores on the sub-dimensions of the Pittsburgh Sleep Quality Index and the total scale did not show a statistically significant difference ($p>0.05$). Scores on the total Constipation Severity Scale were statistically significantly lower in those who engaged in regular physical activity ($p=0.002$; $p<0.01$). According to meal skipping status, participants' scores on the Constipation Severity Scale sub-dimensions and total scale did not show a statistically significant difference ($p>0.05$). According to working styles, the participants' scores from the Constipation Severity Scale sub-dimensions of “Bowel Laziness” and “Fecal Obstruction” and the total scale did not show a statistically significant difference ($p>0.05$).

Keywords: Meal frequency, Body Mass Index, Sleep Quality, Constipation, Physical Activity

1.INTRODUCTION

The body mass index is a useful tool because it is universally accepted as a factor that categorises body fatness. It is considered an indicator of the relative amount of body fat in an individual's frame. It is calculated by dividing a person's weight in kilograms by their height in square meter (m²).

BMI is only intended for adults, as children and adolescents continue to grow.

This makes it difficult to have fixed values for BMI cut-offs for young people. However, in adults who have stopped growing, an increase in BMI is usually caused by an increase in body fat(1).

However, because BMI does not measure fat tissue, it can be inaccurate. For example, people with significant lean body mass may be classified as 'overweight' when they are likely to have a low percentage of body fat. We see this in bodybuilders and other athletes. In these cases, other anthropometric measures may be more clinically relevant. Another important point is that the physical distribution of adipose tissue has been shown in many studies to influence morbidity and mortality. BMI does not take this into account. In the calculation, height is squared to reduce the contribution of leg length in taller people. However, with this normalisation, the equation distributes the same mass to each height level. This reduces the usefulness of BMI in studies that differentiate between body types. Despite these weaknesses, BMI is an excellent tool that is easy to work with and useful in most patient populations (2).

According to the body mass index evaluation, under 18.5 is called underweight individual, 18.5-24.9 is called normal weight individual, 25-29.9 is called pre-obesity individual, 30-34.9 is called 1st class obesity individual, 35-39.9 is called 2nd class obesity individual, above 40 is called 3rd class obesity individual (3).

At the same time, BMI is widely used as a risk factor for the development or prevalence of various health problems.

Obesity is the accumulation of excess fat due to an imbalance between calorie intake from energy-dense foods and energy expended through physical activity.

In adults, obesity increases the risk of heart disease, stroke, hypertension, osteoarthritis, type 2 diabetes and several types of cancer, including liver, breast, ovarian, prostate and colon cancer.

Obesity in children causes breathing problems, high blood pressure, type 2 diabetes, sleep disorders, skin infections and bone and joint problems. Children who are obese are also more likely to become obese as adults. Obesity is a worldwide health problem that has been worsening for decades and has reached epidemic levels.



2.GENERAL INFORMATION

2.1.What is Obesity?

The World Health Organisation defines obesity as abnormal or excessive accumulation of fat in adipose tissue to an extent that it affects health.

Traditionally, obesity is classified according to body mass index (BMI), calculated as weight in kilograms divided by the square of height in metres. According to the WHO and the most recent guidelines for Western populations, obesity is defined as a BMI ≥ 30 kg/m². The same guidelines define overweight as a BMI of 25.0-30 kg/m², normal weight as a BMI of 18.5-25 kg/m² and underweight as a BMI below 18.5 kg/m². BMI is a simple and reasonable measure to diagnose obesity because it is related to fat mass and is associated with morbidity and mortality, as shown in numerous epidemiological studies. (5,6)

Obesity is classically defined by body mass index, but BMI is known to be an imperfect measure of excess or abnormal body fat accumulation, and studies have shown that accounting for body fat distribution by measures such as waist circumference can improve disease prediction (7).

2.2 Epidemiology of Obesity

The global prevalence of overweight and obesity has doubled since 1980. Approximately 1/3 of the world's population is classified as overweight or obese (8). Obesity adversely affects almost every physiological function of the body and is a major public health threat.

The World Health Organization (WHO) defines overweight and obesity as abnormal or excessive accumulation of fat that poses a risk to health. Body mass index (BMI), calculated as body weight in kilograms divided by the square of height in metres, is a simple measure of obesity (9).

By this definition, obesity is a multifactorial disease that occurs when dietary energy intake exceeds energy expenditure. As excess energy is converted to triglycerides, which are stored in adipose tissue depots that increase in size, body fat increases and causes weight gain (10).

The globalisation of food systems, producing more processed and affordable foods and encouraging passive overconsumption of energy-dense, nutrient-poor foods and

beverages, has been identified as a major driver of the obesity epidemic, although there has also been a decline in physical activity due to lifestyle modernisation (11,12).

Obesity can occur at any age. Studies assessing trends in obesity have found that the prevalence of obesity is increasing in both adults and children of all ages, regardless of geographic region, ethnicity or socioeconomic status. (8)

A study conducted in 2019 estimated that 1.9 billion and 609 million adults worldwide were overweight and obese, respectively, in 2015, representing approximately 39% of the world's population. The study showed that the prevalence of obesity is generally higher in women than in men across all age groups, with the greatest gender differences between 50 and 65 years of age.

The study showed that both overweight and obesity rates increase with age from the age of 20, peak between the ages of 50 and 65, and then decline slightly (13).

2.3 Obesity Prevalence

The prevalence of overweight and obesity has increased in recent years in the United States of America (USA) and much of the western world, reaching epidemic proportions (14).

One third of the adult population in North America is reported to be obese (15).

More worryingly, the prevalence of severe or class III obesity [body mass index (BMI) ≥ 40 kg/cm²] has increased more than obesity alone and now accounts for more than 3% of the US population.

The association between the severity of obesity and cardiometabolic risk factors has recently been observed even in the early stages of life (14,16).

As the COVID-19 pandemic unfolded, several studies collected small and relatively homogeneous samples to track US adult obesity rates and obesity-related risk factors. During the COVID-19 pandemic, US adult obesity rates were higher and the pre-existing US adult obesity epidemic worsened. It has been concluded that higher rates of alcohol consumption and lower rates of smoking may have contributed to higher rates of adult obesity in the US during the COVID-19 pandemic (17).

When analysing the body mass index values in Turkey, it is concluded that the rate of obese individuals aged 15 years and older was 19.6% in 2016 and 21.1% in 2019. In terms of gender, in 2019, 24.8% of women were obese and 30.4% were pre-obese, while 17.3% of men were obese and 39.7% were pre-obese (18).

The prevalence of childhood obesity has increased worldwide over the past 50 years (19). From 1975 to 2016, the global age-standardised prevalence of obesity in children and adolescents aged 5-19 years increased from 0.7% (95% credible interval [CrI] 0.4-1.2) to 5.6% (4.8-6.5) in boys and from 0.9% (0.5-1.3) to 7.8% (4.8-6.5) in girls.

(4.8-6.5) in girls and from 0.9% (0.5-1- 3) to 7.8% (6.7-9.1) in boys (20).

Since 2000, average BMI has generally remained at high levels in many high-income countries, but has continued to increase in low- and middle-income countries. In 2016, the prevalence of obesity in this age group was highest (>30%) in many Pacific Island countries and high (>20%) in several countries in the Middle East, North Africa, Micronesia (Western Pacific) and Polynesia (20).

In 2019, the World Obesity Federation estimated that 206 million children and adolescents aged 5-19 years will be living with obesity in 2025 and 254 million in 2030 (21).

The prevalence of severe obesity in the paediatric population has increased in many high-income countries, although the overall prevalence of obesity has remained stable (22, 23, 24, 25).

In a survey of European countries, almost a quarter of obese children were classified as having severe obesity, a finding that has implications for the provision of clinical obesity services, as these children require more specialised and intensive treatment (23).

There are socioeconomic differences in the prevalence of childhood obesity between countries. In low- and middle-income countries, children of higher socioeconomic status are more likely to be overweight or affected by obesity than children of lower socioeconomic status. In high-income countries, children living in socioeconomically disadvantaged situations are at higher risk (26,27,28).

Reports from China, Europe, and the US have documented increased weight gain among children and adolescents during the COVID-19 pandemic compared to the pre-pandemic rate as a marked consequence of decreased physical activity, increased screen time, changes in dietary intake, food insecurity, and increased family and individual stress.(29,30)

2.4 Causes of Obesity

The main red flags for genetic obesity are early-onset obesity, dysmorphic features/congenital malformations with or without intellectual deficits, behavioural problems, hyperphagia and/or a strong family history. More importantly, medications

(especially psychiatric drugs, (local) corticosteroids, insulin and specific beta-adrenergic receptor blockers), sleep habits and quality, fast diets and the yo-yo effect, alcoholism and common factors contributing to weight gain are also points to investigate among the causes of obesity. Other relevant conditions include chronic stress or mental factors such as binge eating disorder and depression. (31)

Identifying and optimising underlying diseases, contributing factors and other associated conditions can not only lead to more effective and personalised treatment, but also reduce the social stigma of obesity (31).

2.5 Outcomes of Obesity

2.5.1. Obesity and Leukocytes

Many studies have been conducted to elucidate Relationship between leukocytosis and body mass index (BMI). One study found that a significant proportion of patients referred for unexplained leukocytosis had no identifiable cause of persistent and stable leukocytosis other than obesity (32).

In another study, no other known cause of leukocytosis (e.g. infection, inflammation, smoking, malignancy, etc.) was identified and the high count was maintained over an average follow-up of 45 months. In three individuals, weight loss was associated with a gradual reduction and normalisation of leukocyte counts and associated CRP levels. To further confirm this association, a cross-sectional analysis of non-smokers with no underlying inflammatory or infectious disease was performed, and subjects with leukocytosis (n = 62) were found to have a higher BMI compared with the population with normal white blood cell counts (33).

A study by Raghavan et al in 2019 similarly reported that white blood cell counts were relatively high in obese women, although mean total leukocyte counts did not exceed the accepted physiological range, based on relative leukocytosis between categories with a progressive numerical increase in total leukocyte count values with increasing BMI (34).

Although more studies are needed in this regard, several studies have supported the positive association between leukocyte count and BMI and concluded that there is a clear predominance of obesity-related leukocytosis in women compared with men (32).

2.5.2.Obesity and Iron Deficiency

There have also been studies of iron deficiency as a consequence of obesity. Wenzel et al (1962) reported lower serum iron levels in obese compared to non-obese adolescents. Although it seems unreasonable to expect iron deficiency (ID) in a state of caloric and nutrient excess, lower serum iron concentrations have been observed for decades in association with increasing BMI (35).

In 2015, Zhao et al performed a meta-analysis of 26 cross-sectional and case-control studies, including a total of 13,393 overweight and obese individuals and 26,621 non-overweight individuals, and found that compared with the non-overweight group, the percentage saturation of serum iron and transferrin was significantly different in the overweight/obese population, with only a marginally significant difference in serum ferritin levels between the same groups. (36)

A 2014 review by Aigner et al reported some improvements in iron status with weight loss (37).

Although there is an association between obesity and iron deficiency, it was considered that more high-quality studies are needed in the future to substantiate this claim and determine whether there is a causal relationship. (32)

Studies show that obesity, in which many factors such as malnutrition, sedentary lifestyle, genetic predisposition, vitamin D deficiency, dysbiosis, endocrine disruptors and circadian rhythm disruption play a role, is spreading rapidly throughout the world and plays a role in the pathogenesis of many diseases (38).

Adipose tissue is considered an endocrine organ and plays an important role in the pathogenesis of many obesity-related diseases, secreting more than 260 proteins and peptides as a result of mechanical problems caused by increased body mass index and metabolic disturbances in the body due to improper nutrition (38).

The proportion of the global burden of disease attributable to increased BMI is 58% for type 2 diabetes, 21% for ischaemic heart disease, 39% for hypertensive disease, 23% for ischaemic stroke, 12% for colorectal cancer and 8% for postmenopausal breast cancer (39).

2.7 Prevention of Obesity

Few health crises have been as predictable as the emerging obesity epidemic. Clinical and public health services remain at the forefront of efforts to reduce the burden of obesity. Although there are many effective interventions for the management

and prevention of obesity, their provision remains a persistent challenge for health systems, even in high-income countries (HICs), given the scarcity of health resources and the growing needs of the population. Clinical practice guidelines recommend routine screening, brief lifestyle advice and referral to prevent and manage unhealthy weight gain in adults and children in high-income countries. World Health Organization (WHO) guidelines recommend routine assessment of height and weight in all children under 5 years of age. Counselling on nutrition and physical activity (including support for exclusive breastfeeding) is recommended for parents of children diagnosed as overweight. (40)

For obese children, disease prevention includes a plan such as referral to a hospital or clinic. However, in low- and middle-income countries, there is no guarantee that hospitals or clinics have the capacity or expertise to treat childhood obesity. (40) Best practice guidelines, including those published by the United States Preventive Services Task Force (USPSTF), have shown that behavioural therapy plays an important role in weight loss in adults with obesity (41).

Statements from the American College of Cardiology/American Heart Association include the use of dietary therapies and bariatric surgery in adults (42). A USPSTF review for children concluded that intensive, 26-hour, face-to-face behavioural therapy is an effective treatment for obesity in children and adolescents. These interventions target parents and children, together or separately. They focus on behaviour modification techniques rather than diet and physical activity (43). Although specific recommendations vary, recommendations for the management of obesity in children, adolescents and adults are largely consistent across clinical practice guidelines, including those published for the USA, Europe, Australia and Canada, and those published by the American Heart Association (44).

However, in high-income countries, these recommendations place a significant burden on providers and patients and are not easily met. Despite the importance of broad clinical recommendations, there are two points of clarity in obesity prevention (5% weight loss and weight maintenance).

In adults, weight loss of >5% reduces many obesity-related comorbidities (45). However, many people regain some or all of the weight lost on weight-loss diets. (46,47)

Balancing these benefits and risks should be part of a joint decision-making process

between healthcare providers and patients, with realistic goal setting (48).

When a weight loss programme is initiated, prevention of weight regain should be a high priority, and evidence-based strategies related to long-term weight loss maintenance should be incorporated into care plans (49).

2.8 Sleep

In addition to being a state of unconsciousness that can be reversed by sensory or other stimuli, sleep is not only a state of inactivity that allows the organism to rest, but also a period of active regeneration that prepares the body for life again (50).

There are two stages of sleep that occur periodically. These are the REM and Non-REM phases. The NREM is divided into 4 stages. Stages 1 and 2 are light sleep, while stages 3 and 4 are deep sleep. During REM, the brain is hyperactive. Dreams are seen or dreams seen during this period are remembered (50).

Sleep is a concept that affects human health, has an impact on the quality of daily life and has psychological, social and physiological dimensions (50).

2.8.1 Sleep Requirement

The amount of sleep a person needs varies depending on their age and other factors.

Newborn (0-3 months) 14-17 hours

Infants (4-11 months) 12-15 hours

Infants (1-2 years) 11-14 hours

Nursery age (3-5 years) 10-13 hours

School age (6-13 years) 9-11 hours

Youth (14-17 years) 8-10 hours

Young adults (18-25 years) 7-9 hours

Adults (26-64 years) 7-9 hours

Older adults (65+ years) 7-8 hours old (51)

It is important to remember that sleep needs may vary within the same age group and depend on other factors such as sleep quality and daily activities (52).

2.8.2 Relationship Between Sleep and Food Intake

As the quality of sleep is affected by the nutrients you consume, the amount of food you eat also affects your sleep patterns.

A diet low in fibre and high in saturated fat can reduce the amount of deep and restorative sleep. Excess sugar can lead to more frequent waking during sleep.

Consuming certain foods and drinks close to bedtime can also reduce sleep quality (53). Eating less fibre, more saturated fat and more sugar is associated with lighter, less restful and more interrupted sleep.

Eating at night is associated with negative effects on sleep quality in healthy people. Food intake close to bedtime (dinner and midnight snacks) is negatively associated with sleep quality variables (54).

Among school-aged children in China, short sleep duration was associated with an increased risk of higher consumption of sugar-sweetened beverages among younger people and boys, but lower consumption of vegetables and fruits among older people and girls (55).

In a review of relationship between sleep duration and food consumption, energy intake, anthropometric characteristics and appetite-regulating hormones in randomised controlled trials (RCTs), the overall results showed that sleep restriction led to significant increases in energy intake, fat intake, body weight, appetite, hunger, eating times and portion size. Protein and carbohydrate intake, total energy expenditure and respiratory quotient were not affected by sleep restriction (56). The Sleep Foundation reported that people who do not get enough sleep are more likely to increase their food consumption without a corresponding increase in energy expenditure, which can lead to weight gain and obesity (57).

2.8.3 The Energy Mechanism between Sleep and Food Intake

There is a physiological link between sleep and eating, and insufficient sleep is a risk factor for overeating and excessive weight gain (58).

Short sleep duration has been consistently associated with higher total energy intake and higher total fat intake (59).

Energy expenditure is thought to be the main mediator of Relationship between insufficient sleep and weight gain, as sleep restriction increases food intake (60). Proposed mechanisms linking insufficient sleep to higher body mass index (BMI) include changes in satiety and hunger hormones (61).

Overall, research suggests that there is a bidirectional relationship between sleep and food intake, with sleep affecting food intake and vice versa. The mechanisms underlying this relationship are complex and include hormonal and behavioural factors.

2.9 Definition and Prevalence of Constipation

Constipation is a common condition in the community and is a significant burden for both individuals and health care systems (62). For the individual, constipation is associated with pain and symptoms that negatively affect quality of life (63).

Three large systematic reviews of 50 epidemiological studies of community-dwelling adult populations have shown that prevalence varies widely, with estimates of constipation ranging from 2% to 35% (64,65,66).

This wide range may be due in part to differences in populations due to various factors such as age group, culture, diet and environment, but it is also thought to be due to differences in the way constipation is defined in each study. (64)

Although the Rome Criteria were developed to be used as a standard definition of chronic constipation, most epidemiological studies have used various other definitions of constipation. The Rome Criteria are a set of clinical symptoms that are internationally recognised as the gold standard for diagnosing chronic constipation (67,68).

One study concluded that the definition used to describe constipation in a population has a significant effect on the prevalence estimate obtained. Simple definitions commonly used in studies performed poorly compared to the Roman III criteria. Studies estimating the prevalence of constipation in the community should use definitions based on the Rome criteria whenever possible (69).

According to the Rome criteria, the definition of constipation must include two or more of the following symptoms:

Straining during more than $\frac{1}{4}$ (25%) of defecations.

Lumpy or hard stools in more than $\frac{1}{4}$ (25%) of defecations

Feeling of incomplete evacuation in more than $\frac{1}{4}$ (25%) of defecations.

Sensation of anorectal obstruction/clogging in more than $\frac{1}{4}$ (25%) of defecations(4).

2.9.1 Relationship between Constipation and Sleep

Relationship between constipation and sleep may be explained by the coupling of circadian and colonic motility rhythms (70,71).

GI symptoms are known to be more common in individuals with disrupted biological rhythms, such as shift workers and those travelling across time zones (72).

Chronic constipation and lifestyle factors may affect sleep quality. A study to assess the

association between chronic constipation and sleep in the Japanese population examined the differences between those reporting good sleep and those reporting poor sleep in 3000 Japanese survey participants with constipation (73).

One of the important findings of the study was that individuals with normal bowel movements were less likely to be in the poor sleep group. Based on the results of the multivariate analysis, it was concluded that maintaining a Bristol Stool Forms Scale score between 3 and 5 (defined as normal) may contribute to better sleep in patients with constipation (73).

However, while patients with constipation report sleep difficulties, the importance of clinicians managing constipation symptoms to improve sleep quality has been emphasized (73).

In the Chinese analysis, poor sleep was also associated with significantly higher levels of anxiety and worry, and sleep disturbances, depression and anxiety were all found to be positively correlated with constipation severity (73).

In addition, the study showed that 30 minutes of moderate exercise at least twice a week for 1 year or more or walking for at least 1 hour a day was positively associated with good sleep (73).

2.9.2 Relationship between Constipation and Physical Activity

Several modifiable behaviours have been studied in relation to constipation risk and management. For example, Relationship between bowel habits and physical activity has long been an active area of research, as studies from almost half a century ago found that light physical activity combined with rest was associated with propellant mass movements in the colon (74). This suggests that exercise may facilitate defecation. In addition, results from recent clinical trials suggest that increased physical activity reduces symptoms of constipation, but evidence from these interventions has a high risk of bias (75).

The American Gastroenterological Association's 2013 white paper on constipation states that physical inactivity is a risk factor for constipation and that light exercise increases bowel gas secretion (76).

Overall, there currently appears to be moderate evidence that physical activity can be used as an adjunctive treatment for chronic constipation.

Although the available literature supports the idea that physical activity can help prevent and treat constipation, some important questions remain to be answered. Most

clinical trials investigating the effects of exercise on constipation have been conducted in homogeneous or highly selected populations, which to some extent limits what can be said about the associations between physical activity and constipation in the general population.



3.MATERIAL AND METHOD

3.1 Sample Selection, Place and Time

The study was conducted with healthy individuals who applied to Sahure Özyay Diet Polyclinic between January 2023 and May2023.A total of 300 individuals aged between 18 and 65 years were included in the study via simple random sampling. The sample consisted of individuals who had not dieted in the last 6 months for any reason and were not pregnant or lactating.

Ethics Committee Approval(Appendix1)was obtained by theYeditepe University Board.

3.2. Study Plan

Questionnaire forms were collected from the participants via Google form. Anthropometric measurement data were collected and recorded. Afterwards, all data were analysed and evaluated by the researcher.

3.3 Data Collection and Data Evaluation

3.3.1 Personal characteristics of the participants

In order to determine the personal characteristics of the individuals, a questionnaire (Appendix 2) was used to collect the data created by the researcher with a google form. Demographic characteristics of the individuals (gender, age, marital status and educational status) and whether they had any diseases were questioned. Lifestyle and whether there was any active diet in the last 6 months were questioned.

3.3.2 Insomnia severity index(ISI)

It is a measure developed to assess the severity of insomnia and has high validity and reliability (77,78).

The scale consists of seven questions and items are scored on a 0-4 scale. Scores obtained from the scale vary between 0 and 28. The characteristics measured by the items of the scale are i) difficulty in falling asleep, ii) difficulty in maintaining sleep, iii) waking up too early, iv) satisfaction with sleep pattern, v) impairment in daily functioning, vi) recognisability of sleep-related impairment, and vii) stress level caused by sleep problems. The scale is scored using categories such as insignificant, subthreshold, moderate, severe insomnia with increasing scores.

3.3.3 Pittsburgh Sleep Quality Index (PSQI)

The scale was developed by Buysse et al. to assess sleep quality, sleep quantity and sleep disturbances in individuals. (79)

The scale consists of nineteen questions and is scored between 0 and 3. The Pittsburgh sleep quality index scale consists of seven sub-items: subjective sleep quality, sleep delay, sleep duration, adequacy of on going sleep, sleep disturbances, use of sleeping pills and daytime dysfunction. An increase in score indicates poor sleep quality. The Turkish validity and reliability study of the scale was conducted by Ağargün et al. (80)

3.3.4 Constipation Severity Scale

The Constipation Severity Scale, developed by Varma et al in 2008, is a scale that aims to measure the frequency and intensity of bowel movements and the difficulty during defecation (81). This scale is also used to measure symptoms of constipation. The scale consists of 16 questions. The CSQ has three sub-dimensions: Fecal Obstruction (FO), Bowel Laziness (BL) and Pain. The score that can be obtained from the Fecal Obstruction sub-dimension is between 0 and 28, the score that can be obtained from the Bowel Laziness sub-dimension is between 0 and 29, and the score that can be obtained from the Pain sub-dimension is between 0 and 16.

The lowest score that can be obtained from the scale is 0 and the highest score is 73. As the score obtained from the scale increases, it is interpreted as an increase in the severity of the symptoms (81).

3.3.5 Anthropometric Measurements

In the study, body weight was measured using the Body Composition Analyzer to determine the body composition of the individuals. During the measurement, the feet and hands were placed on the electrodes in the device so that they were naked and dry. It was ensured that the subjects did not have any metal objects such as watches, metal necklaces, etc. during the measurement. The height of the participants was measured with a metre. It was ensured that the feet of the subjects were next to each other and that the head was in the Frankfurt plane. Height was measured by measuring the distance from the ground plane to the top of the head.

The body mass index (BMI) of the individuals was calculated by dividing the body weight by the square of the height (m²). BMI values according to the World Health Organization (WHO) classification were included in the study.

Table 1. Assessment according to BMI

BMI (kg/m²)	
Weak<18.5	
Normal	18.5-24.9
Lightly Fat	25.0-29.9
Obese	
Grade I Obese≥30-34.9	
Grade II Obese	35-39.9
Grade III Morbid Obese	40 kg/m²

Reference:WHO. Obesity: preventing and managing the global epidemic. Report of a WHO Consultation. WHO Technical Report Series 894. Geneva: World Health Organization, 2000. Erişim: <http://www.who.int/healthinfo> Erişim tarihi: 08.07.2023

3.3.5. Evaluation of Meal Frequencies

The frequency of main meals and snacks were categorized by the researcher as 1-2 times, 2-3 times and more than 3 times a day and recorded.

3.3.6. Statistical Evaluation of Data

NCSS (Number Cruncher Statistical System) 2020 Statistical Software (NCSS LLC, Kaysville, Utah, USA) was used for statistical analyses during the evaluation of the results obtained in the study. In evaluating the study data, quantitative variables were presented using mean, standard deviation, median, minimum and maximum values, and qualitative variables were presented using descriptive statistical methods such as frequency and percentage. The Shapiro-Wilks test and box plots were used to assess the conformity of the data to the normal distribution. The Mann-Whitney U test was used to evaluate two quantitative groups with normal distribution. The Kruskal-Wallis test was used to compare variables that were not normally distributed in three or more groups, and the Dunn test was used to determine the group that caused the difference. Wilcoxon Signed Rank Test was used for within group evaluations. The

Fisher-Freeman-Halton test was used to compare qualitative data. Results were evaluated with 95% confidence interval and significance was evaluated at $p < 0.05$ level.



4.RESULTS

The study was conducted at Sahure Özay Nutrition and Diet Counseling Center between January and May 2023 with a total of 299 subjects, 82.6% (n=247) of whom were female and 17.4% (n=52) were male. The ages of the subjects ranged between 18 and 64 years, and the mean age was 31.52±9.46 years.

4.1.General Characteristics of Individuals

Table 2. Distrubution of Descriptive Characterictics

		n (%)
Gender	Female	247 (82,6)
	Male	52 (17,4)
Age	<i>Mean±Sd</i>	31,52±9,46
	<i>Median (Min-Max)</i>	28 (18-64)
Weight (kg)	<i>Mean±Sd</i>	67,15±14,94
	<i>Median (Min-Max)</i>	64 (40-167)
Height (cm)	<i>Mean±Sd</i>	166,34±8,21
	<i>Median (Min-Max)</i>	165 (145-190)
BMI (kg/m²)	<i>Mean±Sd</i>	24,20±4,72
	<i>Median (Min-Max)</i>	23,8 (16-61)
Low Weight		17 (5,7)
Normal Weight		168 (56,2)
Over weight		85 (28,4)
Obese		29 (9,7)
Marital status	Married	176 (58,9)
	Single	123 (41,1)
Educational Status	Under university	53 (18,0)
	Above university	242 (82,0)
Employment	Employed	191 (64,3)
	Unemployed	106 (35,7)
Type of employment	Continuously morning	178 (84,4)
	Continuously night	1 (0,5)
	Varying shifts in morning-night	32 (15,2)

The hours of work per day	08:00-17:00	133 (58,6)
	08:00-20:00	33 (14,5)
	17:00-24:00	4 (1,8)
	17:00-08:00	2 (0,9)
	Other	55 (24,2)
Monthly salary level	0-5000 TL	45 (17,6)
	5000-8000 TL	27 (10,6)
	8500-12000 TL	42 (16,5)
	12000-15000 TL	37 (14,5)
	≥15001 TL	104 (40,8)

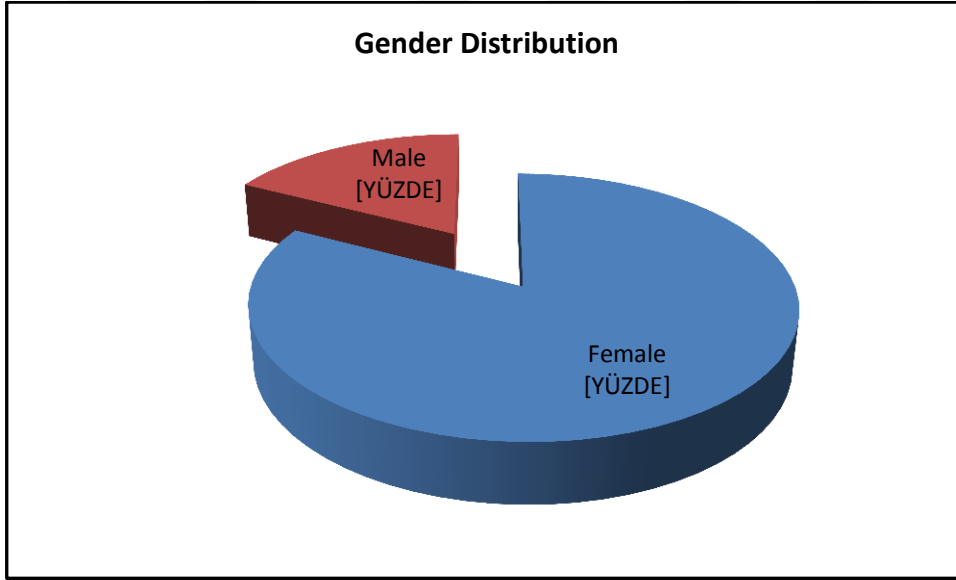


Figure 1. Distribution of Participants According to Gender

The weights of the subjects ranged between 40 and 167kg and the mean weight was 67.15 ± 14.94 kg. The height measurements of the participants ranged between 145 and 190cm, with a mean height of 166.34 ± 8.21 cm.

The BMI measurements of the participants varied ranged between 16 and 61 kg/m^2 and the mean was $24.20 \pm 4.72 \text{kg/m}^2$. According to BMI classification, 5.7% of the subjects were underweight, 56.2% were normal, 28.4% were overweight and 9.7% were obese.

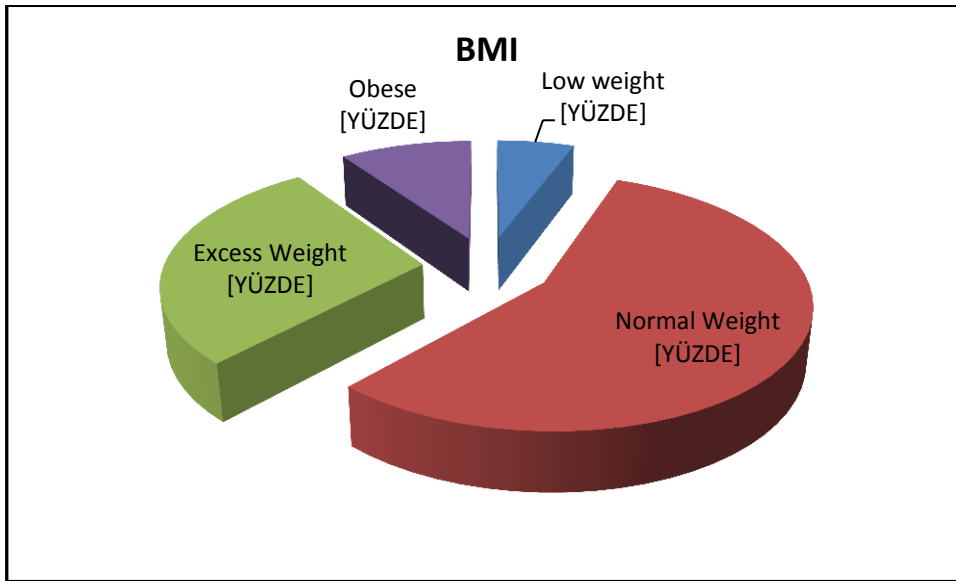


Figure 2. BMI Distribution of Participants

Among the participants, 58.9%(n=176) were married and 41.1%(n=123) were single. When the educational status was analyzed, it was found that 18% (n=53) were below university level and 82% (n=242) were above university level. Of the participants, 58.9%(n=176) were married and 41.1%(n=123) were single.

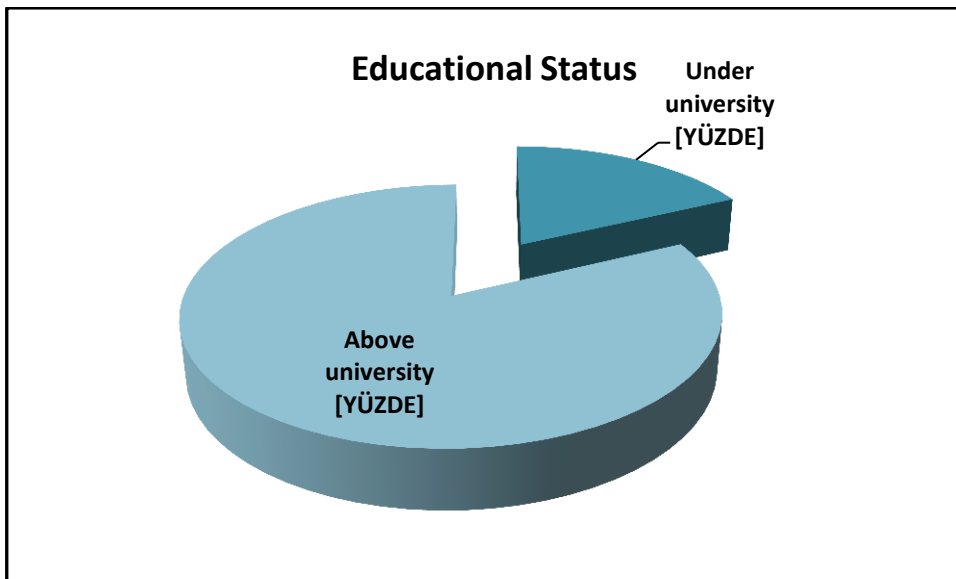


Figure 3. Distribution of Participants by Education Level

When the educational status was analyzed, it was found that 18% (n=53) of the cases were below university level and 82% (n=242) were above university level.

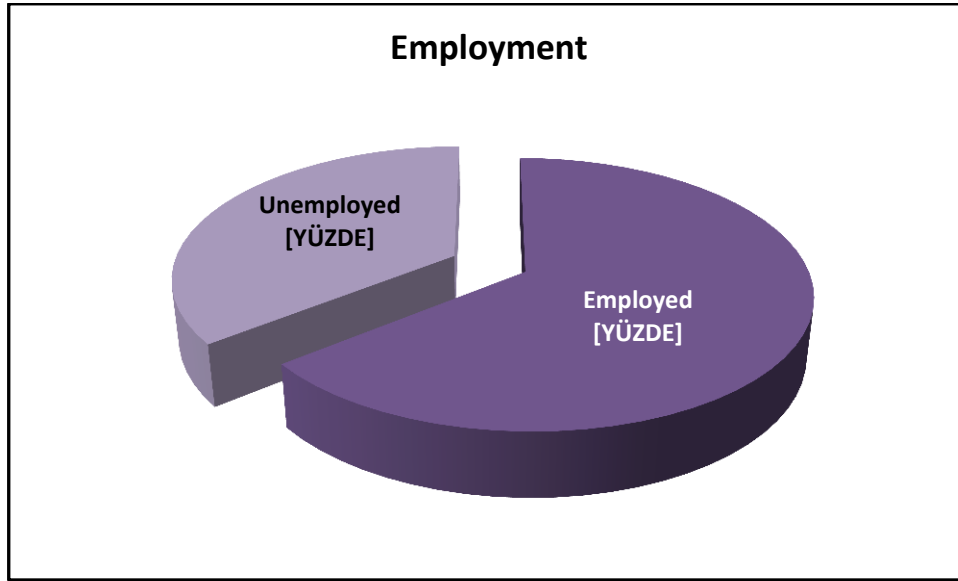


Figure 4. Distribution of Participants by Employment Status

It is seen that 84.4%(n=178) of the participants work continuously during the day, 0.5% (n=1) work continuously at night, and 15.2% (n=32) work in a variable shift system between day and night.

4.2.Disease Status and General Habits of Individuals

Table 3. Distribution of Descriptive Characteristics

		n (%)
Disease diagnosed by a doctor	No	202 (68,9)
	Cardiovascular diseases	3 (1,0)
	Hypertension	6 (2,0)
	Diabetic	3 (1,0)
	Obesity	6 (2,0)
	Digestive system diseases	5 (1,7)
	Goitre	7 (2,4)
	Anemia	15 (5,1)
	Neurological diseases	4 (1,4)

	Renal diseases	2 (0,7)
	Liver diseases	2 (0,7)
	Joint/bone diseases	5 (1,7)
	Lung diseases	2 (0,7)
	Intestinal diseases	3 (1,0)
	Other	28 (9,6)
Smoking	Yes	84 (28,3)
	No	213 (71,7)
Alcohol consumption	Yes	65 (21,9)
	No	232 (78,1)
With whom he/she lived	Alone	42 (14,1)
	Family/Relatives	231 (77,5)
	Friend	16 (5,4)
	Other	9 (3,0)

Of the participants, 58.6% (n=133) work between 08:00 and 17:00, 14.5% (n=33) between 08:00 and 20:00, 1.8%(n=4) between 17:00 and 24:00, 0.9%(n=2) between 17:00 and 08:00, and 24.2%(n=55) between other hours.

When the monthly income levels were analyzed, it was found that 17.6% (n=45) of the cases were between 0 and 5000 TL, 10.6% (n=27) were between 5000 and 8000 TL, 16.5%(n=42)were between 8500 and 12000TL, 14.5%(n=37) were between 12000 and 15000 TL, and 40.8% (n=104) were 15001 TL and above.

While 68.9% (n=202) of the participants did not have a disease diagnosed by a doctor, 1% (n=3) had cardiovascular diseases, 2% (n=6) had hypertension, 1% (n=3) were diabetic, 2% (n=6) were obese, 1.7% (n=5) had digestive system diseases, 2.4% (n=7) had goiter, and 5,1% (n=15) had anemia, 1.4% (n=4) had neurological diseases, 0.7% (n=2) had kidney diseases, 0.7% (n=2) had liver diseases, 1.7% (n=5) had joint/bone diseases, 0.7% (n=2) had lung diseases, 1% (n=3) had intestinal diseases and 9.6% (n=28) had other diseases. Among the study participants, 28.3% (n=84) were smokers. 21.9%(n=65)of the participants consume alcohol. 14.1%(n=42) of the participants live alone, 77.5% (n=231) live with family/relatives, 5.4% (n=16) live with friends, and 3% (n=9) live with other people.

Table 4. Distribution of Responses to Questions Related to Nutrition

		n (%)
Special diet in the last 6 months	Yes	33 (11,1)
	No	264 (88,9)
Regular physical activity status	Yes	97 (32,6)
	No	201 (67,4)
No. of main meals a day	1-2 times	127 (42,6)
	2-3 times	160 (53,7)
	>3 times	11 (3,7)
No. of snacks a day	1-2 times	222 (76,8)
	2-3 times	51 (17,6)
	>3 times	16 (5,5)
Meal skipping	Yes	230 (76,9)
	No	69 (23,1)
If “yes”, the most frequently skipped meal	Breakfast	91 (39,6)
	Lunch	99 (43,0)
	Dinner	13 (5,7)
	Snack	27 (11,7)
Reason for skipping meals	Insufficient time	52 (22,6)
	I don't feel like it	87 (37,8)
	I want to lose weight	17 (7,4)
	Because I didn't prepare	34 (14,8)
	I'm not used to it	40 (17,4)
Type of bread he/she consumes most often	White bread	138 (46,9)
	Whole wheat bread	95 (32,3)
	Wholemeal bread	11 (3,7)
	Village bread	11 (3,7)
	Rye bread	13 (4,4)
	Sourdough bread	25 (8,5)
	Corn bread	1 (0,3)
Regular consumption of	Yes	136 (45,5)

probiotic food every day	No	163 (54,5)
Using probiotic supplements	Yes	20 (6,7)
	No	279 (93,3)
Frequency of consuming legumes	I never consume it, I don't like it	33 (11,1)
	I consume at least 1-2 times a week	264 (88,9)

While 42.6% (n=127) of the participants consume main meals 1-2 times a day, 53.7%(n=160)consume main meals 2-3 times a day,and 3.7% (n=11) consume main meals more than 3 times a day.

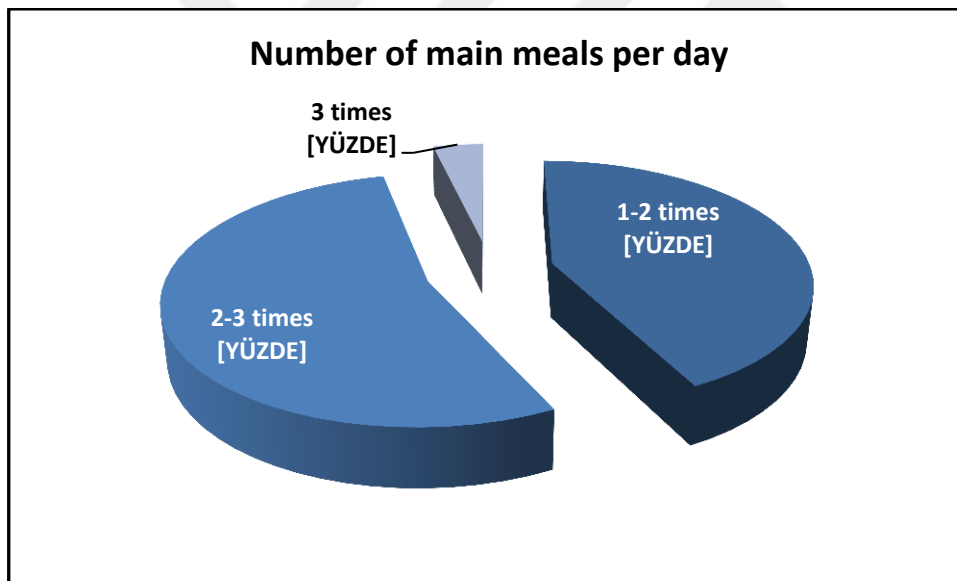


Figure 5. Distribution of Participants According to teh Number of Main Meals a Day

While 76.8% (n=222) of the participants consume snacks 1-2 times a day, 17.6% (n=51) consume snacks 2-3 times and 5.5% (n=16) consume snacks more than 3 times a day.

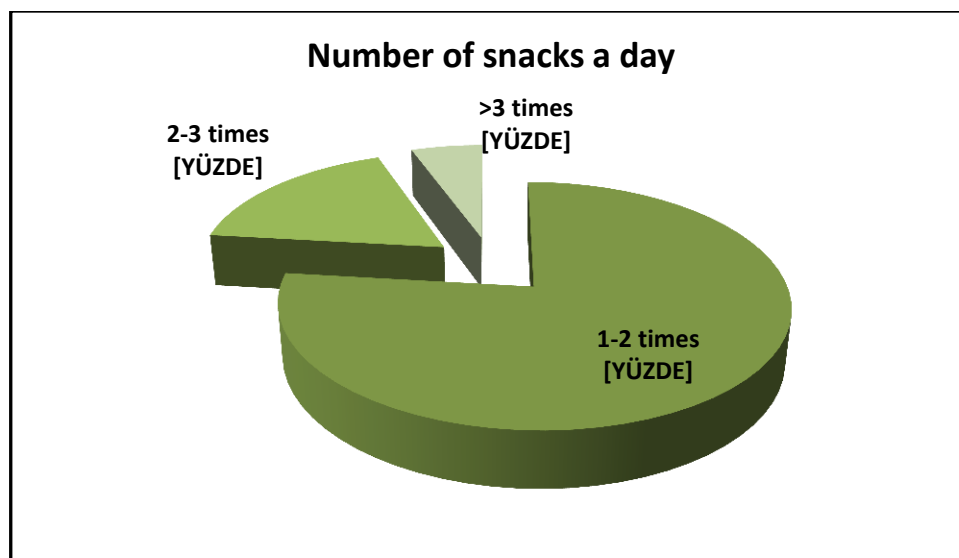


Figure 6. Distribution of Participants According to the Number of Snacks Taken Per Day

Of the subjects, 76.9% (n=230) skipped meals. Among those who skipped meals, 39.6% (n=91) skipped morning meals, 43% (n=99) skipped lunch, 5.7% (n=13) skipped evening meals, and 11.7% (n=27) skipped snacks. When the reasons for skipping meals were analyzed, it was found that 22.6% (n=52) of the subjects had insufficient time, 37.8% (n=87) did not feel like it, 7.4% (n=17) wanted to lose weight, 14.8% (n=34) did not prepare it, and 17.4% (n=40) were not used to it.

When the type of bread consumed most frequently was analyzed, 46.9% (n=138) of the participants consumed white bread, 32.3% (n=95) whole wheat bread, and 3.7% (n=11) whole wheat bread, 3.7% (n=11) consumed village bread, 4.4% (n=13) consumed rye bread, 8.5% (n=25) consumed sourdough bread and 0.3% (n=1) consumed corn bread. Among the participants, 45.5% (n=136) regularly consume probiotic food everyday.

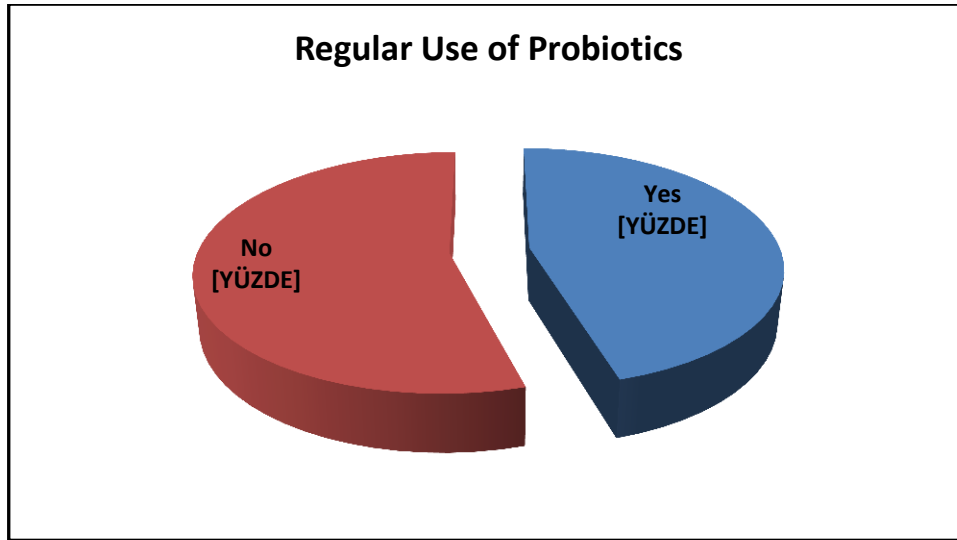


Figure 7. Distribution of Participants According to Regular Probiotic Use

Of the participants, 6.7% (n=20) used probiotic supplements. While 11.1% (n=33) of the participants do not consume dried legumes because they do not like them, 88.9% (n=264) consume them at least 1-2 times a week.

Table 5. Distribution of Responses to Pulp Knowledge Level Questions

		n (%)
Knowing what dietary fiber means	Yes	103 (34,4)
	No	196 (65,6)
Is dietary fiber essential for maintaining a healthy lifestyle and preventing certain diseases?	Yes	109 (36,8)
	No	8 (2,7)
	I don't know	179 (60,5)
Does your stool frequency and stool weight change with increased dietary fiber intake?	Yes	116 (38,9)
	No	10 (3,4)
	I don't know	172 (57,7)
Natural food group with the highest pulp content	Milk and dairy products	4 (1,3)
	Vegetables and fruits	120 (40,3)
	Legumes	58 (19,5)

	Meat and meat products	8 (2,7)
	Bread and cereals	7 (2,3)
	I don't know	101 (33,9)
Fruit consumption status	Yes	248 (82,9)
	No	51 (17,1)
If your answer is “No”, the reason	I don't like	16 (30,8)
	I have no habit	32 (61,5)
	I don't have time to prepare	3 (5,8)
	Expensive	1 (1,9)
In which form he/she prefers to consume fruit most often	Fresh	272 (91,3)
	Dry	8 (2,7)
	Freshly squeezed fruit juice	13 (4,4)
	Instant fruit juice	3 (1,0)
	Fruit Stew / Compote	2 (0,7)
Vegetable consumption	Yes	292 (99,0)
	No	3 (1,0)
In which form he/she prefers to consume vegetables most often	Dew	175 (58,5)
	Cooked meat	106 (35,5)
	Cooked food	141 (47,2)
	Boiling	65 (21,7)
	Steamed	44 (14,7)
	Roast	65 (21,7)
	In the oven	126 (42,1)
	Grilled	60 (20,1)

Of the participants, 34.4% (n=103) knew what dietary fiber means. While 36.8%(n=109) of the participants answered “Yes”, 2.7% (n=8) answered “No” and 60.5% (n=179) answered “I don't know” to the question “Is dietary fiber essential for maintaining a healthy life and preventing some diseases?”.

Then, 38.9% (n=116) of the participants answered “Yes”, 3.4% (n=10) answered “No”, and 57.7%(n=172) answered “I don't know” to the question “Does your stool frequency and stool weight change with increased dietary fiber intake?”.

When the answers given by the participants to the question of the natural food group with the highest fiber content were analyzed, it was found that 1.3% (n=4) answered milk and dairy products, 40.3% (n=120) vegetables and fruits, 19.5% (n=58) legumes, 2.7%(n=8) meat and meat products, 2.3%(n=7) bread and cereals, and 33.9% (n=101) did not know.

Among the participants in the study, 17.1% (n=51) did not consume fruit. Of those who do not consume fruit, 30.8%(n=16) do not consume fruit because they do not like it, 61.5% (n=32) because they are not in the habit, 5.8% (n=3) because they do not have time to prepare it, and 1.9% (n=1) as it is expensive.

It was found that 91.3% (n=272) of the participants preferred to consume fruit in fresh form, 2.7%(n=8) in dried form, 4.4%(n=13) in the form of freshly squeezed fruit juice, 1% (n=3) in the form of ready-made fruit juice, and 0.7% (n=2) in the form of fruit stew/compote.

Vegetables were consumed by 99% (n=292) of the subjects. When it was analyzed in which form they preferred to consume vegetables most frequently, 58.5%(n=175) of the participants ate raw, 35.5% (n=106) cooked with meat, 47.2% (n=141) cooked without meat, 21.7% (n=65) preferred boiling, 14.7% (n=44) steamed, 21.7% (n=65) fried, 42.1% (n=126) baked and 20.1% (n=60) roasted.

4.3. Anthropometric Measurements

Table 6. Evaluations According to BMI Groups

		BMI				P
		Low weight (n=17)	Normal weight (n=168)	Over weight (n=85)	Obese and morbid obese (n=29)	
Meal frequency	1-2 times	8 (47,1)	72 (43,1)	32 (37,6)	15 (51,7)	^b 0,753
	2-3 times	9 (52,9)	90 (53,9)	48 (56,5)	13 (44,8)	

		>3 times	0 (0,0)	5 (3,0)	5 (5,9)	1 (3,4)	
Meal skipping status	Yes	Yes	13 (76,5)	128 (76,2)	66 (77,6)	23 (79,3)	^b 0,984
		No	4 (23,5)	40 (23,8)	19 (22,4)	6 (20,7)	
Regular consumption of probiotic food	Yes	Yes	6 (35,3)	78 (46,4)	40 (47,1)	12 (41,4)	^b 0,806
		No	11 (64,7)	90 (53,6)	45 (52,9)	17 (58,6)	
Knowing dietary means	what fiber	Yes	5 (29,4)	64 (38,1)	23 (27,1)	11 (37,9)	^b 0,333
		No	12 (70,6)	104 (61,9)	62 (72,9)	18 (62,1)	
Which bread he/she consumes often	type of bread	White bread	10 (58,8)	70 (42,4)	43 (51,8)	15 (51,7)	^b 0,753
		Whole wheat bread	4 (23,5)	58 (35,2)	25 (30,1)	8 (27,6)	
		Wholemeal bread	0 (0,0)	6 (3,6)	4 (4,8)	1 (3,4)	
		Village bread	2 (11,8)	4 (2,4)	3 (3,6)	2 (6,9)	
		Rye bread	0 (0,0)	8 (4,8)	3 (3,6)	2 (6,9)	
		Sourdough bread	1 (5,9)	18 (10,9)	5 (6,0)	1 (3,4)	
		Corn bread	0 (0,0)	1 (0,6)	0 (0,0)	0 (0,0)	

^bFisher Freeman Halton Test

According to the BMI groups, the frequency of meals, skipping meals, regular consumption of probiotic foods, knowing the meaning of dietary fiber and the type of bread they consume most frequently did not show statistically significant differences ($p > 0.05$).

4.4.Scales Applied to Individuals

Constipation Severity Scale

Table 7. Distribution of Responses to Constipation Severity Scale Questions

		n (%)
Fecal Obstruction		
How often do you experience incomplete bowel discharge?	I never have this problem	65 (21,7)
	I rarely have this problem	138 (46,2)
	Sometimes I have this problem	45 (15,1)
	I usually have this problem	39 (13,0)
	I always have this problem	12 (4,0)
How serious is this symptom (incomplete bowel movement) for you?	Not serious at all (I don't have this kind of defecation problem most of the time).	58 (24,8)
	Mild	101 (43,2)
	Slightly serious (I still have feces in my intestines after a bowel movement)	33 (14,1)
	Serious	22 (9,4)
	Extremely serious (I feel constant pressure in my rectum due to feces / I go to the toilet repeatedly).	20 (8,5)
How much does this disturb you?	It doesn't bother me at all	32 (13,7)
	A little uncomfortable	113 (48,3)
	It's quite uncomfortable	55 (23,5)
	Very uncomfortable	17 (7,3)
	Extremely uncomfortable	17 (7,3)
How much does this disturb you?	I never feel	52 (17,4)
	I rarely feel	148 (49,5)
	Sometimes I feel	60 (20,1)
	I usually feel	32 (10,7)

	I always feel	7 (2,3)
How serious is this situation for you?	Not serious at all. (I'm pushing a little.)	51 (20,7)
	It's light	128 (52)
	Quite serious (I am pushing seriously.)	19 (7,7)
	Seriously	38 (15,4)
	Extremely serious (I press my stomach, moan and push hard).	10 (4,1)
How uncomfortable is this situation for you?	It doesn't bother me at all	29 (11,8)
	A little uncomfortable	131 (53,5)
	It's quite uncomfortable	51 (20,8)
	Very uncomfortable	14 (5,7)
	Extremely uncomfortable	20 (8,2)
Bowel Laziness		
Think about a time when you had a problem with bowel habits: During the course of a month, how many times do you usually have a bowel movement? (Please mark only one.)	I never have problems with my bowel habits.	33 (11)
	I have a bowel movement every day.	153 (51,2)
	I have a bowel movement several times a week.	97 (32,4)
	I have a bowel movement once a week.	11 (3,7)
	I have a bowel movement once every two weeks.	5 (1,7)
How often do you feel the problem of "defecating less than once every 3 days"?	I never feel	120 (40,1)
	I rarely feel	39 (13)
	Sometimes I feel	86 (28,8)
	I usually feel	34 (11,4)
	I always feel	20 (6,7)
How serious is this symptom (infrequent defecation) for you?	Not serious at all (I have bowel movements almost every day.	47 (26,3)
	Mild	71 (39,7)
	Somewhat serious (I have bowel	34 (19)

	movements 1-2 times a week).	
	Serious	21 (11,7)
	Extremely serious (I can go up to 4 weeks without a bowel movement)	6 (3,4)
How much does this symptom (infrequent defecation) bother you?	Doesn't bother me at all	34 (19,2)
	A little uncomfortable	71 (40,1)
	It's quite uncomfortable	36 (20,3)
	Very uncomfortable	22 (12,4)
	Extremely uncomfortable	14 (7,9)
How serious is your problem of not feeling your bowel movement coming up?	I never have this problem	149 (49,8)
	No problem at all. (I feel my need to empty well.)	57 (19,1)
	Mild	41 (13,7)
	Slightly serious problem (I can vaguely feel the need to void)	30 (10)
	A serious problem	22 (7,4)
How uncomfortable is it for you when you don't feel your bowel movement coming?	It never bothers	124 (41,5)
	It doesn't bother you at all	40 (13,4)
	A little uncomfortable	46 (15,4)
	It's quite uncomfortable	41 (13,7)
	Very uncomfortable	48 (16,1)
Pain		
On average, how severe was the pain in your anus during the past month?	I did not feel any pain	215 (71,9)
	Lightweight	53 (17,7)
	A little strong	25 (8,4)
	Severe	4 (1,3)
	Extremely violent	2 (0,7)
Please indicate the level of pain in your anus at the moment?	No pain	266 (89)
	Lightweight	23 (7,7)
	A little strong	6 (2)

	Severe	2 (0,7)
	Extremely strong	2 (0,7)
How uncomfortable are you because of the pain in your anus?	I'm not uncomfortable at all	226 (75,6)
	Lightweight	38 (12,7)
	A little uncomfortable	22 (7,4)
	Serious	10 (3,3)
	I am very seriously disturbed	3 (1)
During the last month, how often have you had bleeding during or after a bowel movement?	Never	246 (82,3)
	Rarely	39 (13)
	Occasionally	8 (2,7)
	Usually	5 (1,7)
	Always	1 (0,3)

The distribution of the participants' responses to the questions of the Constipation Severity Scale is shown in Table 7.

Table 8. Examination of Constipation Severity Scale Subscales

	Number of Questions	Mean±Sd	Median (Min-Max)	Cronbach's <i>Algha</i>
Bowel Laziness	6	7,58±7,36	8 (0-26)	0,909
Feces obstruction	6	9,65±7,30	10 (0-28)	0,805
Pain	4	1,24±2,30	0 (0-15)	0,837
Total	16	18,46±14,26	16 (0-65)	0,914

The scores obtained by the participants from the “*bowel laziness*” sub-dimension of the Constipation Severity Scale ranged between 0 and 26 points, with a mean score of 7.58±7.36; the scores obtained from the “*Fecal Obstruction*” sub-dimension ranged between 0 and 28 points, with a mean score of 9.65±7.30; The scores obtained from the “*Pain*” sub-dimension ranged between 0 and 15 points, with a mean

score of 1.24 ± 2.30 ; and the scores obtained from the total scale ranged between 0 and 65 points, with a mean score of 18.46 ± 14.26 .

When the internal consistency of the scale was examined; Cronbach's Alpha $\alpha=0.909$ for the sub-dimension of “*Bowel Laziness*”; Cronbach's Alpha $\alpha=0.805$ for the sub-dimension of “*Fecal Obstruction*”; Cronbach's Alpha $\alpha=0.837$ for the sub-dimension of “*Pain*”; and Cronbach's Alpha $\alpha=0.914$ for the total scale, it can be said that the scale is highly reliable.

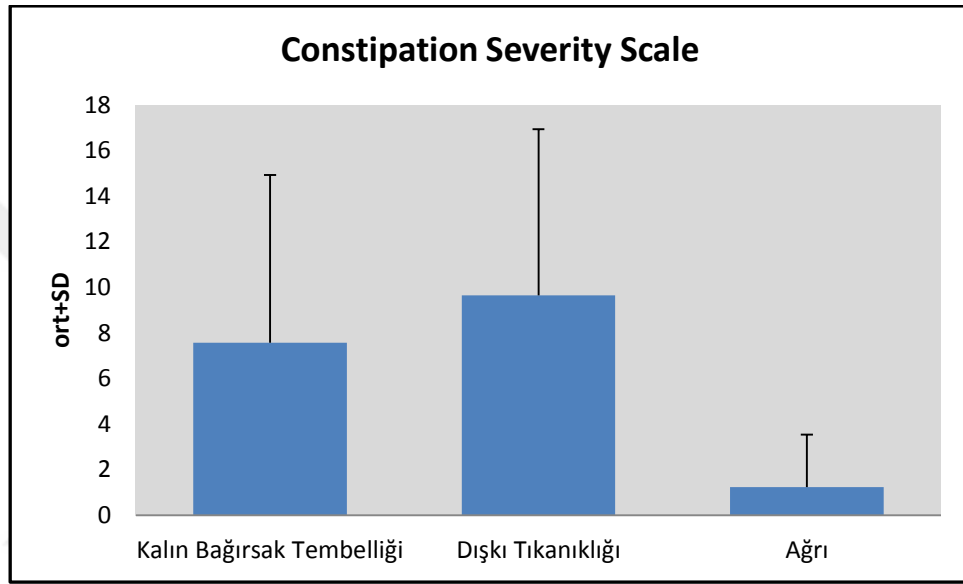


Figure 8. Distribution of Constipation Severity Scale Subscales

Insomnia Severity Index

Table 9. Distribution of Responses to Insomnia Severity Index Questions

a) Difficulty falling asleep	None	198 (66,2)
	Mild	72 (24,1)
	Moderate	18 (6,0)
	Severe	11 (3,7)
	Very severe	0 (0,0)
b) Difficulty maintaining sleep	None	220 (73,6)
	Mild	57 (19,1)
	Moderate	16 (5,4)

	Severe	6 (2,0)
	Very severe	0 (0,0)
c) The problem of waking up too early	None	223 (74,6)
	Mild	49 (16,4)
	Moderate	17 (5,7)
	Severe	10 (3,3)
	Very severe	0 (0,0)
2. How satisfied/dissatisfied are you with your recent sleep patterns?	Very satisfied	52 (17,4)
	Satisfied	81 (27,1)
	Neutral	74 (24,7)
	Not satisfied	68 (22,7)
	Not satisfied at all	24 (8,0)
3. To what extent do you think that your sleep problem interferes with your day-to-day functioning (e.g., daytime burnout, potential for work/daily pursuits, concentration, memory, mood, etc.)?	Definitely not prohibitive	66 (22,1)
	Somewhat obstructive	123 (41,1)
	Quite obstructive	64 (21,4)
	Very obstructive	39 (13)
	Not too much of a blocker	7 (2,3)
4. To what extent do you think your sleep problem is noticeable to others in terms of impairment of your quality of life?	Absolutely unrecognizable	107 (35,8)
	Slightly noticeable	130 (43,5)
	Quite recognizable	38 (12,7)
	Very recognizable	24 (8,0)
	Too much noticeable	0 (0,0)
5. How much do your recent sleep problems worry/stress you?	Absolutely no worries	143 (47,8)
	A little worrying	101 (33,8)
	It is quite worrying	30 (10)
	Very worrying	16 (5,4)
	It worries too much	9 (3,0)

The distribution of the responses of the subjects to the Insomnia Severity Index questions is shown in Table 9.

Table 10. Distribution of Insomnia Severity Index Score

InsomniaSeverityScore	
Number of questions	7
Mean±Sd	6,05±4,68
Median (Min-Max)	5 (0-20)
Cronbach's Alpha	0,848

Insomnia Severity scores of the participants ranged between 0 and 20 points and the mean score was 6.05±4.68.

Cronbach's Alpha $\alpha=0.848$ for the total Insomnia Severity Index, which indicates that the scale is highly reliable.

Table 11. Distribution of Pittsburg Sleep Quality Index Scores

	Mean±Sd	Median (Min-Max)
Subjective Sleep Quality	1,18±0,78	1 (0-3)
Sleep Latency	1,06±0,79	1 (0-3)
Sleep Duration	7,11±1,59	7 (1-13)
Habitual Sleep Activity	0,42±0,82	0 (0-3)
Sleep Disorder	1,35±0,62	1 (0-3)
Use of sleeping pills	0,15±0,57	0 (0-3)
Daytime Dysfunction	1,11±1,04	1 (0-3)
PSQI Total	12,38±2,74	12 (7-22)

The participants' scores on the “*Subjective Sleep Quality*” subscale of the Pittsburg Sleep Quality Index ranged between 0 and 3 points, with a mean score of 1.18±0.78; the scores on the “*Sleep Latency*” subscale ranged between 0 and 3 points, with a mean score of 1.06±0.79; “*Sleep Duration*” subscale scores ranged between 1 and 13 points, with a mean score of 7.11±1.59; “*Habitual Sleep Activity*” subscale scores ranged between 0 and 3 points, with a mean score of 0.42±0.82; “*Sleep Disorder*” sub-dimension ranged between 0 and 3 points, with an average score of 1.35±0.62 points; “*Sleep Medication Use*” sub-dimension ranged between 0 and 3

points, with an average score of 0.15 ± 0.57 points; “Daytime Dysfunction” sub-dimension ranged between 0 and 3 points, with an average score of 1.11 ± 1.04 points; and total scale scores ranged between 7 and 22 points, with an average score of 12.38 ± 2.74 .

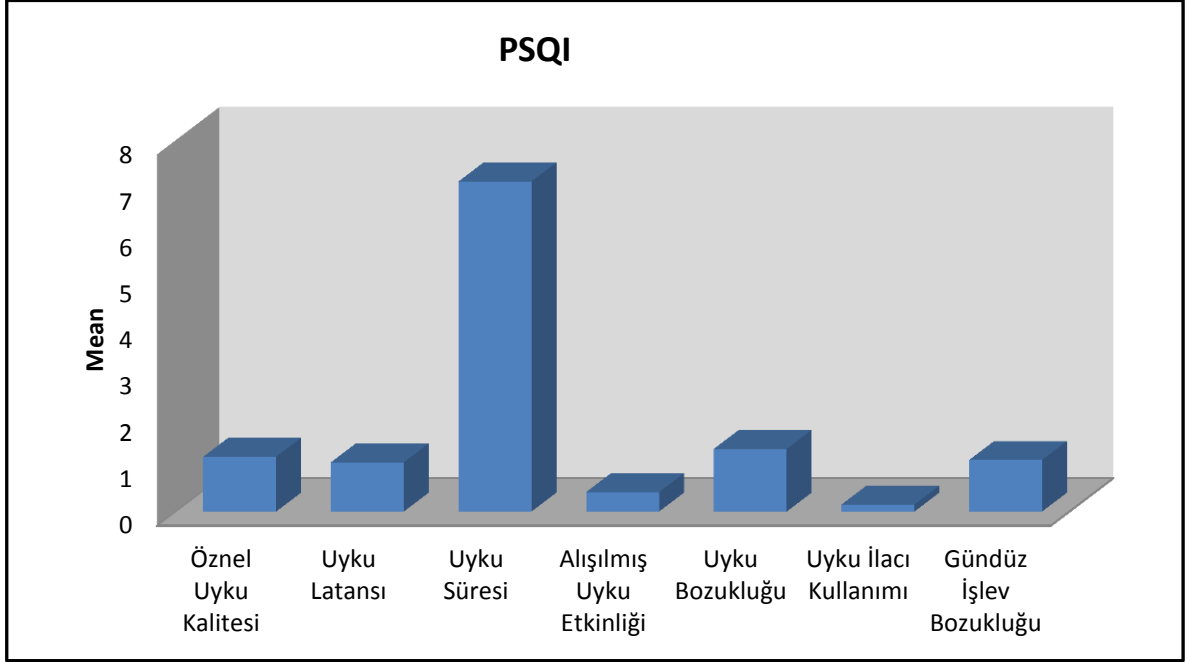


Figure 9. Distribution of PSQI Sleep Quality Index Scores

Table 12. Relationship between Insomnia Severity Index and Constipation Severity Scale

Constipation Severity Scale	InsomniaSeverity Score	
	†r	P
Bowel Laziness	0,207	0,001**
Fecal obstruction	0,354	0,001**
Pain	0,290	0,001**
Total Constipation Severity	0,325	0,001**

†r: Spearman Correlation Coefficient

** $p < 0,01$

There was a statistically significant weak positive correlation (as the total score of Insomnia Severity Index increased, the score of *Bowel Laziness* increased) between the scores obtained from the total score of Insomnia Severity Index and the scores obtained from the “*Bowel Laziness*” sub-dimension of the Constipation Severity Scale ($r=0.207$; $p=0.001$; $p<0.01$).

There was a statistically significant weak positive correlation between the scores obtained from the total Insomnia Severity Index and the scores obtained from the “*Fecal Obstruction*” sub-dimension of the Constipation Severity Scale ($r=0.354$; $p=0.001$; $p<0.01$).

There was a statistically significant weak positive correlation between the scores obtained from the total Insomnia Severity Index and the scores obtained from the “*Pain*” sub-dimension of the Constipation Severity Scale ($r=0.290$; $p=0.001$; $p<0.01$).

There was a statistically significant weak positive correlation between the total scores of the participants on the Insomnia Severity Index and the total scores on the Constipation Severity Scale ($r=0.325$; $p=0.001$; $p<0.01$).

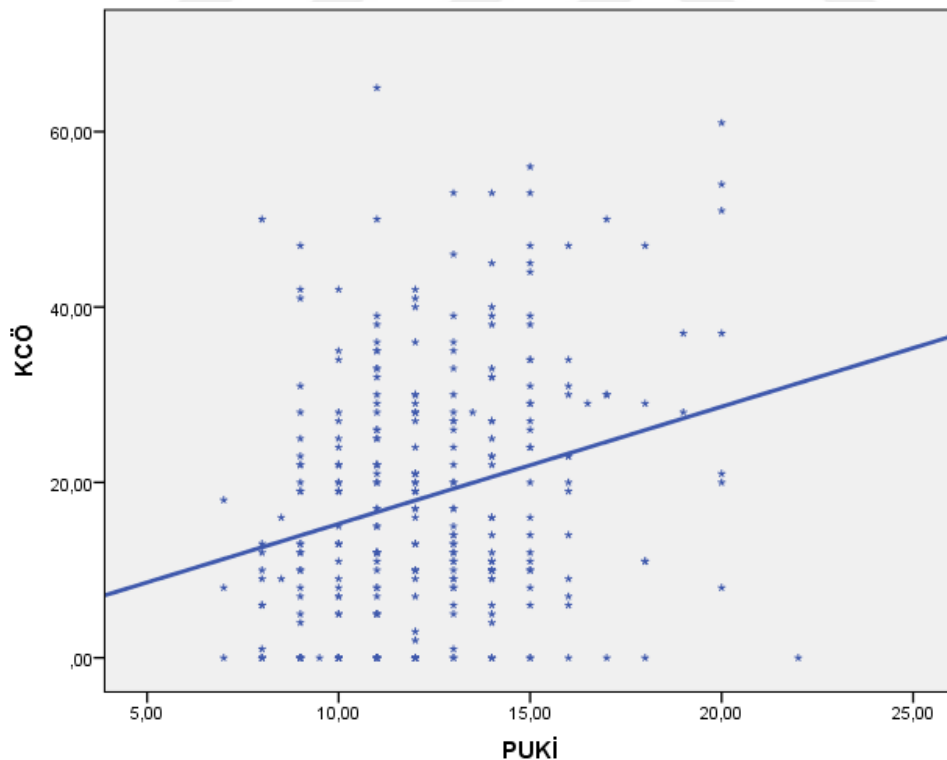


Figure 10. Relationship Between the PSQI Insomnia Severity Index and the Constipation Severity Scale Total

Table 13. Relationship between Insomnia Severity Index and Pittsburg Sleep Quality Index

PSQI	InsomniaSeverityScore	
	r	<i>P</i>
Subjective Sleep Quality	0,627	0,001**
Sleep Latency	0,457	0,001**
Sleep Duration	-0,217	0,001**
Habitual Sleep Activity	0,139	0,016*
Sleep Disorder	0,453	0,001**
Use of sleeping pills	0,146	0,012*
Daytime Dysfunction	0,584	0,001**
Total	0,618	0,001**

r : Spearman Correlation Coefficient

** $p < 0,01$

A statistically significant positive correlation was found between the total scores obtained from the Insomnia Severity Index and the scores obtained from the “*Subjective Sleep Quality*” subscale of the Pittsburg Sleep Quality Index ($r=0.627$; $p=0.001$; $p<0.01$).

There was a statistically significant moderate positive correlation between the scores obtained from the total Insomnia Severity Index and the scores obtained from the “*Sleep Latency*” subscale of the Pittsburg Sleep Quality Index ($r=0.457$; $p=0.001$; $p<0.01$).

A highly statistically significant negative correlation (as the Insomnia Severity Index score increases, the Sleep Duration score decreases) was found between the scores obtained from the total Insomnia Severity Index and the scores obtained from the “*Sleep Duration*” subscale of the Pittsburg Sleep Quality Index ($r=-0.217$; $p=0.001$; $p<0.01$).

There was a statistically significant positive correlation at a very weak level between the total scores obtained from the Insomnia Severity Index and the scores obtained from the “*Habitual Sleep Efficacy*” subscale of the Pittsburg Sleep Quality Index ($r=0.139$; $p=0.016$; $p<0.05$).

A statistically significant moderate positive correlation was found between the scores obtained from the total Insomnia Severity Index and the scores obtained from the “*Sleep Disorder*” subscale of the Pittsburg Sleep Quality Index ($r=0.453$; $p=0.001$; $p<0.01$)

There was a statistically significant positive correlation at a very weak level between the total scores obtained from the Insomnia Severity Index and the scores obtained from the “*SleepMedicationUse*” subscale of the Pittsburg Sleep Quality Index ($r=0.146$; $p=0.012$; $p<0.05$).

There was a statistically significant moderate positive correlation between the scores obtained from the total Insomnia Severity Index and the scores obtained from the “*Daytime Dysfunction*” subscale of the Pittsburg Sleep Quality Index($r=0.584$; $p=0.001$; $p<0.01$).

There was a statistically significant positive correlation between the total scores obtained from the Insomnia Severity Index and the total scores obtained from the Pittsburg Sleep Quality Index ($r=0.618$; $p=0.001$; $p<0.01$).

Table 14. Relationship between Constipation Severity Scale and Pittsburg Sleep Quality Index

			ConstipationSeverityScale			
			Bowel Lazines	Fecal Obstruction	Pain	Constipation Severity Scale
PSQI						
Subjective Quality	Sleep	r	0,107	0,176	0,198	0,166
		p	0,066	0,002**	0,001**	0,004**
Sleep Latency		r	0,185	0,220	0,122	0,229
		p	0,001**	0,001**	0,034*	0,001**
Sleep Duration		r	-0,087	-0,043	-0,137	-0,082
		p	0,134	0,461	0,018*	0,156
Habitual Sleep Activity		r	0,108	0,041	0,071	0,096
		p	0,062	0,480	0,219	0,099
Sleep Disorder		r	0,166	0,277	0,257	0,255
		p	0,004**	0,001**	0,001**	0,001**

Use of sleeping pills	r	0,137	0,069	0,040	0,102
	p	0,018*	0,237	0,492	0,080
Daytime Dysfunction	r	0,022	0,172	0,183	0,115
	p	0,702	0,003**	0,002**	0,048*
Total	r	0,135	0,273	0,186	0,235
	p	0,019*	0,001**	0,001**	0,001**

†r: Spearman Correlation Coefficient

**p<0,01

*p<0,05

There was no statistically significant correlation between the participants' scores on the “*Bowel Laziness*” subscale of the Constipation Severity Scale and their scores on the “*Subjective Sleep Quality*” subscale of the Pittsburgh Sleep Quality Index ($p>0.05$).

There was a statistically significant positive and very weak positive correlation between the participants' scores on the “*Fecal Obstruction*” subscale of the Constipation Severity Scale and their scores on the “*Subjective Sleep Quality*” subscale of the Pittsburgh Sleep Quality Index ($r=0.176$; $p=0.002$; $p<0.01$).

There was a statistically significant positive and very weak positive correlation between the participants' scores on the “*Pain*” subscale of the Constipation Severity Scale and their scores on the “*Subjective Sleep Quality*” subscale of the Pittsburgh Sleep Quality Index ($r=0.198$; $p=0.001$; $p<0.01$).

There was a statistically significant positive correlation at a very weak level between the participants' total scores on the Constipation Severity Scale and their scores on the “*Subjective Sleep Quality*” subscale of the Pittsburgh Sleep Quality Index ($r=0.166$; $p=0.004$; $p<0.01$).

There was a statistically significant positive correlation at a very weak level between the participants' scores on the “*Bowel Laziness*” subscale of the Constipation Severity Scale and their scores on the “*Sleep Latency*” subscale of the Pittsburgh Sleep Quality Index ($r=0.185$; $p=0.001$; $p<0.01$).

There was a statistically significant weak positive correlation between the participants' scores on the “*Fecal Obstruction*” subscale of the Constipation Severity Scale and their scores on the “*Sleep Latency*” subscale of the Pittsburgh Sleep Quality Index ($r=0.220$; $p=0.001$; $p<0.01$).

There was a statistically significant positive correlation at a very weak level

between the participants' scores on the "*Pain*" subscale of the Constipation Severity Scale and their scores on the "*Sleep Latency*" subscale of the Pittsburg Sleep Quality Index ($r=0.122$; $p=0.034$; $p<0.01$).

There was a statistically significant weak positive correlation between the participants' total scores on the Constipation Severity Scale and their scores on the "*Sleep Latency*" subscale of the Pittsburg Sleep Quality Index ($r=0.229$; $p=0.001$; $p<0.01$).

A negative, statistically significant and very weak relationship was found between the participants' scores on the "*Pain*" subscale of the Constipation Severity Scale and their scores on the "*Sleep Duration*" subscale of the Pittsburg Sleep Quality Index ($r=-0.137$; $p=0.018$; $p<0.05$).

There was no statistically significant correlation between the scores obtained by the participants from the sub-dimensions of "*Bowel Laziness*", "*Fecal Obstruction*" and the total scale of the Constipation Severity Scale and the score obtained from the "*Sleep Duration*" sub-dimension of the Pittsburg Sleep Quality Index ($p>0.05$).

There was no statistically significant correlation between the scores obtained by the participants from the sub-dimensions of "*Bowel Laziness*", "*Fecal Obstruction*", "*Pain*" and the total scale of the Constipation Severity Scale and the score obtained from the sub-dimension of "*Habitual Sleep Activity*" of the Pittsburg Sleep Quality Index ($p>0.05$).

There was a statistically significant positive and very weak positive correlation between the participants' scores on the "*Bowel Laziness*" subscale of the Constipation Severity Scale and their scores on the "*Sleep Disorder*" subscale of the Pittsburg Sleep Quality Index ($r=0.166$; $p=0.004$; $p<0.01$).

There was a statistically significant weak positive correlation between the participants' scores on the "*Fecal Obstruction*" subscale of the Constipation Severity Scale and their scores on the "*Sleep Disorder*" subscale of the Pittsburg Sleep Quality Index ($r=0.277$; $p=0.001$; $p<0.01$).

There was a statistically significant weak positive correlation between the participants' scores on the "*Pain*" subscale of the Constipation Severity Scale and their scores on the "*Sleep Disorder*" subscale of the Pittsburg Sleep Quality Index ($r=0.257$; $p=0.001$; $p<0.01$).

There was a statistically significant weak positive correlation between the participants' total scores on the Constipation Severity Scale and their scores on the

“*Sleep Disorder*” subscale of the Pittsburg Sleep Quality Index($r=0.255$; $p=0.001$; $p<0.01$).

There was no statistically significant correlation between the scores obtained by the participants from the sub-dimensions of “*Bowel Laziness*”, “*Fecal Obstruction*”, “*Pain*” and the total scale of the Constipation Severity Scale and the score obtained from the sub-dimension of “*Sleep Medication Use*” of the Pittsburg Sleep Quality Index ($p>0.05$).

There was no statistically significant correlation between the participants' scores on the “*Bowel Laziness*” sub-dimension of the Constipation Severity Scale and their scores on the “*Daytime Dysfunction*” sub-dimension of the Pittsburg Sleep Quality Index ($p>0.05$).

There was a statistically significant positive and very weak positive correlation between the participants' scores on the “*Fecal Obstruction*” subscale of the Constipation Severity Scale and their scores on the “*Daytime Dysfunction*” subscale of the Pittsburg Sleep Quality Index ($r=0.172$; $p=0.003$; $p<0.01$).

There was a statistically significant positive correlation at a very weak level between the participants' scores on the “*Pain*” subscale of the Constipation Severity Scale and their scores on the “*Daytime Dysfunction*” subscale of the Pittsburg Sleep Quality Index ($r=0.183$; $p=0.002$; $p<0.01$).

There was a statistically significant positive correlation at a very weak level between the participants' total scores on the Constipation Severity Scale and their scores on the “*Daytime Dysfunction*” subscale of the Pittsburg Sleep Quality Index ($r=0.115$; $p=0.048$; $p<0.05$).

There was a statistically significant positive correlation at a very weak level between the participants' scores on the “*Bowel Laziness*” sub-dimension of the Constipation Severity Scale and the total score on the Pittsburg Sleep Quality Index ($r=0.166$; $p=0.004$; $p<0.01$).

There was a statistically significant weak positive correlation between the participants' scores on the “*Fecal Obstruction*” sub-dimension of the Constipation Severity Scale and the total score on the Pittsburg Sleep Quality Index ($r=0.277$; $p=0.001$; $p<0.01$).

There was a statistically significant weak positive correlation between the participants' scores on the “*Pain*” sub-dimension of the Constipation Severity Scale and

the total score on the Pittsburg Sleep Quality Index ($r=0.257$; $p=0.001$; $p<0.01$).

There was a statistically significant weak positive correlation between the participants' total scores on the Constipation Severity Scale and their total scores on the Pittsburg Sleep Quality Index ($r=0.255$; $p=0.001$; $p<0.01$).

Table 15. Evaluation of Pittsburg Sleep Index Scores According to Meal Frequency

			Meal Frequency			P
			1-2	2-3	>3	
			(n=127)	times(n=160)	times(n=11)	
Subjective Sleep Quality	<i>Mean±Sd</i>		1,31±0,76	1,12±0,79	0,64±0,50	^a 0,005**
	<i>Median</i>		1 (0-3)	1 (0-3)	1 (0-1)	
	<i>(Min-Max)</i>					
Sleep Latency	<i>Mean±Sd</i>		1,07±0,8	1,08±0,78	0,73±0,65	^a 0,353
	<i>Median</i>		1 (0-3)	1 (0-3)	1 (0-2)	
	<i>(Min-Max)</i>					
Sleep Duration	<i>Mean±Sd</i>		7,02±1,57	7,21±1,63	6,82±1,40	^a 0,660
	<i>Median</i>		7 (2-10)	7 (1-13)	7 (4-8)	
	<i>(Min-Max)</i>					
Habitual Sleep Activity	<i>Mean±Sd</i>		0,48±0,86	0,39±0,8	0,36±0,67	^a 0,632
	<i>Median</i>		0 (0-3)	0 (0-3)	0 (0-2)	
	<i>(Min-Max)</i>					
Sleep Disorder	<i>Ort±Ss</i>		1,38±0,63	1,33±0,61	1,36±0,81	^a 0,663
	<i>Mean±Sd</i>		1 (0-3)	1 (0-3)	1 (0-3)	
Use of sleeping pills	<i>Median</i>		0,14±0,56	0,13±0,53	0,45±1,04	^a 0,380
	<i>(Min-Max)</i>					
	<i>Mean±Sd</i>		0 (0-3)	0 (0-3)	0 (0-3)	
Daytime	<i>Median</i>		1,16±1,07	1,09±1,00	1,00±1,18	^a 0,806

Dysfunction	(Min- Max)				
	Mean±Sd	1 (0-3)	1 (0-3)	1 (0-3)	
Total	Median	12,55±2,54	12,33±2,90	11,36±2,29	^a 0,285
	(Min- Max)				
	Mean±Sd	12 (7-20)	12 (7-22)	11 (8-14)	

^aKruskal Wallis Test**p<0,01

A statistically significant difference was found between the scores obtained from the “Subjective Sleep Quality” sub-dimension of the Pittsburgh Sleep Quality Index according to the meal frequency of the study participants (p=0.005; p<0.01). As a result of the pairwise comparisons made to determine the source of the difference, the scores of those whose meal frequency was 1-2 times were found to be statistically significantly higher than those whose meal frequency was more than 3 times (p=0.013; p<0.05).

According to meal frequency, the scores obtained by the subjects from the Pittsburgh Sleep Quality Index “Sleep Latency”, “Sleep Duration”, “Habitual Sleep Efficiency”, “Sleep Disorder”, “Sleep Medication Use”, “Daytime Dysfunction” sub-dimensions and the total scale did not show statistically significant difference (p>0.05).

Table 16. Evaluation of Pittsburgh Sleep Quality Index Scores According to BMI

		BMI				P
		Low weight(n=17)	Normal weight (n=168)	Over weight (n=85)	Obese and morbid obese (n=29)	
Subjective	Mean±S	1,24±0,66	1,17±0,73	1,12±0,8	1,34±0,86	^a 0,430
Sleep	d			6		
Quality	Median	1 (0-2)	1 (0-3)	1 (0-3)	1 (0-3)	
	(Min- Max)					

Sleep Latency	<i>Mean±S</i>	1,06±0,66	1,12±0,79	1,01±0,7	0,83±0,89	^a 0,343
	<i>d</i>			6		
	<i>Median</i>	1 (0-2)	1 (0-3)	1 (0-2)	1 (0-2)	
	<i>(Min-Max)</i>					
Sleep Duration	<i>Mean±S</i>	7,47±2,24	7,10±1,43	7,05±1,7	7,16±1,64	^a 0,749
	<i>d</i>			5		
	<i>Median</i>	7 (2-11)	7 (3-12,5)	7 (1-13)	7 (3-10)	
	<i>(Min-Max)</i>					
Habitual Sleep Activity	<i>Mean±S</i>	0,59±1,06	0,39±0,78	0,47±0,8	0,41±0,73	^a 0,889
	<i>d</i>			8		
	<i>Median</i>	0 (0-3)	0 (0-3)	0 (0-3)	0 (0-2)	
	<i>(Min-Max)</i>					
Sleep Disorder	<i>Mean±S</i>	1,12±0,33	1,38±0,62	1,27±0,6	1,52±0,78	^a 0,124
	<i>d</i>			1		
	<i>Median</i>	1 (1-2)	1 (0-3)	1 (0-3)	1 (1-3)	
	<i>(Min-Max)</i>					
Use of sleeping pills	<i>Mean±S</i>	0,06±0,24	0,16±0,59	0,09±0,4	0,28±0,84	^a 0,801
	<i>d</i>			3		
	<i>Median</i>	0 (0-1)	0 (0-3)	0 (0-3)	0 (0-3)	
	<i>(Min-Max)</i>					
Daytime Dysfunction	<i>Mean±S</i>	0,65±0,61	1,26±1,05	0,89±0,9	1,14±1,19	^a 0,018
	<i>d</i>			6		*
	<i>Median</i>	1 (0-2)	1 (0-3)	1 (0-3)	1 (0-3)	
	<i>(Min-Max)</i>					
Total	<i>Mean±S</i>	12,18±2,07	12,58±2,8	11,91±2,	12,67±2,7	^a 0,334
	<i>d</i>		9	5	8	
	<i>Median</i>	12 (9-18)	12 (7-22)	12 (7-20)	13 (8-18)	

(Min-
Max)

^aKruskal Wallis Test** $p < 0,01$

A statistically significant difference was found between the scores obtained from the “DaytimeDysfunction” sub-dimension of the Pittsburg Sleep Quality Index according to BMI groups ($p=0.018$; $p < 0.05$). As a result of the pairwise comparisons made to determine the source of the difference; the scores obtained by those who were normal weight were found to be statistically significantly higher than the scores obtained by those who were overweight ($p=0.046$; $p < 0.05$).

According to the BMI groups, the scores obtained by the subjects from the Pittsburg Sleep Quality Index “Subjective Sleep Quality”, “Sleep Latency”, “Sleep Duration”, “Habitual Sleep Efficiency”, “Sleep Disorder”, “Use of sleeping pills” sub-dimensions and the total scale did not show statistically significant difference ($p > 0.05$).

Table 17. Evaluation of Constipation Severity Scale and Insomnia Severity Index Scores According to BMI Groups

		BMI				P
		Low weight (n=17)	Normal weight (n=168)	Over weight (n=85)	Obese and morbid obese (n=29)	
Constipation Severity Scale						
Bowel laziness	<i>Mean±Sd</i>	7,82±6,64	6,86±7,44	8,86±6,79	7,79±8,68	^a 0,189
	<i>Median (Min-Max)</i>	9 (0-21)	5 (0-25)	9 (0-26)	0 (0-24)	
Fecal obstruction	<i>Mean±Sd</i>	8,12±6,22	9,83±7,34	8,61±7,37	12,52±6,92	^a 0,049
	<i>Median (Min-Max)</i>	9 (0-18)	10 (0-28)	10 (0-28)	12 (0-26)	*

	Max)					
Pain	<i>Mean±S</i>	1,47±2,48	1,08±1,92	1,26±2,54	1,97±3,25	^a 0,643
	<i>d</i>					
	<i>Median</i>	0 (0-8)	0 (0-8)	0 (0-15)	0 (0-12)	
	<i>(Min- Max)</i>					
Total	<i>Mean±S</i>	17,41±12,5	17,77±14,	18,73±13,5	22,28±15,7	^a 0,507
	<i>d</i>	5	5	8	1	
	<i>Median</i>	17 (0-47)	15,5 (0-	17 (0-65)	20 (0-56)	
	<i>(Min- Max)</i>		61)			
Insomnia Severity Index						
Total	<i>Mean±S</i>	5,41±3,06	6,14±4,76	5,59±4,58	7,24±5,19	^a 0,475
	<i>d</i>					
	<i>Median</i>	5 (1-12)	5 (0-20)	4 (0-20)	6 (0-18)	
	<i>(Min- Max)</i>					

^aKruskal Wallis Test* $p < 0,05$

A statistically significant difference was found between the scores obtained by the subjects from the “Fecal Obstruction” sub-dimension of the Constipation Severity Scale according to the BMI groups ($p=0.049$; $p < 0.05$). As a result of the pairwise comparisons made to determine the source of the difference, the scores of obese and extremely obese subjects were found to be statistically significantly higher than those of overweight and underweight subjects ($p=0.008$; $p=0.042$; $p < 0.05$).

According to the BMI groups, the scores obtained by the subjects from the “Bowel Laziness” and “Pain” sub-dimensions of the Constipation Severity Scale and the total scale did not show a statistically significant difference ($p > 0.05$).

There was no statistically significant difference between the scores obtained from the Insomnia Severity Index according to BMI groups ($p > 0.05$).

Table 18. Evaluation of Pittsburg Sleep Quality Index Scores According to the Most Frequently Consumed Bread Type

		Which type of bread he/she consumes most often							<i>P</i>
		White bread (n=138)	Whole wheat bread (n=95)	Whole meal bread (n=11)	Village bread (n=11)	Rye bread (n=13)	Sourdough bread (n=25)	Corn Bread (n=1)	
Subjective Sleep Quality	<i>Mean</i>	1,2±0,	1,16±0	1,00±0	1,36±0	1,23±0	1,04±0	1,00±	^a 0,8
	<i>±Sd</i>	84	,69	,77	,92	,73	,73	0,00	47
	<i>Median (Min-Max)</i>	1 (0-3)	1 (0-3)	1 (0-2)	1 (0-3)	1 (0-3)	1 (0-3)	1 (1-1)	
Sleep Latency	<i>Mean</i>	1,14±0	1,03±0	0,91±1	0,73±0	1±0,71	0,92±0	0,00±	^a 0,3
	<i>±Sd</i>	,79	,78	,04	,79		,7	0,00	73
	<i>Median (Min-Max)</i>	1 (0-3)	1 (0-3)	1 (0-3)	1 (0-2)	1 (0-2)	1 (0-2)	0 (0-0)	
Sleep Duration	<i>Mean</i>	6,89±1	7,19±1	7,55±1	8,41±2	7,42±0	7,02±1	5±0	^a 0,1
	<i>±Sd</i>	,67	,44	,44	,91	,76	,05		64
	<i>Median (Min-Max)</i>	7 (1-11)	7 (1-10)	8 (6-10)	8 (3-13)	7 (6-9)	7 (4-8)	5 (5-5)	
Habitual Sleep	<i>Mean</i>	0,58±0	0,35±0	0,09±0	0,27±0	0,31±0	0,24±0	0,00±	^a 0,1
	<i>±Sd</i>	,95	,7	,3	,9	,85	,52	0,00	05
	<i>Median</i>	0 (0-3)	0 (0-3)	0 (0-1)	0 (0-3)	0 (0-3)	0 (0-2)	0 (0-	

Activity	<i>an</i>								0)
	(Min- Max)								
Sleep Disorder	<i>Mean</i>	1,35±0	1,32±0	1,00±0	1,64±0	1,69±0	1,28±0	1,00±	^a 0,0
	<i>±Sd</i>	,64	,62	,45	,67	,63	,46	0,00	58
	<i>Median</i>	1 (0-3)	1 (0-3)	1 (0-2)	2 (1-3)	2 (1-3)	1 (1-2)	1 (1-1)	
	(Min- Max)								
Use of sleeping pills	<i>Mean</i>	0,14±0	0,19±0	0,00±0	0,00±0	0,00±0	0,12±0	0,00±	^a 0,2
	<i>±Sd</i>	,59	,57	,00	,00	,00	,6	0,00	48
	<i>Median</i>	0 (0-3)	0 (0-3)	0 (0-0)	0 (0-0)	0 (0-0)	0 (0-3)	0 (0-0)	
	(Min- Max)								
Daytime Dysfunction	<i>Mean</i>	1,14±1	1,17±0	0,55±0	0,82±1	1,08±1	1,08±1	0,00±	^a 0,4
	<i>±Sd</i>	,1	,99	,69	,08	,04	,04	0,00	56
	<i>Median</i>	1 (0-3)	1 (0-3)	0 (0-2)	0 (0-3)	1 (0-3)	1 (0-3)	0 (0-0)	
	(Min- Max)								
Total	<i>Mean</i>	12,45±	12,41±	11,09±	13,23±	12,73±	11,7±2	7±0	^a 0,4
	<i>±Sd</i>	2,91	2,26	2,91	3,78	2,76	,43		35
	<i>Median</i>	12 (7-22)	12 (8-20)	10 (8-17)	11 (9-20)	12 (8-20)	12 (8-16)	7 (7-7)	
	(Min- Max)								

Not included in the comparison due to insufficient number of observations

^aKruskal Wallis Test

According to the type of bread they consume most frequently, the scores of the participants from the Pittsburgh Sleep Quality Index sub-dimensions and the total scale do not show statistically significant difference ($p > 0.05$).

Table 19. Evaluation of Pittsburg Sleep Quality Index Scores According to Alcohol Use

			Alcohol consumption		P
			Yes (n=65)	No (n=232)	
Subjective Quality	Sleep	<i>Mean±Sd</i>	1,31±0,79	1,14±0,78	^c 0,176
		<i>Median (Min- Max)</i>	1 (0-3)	1 (0-3)	
Sleep Latency		<i>Mean±Sd</i>	1,05±0,8	1,06±0,79	^c 0,905
		<i>Median (Min- Max)</i>	1 (0-3)	1 (0-3)	
Sleep Duration		<i>Mean±Sd</i>	7,08±1,53	7,12±1,62	^c 0,467
		<i>Median (Min- Max)</i>	7 (3-12,5)	7 (1-13)	
Habitual Activity	Sleep	<i>Mean±Sd</i>	0,32±0,69	0,46±0,86	^c 0,319
		<i>Median (Min- Max)</i>	0 (0-3)	0 (0-3)	
Sleep Disorder		<i>Mean±Sd</i>	1,35±0,65	1,34±0,62	^c 0,891
		<i>Median (Min- Max)</i>	1 (0-3)	1 (0-3)	
Use of sleeping pills		<i>Mean±Sd</i>	0,23±0,75	0,11±0,47	^c 0,465
		<i>Median (Min- Max)</i>	0 (0-3)	0 (0-3)	
Daytime Dysfunction		<i>Mean±Sd</i>	1,25±1,08	1,06±1,02	^c 0,217
		<i>Median (Min- Max)</i>	1 (0-3)	1 (0-3)	
Total		<i>Mean±Sd</i>	12,59±3,15	12,29±2,61	^c 0,688
		<i>Median (Min- Max)</i>	12 (8-22)	12 (7-20)	

^cMann Whitney U Test

According to alcohol consumption, the scores of the participants obtained from the Pittsburgh Sleep Quality Index sub-dimensions and the total scale do not show statistically significant difference ($p>0.05$)

Table 20. Evaluation of Pittsburgh Sleep Quality Index and Constipation Severity Scale Scores According to Regular Physical Activity

			Regular Physical Activity		P
			Yes (n=97)	No (n=201)	
Subjective Sleep Quality	<i>Ort±Ss</i>		1,09±0,74	1,21±0,8	^c 0,135
	<i>Median (Min-Max)</i>		1 (0-3)	1 (0-3)	
Sleep Latency	<i>Mean±Sd</i>		0,99±0,78	1,09±0,79	^c 0,274
	<i>Median (Min-Max)</i>		1 (0-3)	1 (0-3)	
Sleep Duration	<i>Median (Min-Max)</i>		7,45±1,65	6,95±1,54	^c 0,010*
	<i>Mean±Sd</i>		8 (1-13)	7 (1-11)	
Habitual Sleep Activity	<i>Median (Min-Max)</i>		0,38±0,78	0,45±0,84	^c 0,532
	<i>Median (Min-Max)</i>		0 (0-3)	0 (0-3)	
Sleep Disorder	<i>Mean±Sd</i>		1,25±0,61	1,4±0,63	^c 0,054
	<i>Median (Min-Max)</i>		1 (0-3)	1 (0-3)	
Use of sleeping pills	<i>Median (Min-Max)</i>		0,2±0,66	0,12±0,52	^c 0,247
	<i>Mean±Sd</i>		0 (0-3)	0 (0-3)	
Daytime Dysfunction	<i>Median (Min-Max)</i>		0,92±0,98	1,20±1,05	^c 0,030*
	<i>Median (Min-Max)</i>		1 (0-3)	1 (0-3)	
Total	<i>Mean±Sd</i>		12,28±2,96	12,43±2,64	^c 0,484
	<i>Median (Min-Max)</i>		12 (7-22)	12 (7-20)	

Max)					
Constipation Severity Scale					
Bowel Laziness	Median (Min- Max)	6,42±7,07 5 (0-26)	8,17±7,45 9 (0-24)	^c 0,044*	
	Mean±Sd				
Fecal obstruction	Median (Min- Max)	7,71±7,21 9 (0-28)	10,63±7,16 11 (0-28)	^c 0,002**	
	Median (Min- Max)				
Pain	Mean±Sd	0,84±1,84	1,44±2,47	^c 0,049*	
	Median (Min- Max)	0 (0-9)	0 (0-15)		
Total	Median (Min- Max)	14,97±13,09 12 (0-61)	20,24±14,48 19 (0-65)	^c 0,002**	
	Mean±Sd				

^cMann Whitney U Test

* $p < 0,05$

The scores obtained from the “*SleepDuration*” sub-dimension of the Pittsburgh Sleep Quality Index by those who engaged in regular physical activity were found to be statistically significantly higher ($p=0.010$; $p<0.05$).

The scores obtained from the “*Daytime Dysfunction*” sub-dimension of the Pittsburgh Sleep Quality Index by those who engaged in regular physical activity were found to be statistically significantly lower ($p=0.030$; $p<0.05$).

The scores of the participants on the Pittsburgh Sleep Quality Index “*Subjective Sleep Quality*”, “*Sleep Latency*”, “*Habitual Sleep Efficacy*”, “*SleepDisorder*”, “*Use of sleeping pills*” sub-dimensions and the total scale did not show statistically significant difference according to their regular physical activity status ($p>0.05$).

The scores of those who practiced regular physical activity on the “*Bowel Laziness*” sub-dimension of the Constipation Severity Scale were found to be statistically significantly lower ($p=0.044$; $p<0.05$).

The scores obtained from the “*Fecal Obstruction*” sub-dimension of the Constipation Severity Scale by those who engaged in regular physical activity were found to be statistically significantly lower ($p=0.002$; $p<0.01$).

The scores obtained from the “*Pain*” sub-dimension of the Constipation Severity Scale by those who practiced regular physical activity were found to be statistically significantly lower ($p=0.049$; $p<0.05$).

Those who practiced regular physical activity had statistically significantly lower scores on the total Constipation Severity Scale ($p=0.002$; $p<0.01$).

Table 21. Evaluation of Constipation Severity Scale Scores According to Meal Skipping Status

			Meal skipping status		P
			Yes (n=230)	No (n=69)	
Bowel Laziness	Median (Min-Max)		7,67±7,47	7,28±7,04	^c 0,737
	Mean±Sd		8 (0-26)	8 (0-24)	
Fecal obstruction	Median (Min-Max)		10,02±7,47	8,41±6,62	^c 0,127
	Median (Min-Max)		10 (0-28)	10 (0-26)	
Pain	Mean±Sd		1,34±2,39	0,9±1,91	^c 0,130
	Median (Min-Max)		0 (0-15)	0 (0-9)	
Total	Median (Min-Max)		19,03±14,78	16,58±12,25	^c 0,342
	Mean±Sd		16 (0-65)	17 (0-50)	

^cMann Whitney U Test

According to meal skipping status, the scores of the participants obtained from the sub-dimensions of the Constipation Severity Scale and the total scale do not show a statistically significant difference ($p>0.05$).

Table 22. Evaluation of Constipation Severity Scale Scores by Employment Status

		Employment		P
		Yes (n=230)	No (n=69)	
Bowel Laziness	Median (Min-Max)	7,29±7,37	8,08±7,34	^c 0,363
	Mean±Sd	8 (0-24)	8,5 (0-26)	
Fecal obstruction	Median (Min-Max)	9,25±7,14	10,27±7,6	^c 0,397
	Median (Min-Max)	10 (0-28)	10 (0-28)	
Pain	Mean±Sd	1,20±2,19	1,28±2,47	^c 0,980
	Median (Min-Max)	0 (0-15)	0 (0-12)	
Total	Median (Min-Max)	17,74±13,99	19,63±14,65	^c 0,303
	Mean±Sd	16 (0-65)	17 (0-61)	

^cMann Whitney U Test

According to the employment status, the scores of the participants from the sub-dimensions of the Constipation Severity Scale and the total scale do not show statistically significant difference ($p>0.05$).

Table 23. Evaluation of Constipation Severity Scale Scores by Type of Work

		Type of employment			P
		Continuously morning (n=178)	Continuously night (n=1)	Shift system (n=32)	
Bowel Laziness	<i>Median</i>	7,31±7,37	14,00±0,00	9,72±7,91	^c 0,095
	<i>(Min-Max)</i>				
	<i>Mean±Sd</i>	8 (0-26)	14 (14-14)	9,5 (0-25)	
Fecal obstruction	<i>Median</i>	9,34±7,13	18,00±0,00	10,81±7,42	^c 0,309
	<i>(Min-Max)</i>				
	<i>Median (Min-Max)</i>	10 (0-28)	18 (18-18)	11 (0-28)	
Pain	<i>Mean±Sd</i>	1,16±2,25	2,00±0,00	1,66±2,27	^c 0,042*
	<i>Median</i>	0 (0-15)	2 (2-2)	1 (0-8)	
	<i>(Min-Max)</i>				
Total	<i>Median</i>	17,81±14,01	34,00±0,00	22,19±15,29	^c 0,121
	<i>(Min-Max)</i>				
	<i>Mean±Sd</i>	16 (0-65)	34 (34-34)	22 (0-61)	

^cNot included in the comparison due to insufficient number of observations.

^cMann Whitney U Test* $p < 0,05$

The scores obtained from the “*Pain*” sub-dimension of the Constipation Severity Scale by those working with the shift system were found to be statistically significantly higher ($p=0.042$; $p < 0.05$).

According to the working styles, the scores of the participants obtained from the sub-dimensions of the Constipation Severity Scale “*Bowel Laziness*” and “*Fecal Obstruction*” and the total scale do not show statistically significant difference ($p > 0.05$).

5.DISCUSSION

5.1. Relationship Between Meal Frequency and Body Mass Index

Relationship between meal frequency and BMI has been examined in several research articles. A study of adults found that people who ate 1 or 2 meals a day had a reduction in Body Mass Index over a year compared to those who ate 3 meals a day. On the other hand, eating more than 3 meals a day (snacking) has been associated with a relative increase in BMI. (82)

Another study concluded that frequency of food consumption was not significantly associated with BMI and that hereditary involvement was more important than frequency of food consumption in maintaining the BMI of the study subjects. The study shed light on the fact that family history of obesity or thinness (thinness grade 1) was significant with respect to BMI.

The recommendation of nutrition education to improve physical activity for overweight, obese and underweight individuals was emphasized, especially if there is a family history of hereditary obesity or underweight. (83)

Another study focusing on black and white adolescent girls found that meal frequency was inversely associated with BMI. This means that higher meal frequency is associated with lower BMI in girls (84).

According to the current study, meal frequency and meal skipping status of the participants according to BMI groups did not show statistically significant difference ($p > 0.05$).

Many factors such as insufficient number of observations and hereditary factors may be among the reasons why no significant relationship was found between meal frequency and BMI in the study.

In general, research shows that there is an association between meal frequency and BMI: eating fewer meals may be associated with a reduction in BMI, while greater meal frequency may be associated with higher BMI. It is important to note that these findings may vary depending on the population studied, the nutrient content of the meals and genetic makeup. Further research is needed before we can clearly comment on relationship between meal frequency and BMI.

5.2.Relationship Between Meal Frequency and Sleep Quality

Foods consumed close to the sleep period, such as dinner and night snacks, are known to negatively affect sleep quality (85).

Eating at night has been associated with negative effects on sleep quality in healthy individuals (86). Late food intake has been associated with impaired sleep quality (87). Observational studies have shown that eating or drinking close to bedtime is associated with an increased risk of shortened sleep duration (88). Diet composition and meal timing may be associated with sleep disturbances, especially among night shift workers (89). There is evidence of a bidirectional relationship between sleep duration, sleep quality and food consumption, where poor sleep quality can affect eating habits and appetite (90).

Overall, the research suggests that consuming food close to bedtime, especially heavy meals or snacks, can have a negative impact on sleep quality. For better sleep quality, it is generally recommended to allow at least three hours between the last meal of the day and bedtime. (85)

In the study, a statistically significant difference was found between the scores obtained from the “*Subjective Sleep Quality*” sub-dimension of the Pittsburgh Sleep Quality Index according to the meal frequency of the study participants.

As a result of the pairwise comparisons made to determine the source of the difference, the scores of those whose meal frequency was 1-2 times were found to be statistically significantly higher than those whose meal frequency was more than 3 times. This result can be interpreted as a decrease in sleep quality with a decrease in the number of meals.

In a 2019 thesis study on this subject, relationship between meal frequency and sleep quality was not found to be statistically significant (91).

In addition, more research is needed to fully understand the complex relationship between meal frequency and sleep quality.

5.3.Relationship between constipation and BMI

One of the studies on this subject found that relationship between constipation and BMI has a bimodal distribution with age. Under 18 years of age, boys and girls with constipation had a higher prevalence of obesity compared to the control group. (92)

In another study focusing on the comparison of BMI values of children with functional constipation and healthy children, no statistically significant difference was

found between constipation and BMI (93).

Another study conducted on adolescents did not find a relationship between overweight and constipation. However, there was a relationship between overweight and fecal incontinence (94).

A study on relationship between obesity and functional gastrointestinal disorders found no statistically significant association between obesity and constipation (95).

A study conducted on adults with obesity class II and III emphasized that obesity is associated with constipation. However, he also stated that constipation is not accepted as a causal factor for obesity (96).

In the study, a statistically significant difference was found between the scores obtained by the subjects from the “*Fecal Obstruction*” sub-dimension of the Constipation Severity Scale according to the BMI groups ($p=0.049$; $p<0.05$). As a result of the pairwise comparisons made to determine the source of the difference, the scores of obese and extremely obese subjects were found to be statistically significantly higher than those of overweight and underweight subjects ($p=0.008$; $p=0.042$; $p<0.05$).

According to the BMI groups, the scores obtained by the subjects from the “*Bowel Laziness*” and “*Pain*” sub-dimensions of the Constipation Severity Scale and the total scale did not show a statistically significant difference ($p>0.05$).

In another study aiming to evaluate relationship between functional constipation and obesity in the pediatric population, a significantly increased risk of obesity was observed in boys with functional constipation. A statistically significant association was observed between overweight/obesity and increased risk of functional constipation in children and adolescents, especially in developed countries (97).

In general, relationship between constipation and BMI is complex. This relationship may vary depending on factors such as age groups and study population. Some studies support the idea that there is an association between obesity and constipation, while others do not find a significant association. More research is needed to fully understand the link between constipation and BMI.

5.4. Relationship Between Sleep Quality and BMI

There is an association between sleep quality and Body Mass Index (BMI) among young adults. Several studies have found that poor sleep quality is associated with higher BMI (98,99,98).

In these studies, the Pittsburgh Sleep Quality Index (PSQI), a reliable and valid

instrument specifically designed to measure sleep quality, was used to assess sleep quality (99).

The PSQI consists of 19 questions that form 7 main components and a higher score indicates poorer sleep quality (98,99).

A study focusing specifically on the Korean population found that short sleep duration and poor sleep quality were more positively associated with obesity across BMI than underweight (100).

In another study conducted among university students, an inverse relationship was found between sleep quality and BMI, especially in women (101).

A study with a sample of 1117 women aged 20-69 years concluded that poor sleep quality was associated with lower physical activity, higher physical activity levels were associated with lower BMI and waist circumference, poor sleep quality may have a non-significant direct effect on BMI and waist circumference, and low physical activity showed a significant indirect effect on the association between poor sleep quality and increased waist circumference (102).

In the study, a statistically significant difference was found between the scores obtained by the subjects from the “*Daytime Dysfunction*” sub-dimension of the Pittsburgh Sleep Quality Index according to BMI groups ($p=0.018$; $p<0.05$). As a result of the pairwise comparisons made to determine the source of the difference; the scores obtained by those who were normal weight were found to be statistically significantly higher than the scores obtained by those who were overweight ($p=0.046$; $p<0.05$).

This contradicts the interpretation that sleep quality increases as the BMI value decreases.

According to the BMI groups, the scores obtained by the subjects from the Pittsburgh Sleep Quality Index “*Subjective Sleep Quality*”, “*Sleep Latency*”, “*Sleep Duration*”, “*Habitual Sleep Efficiency*”, “*Sleep Disorder*”, “*Use of sleeping pills*” sub-dimensions and the total scale did not show statistically significant difference ($p>0.05$).

Overall, these findings suggest that there is a link between sleep quality and BMI and that poor sleep quality is associated with higher BMI. It is important to promote healthy sleep habits and lifestyle interventions to prevent sleep disorders and maintain a healthy weight (1)(98).

The reason for the opposite conclusion in our study may be the small sample size in our study or the high number of differences between normal weight individuals (56.2%) and overweight (28.4%) and obese (9.7%) individuals according to BMI values.

5.5.Relationship between Insomnia Severity Index and BMI

Regression analyses of a study among adolescents indicated that higher BMI Z-score modestly predicted baseline insomnia severity and poorer sleep hygiene. For children, higher BMI Z-score was modestly associated with total sleep problems at baseline, but not with insomnia severity. Although there is evidence that children with higher body mass present to insomnia treatment with more sleep concerns, body mass did not predict treatment completion or insomnia improvement, and the data suggest that insomnia treatment is effective regardless of weight status (103).

In another study, among the youngest respondents, there was a linear relationship with the highest BMI being associated with the shortest sleepers and the lowest BMI being associated with the longest sleepers. These findings may provide insights for clinical recommendations and may help guide mechanistic research on the sleep-obesity relationship (104).

A study assessing sleep disturbances in healthy individuals concluded that participants with a BMI within the recommended range (18.5-24.99) suffered less from insomnia than participants who were underweight ($BMI < 18.5$) or overweight/obese ($BMI \geq 25$). (105)

A study investigating the effect of time-restricted feeding on sleep quality concluded that small reductions in BMI reduced the severity of insomnia (106).

Another study investigating relationship between insomnia severity and health outcomes concluded that insomnia severity is linearly related to the majority of health outcomes (107).

A study investigating relationship between sleep disorders and health-related quality of life found that the ISI, a well-established measure of insomnia symptoms, is widely used as a subjective index of sleep difficulties (108).

In the present study, no statistically significant difference was found between the total scores of the Insomnia Severity Index according to BMI groups ($p > 0.05$).

The reason for this is that 0-7 points obtained from the insomnia severity index scale indicates a clinically insignificant level of insomnia and in our study, it was stated that the average score was 6 according to the answers given to the 7 questions in the scale. The fact that the individuals in our study did not suffer from severe insomnia may be effective in the fact that we did not find significant results.

Overall, studies suggest an association between BMI and insomnia severity. However, studies do not provide a clear consensus on the nature of the association.

5.6.Relationship between Sleep Duration and Body Mass Index

In the last two decades, there have been numerous epidemiological studies on obesity and sleep duration, focusing on body mass index because It is easy and inexpensive to measure and analyze. (109) Overall, epidemiological evidence suggests that the association between BMI and sleep duration is stronger in children than in adults because a decrease in effect size as a function of age has been observed.

One study on this issue concluded cross-sectionally that a higher BMI is associated with shorter sleep, and in longitudinal studies shorter sleep duration is associated with an increase in BMI over time (109).

Another study suggested that the association between sleep duration and BMI maybe age dependent, with shorter sleep duration being associated with higher BMI in unadjusted analyses only for 18-29- and 30–49-year-olds (104).

Less than 7 hours of short sleep duration has been associated with higher rates of overweight and obesity (110).

Another study reported that shorter sleep duration and greater sleep variability were associated with higher BMI (111).

In the present study, according to the BMI groups, the scores obtained by the subjects from the Pittsburgh Sleep Quality Index “*Subjective Sleep Quality*”, “*Sleep Latency*”, “*Sleep Duration*”, “*Habitual Sleep Efficiency*”, “*Sleep Disorder*”, “*Use of sleeping pills*” sub-dimensions and the total scale did not show statistically significant difference ($p>0.05$).

Overall, relationship between sleep duration and BMI is complex and may depend on several factors such as age and sleep variability. Some studies have found a clear association between shorter sleep and higher BMI, while others have found no association or even an inverse association.

The reason why a significant relationship was not found in our study may be due to the age differences of the individuals in our study.

5.7. Relationship Between Constipation and Sleep Quality

Studies have suggested that unhealthy sleep patterns are closely associated with gastrointestinal diseases, but the effect of unhealthy sleep duration on chronic constipation has not been well studied. One study aimed to investigate relationship between sleep duration and constipation in men and women. It found that short sleep duration was associated with a higher risk of constipation in men and excessive sleep duration was associated with a higher risk of constipation in women (112).

Another study highlighted that poor sleep can predispose a previously healthy person to constipation. (113)

A study of patients with functional constipation found that sleep deprivation was associated with worse constipation-related symptoms, altered anorectal function and perception, and impaired autonomic function (114).

A three-year cross-sectional study suggested a strong association between sleep disturbances and constipation symptoms in shift workers (115).

A nation wide survey found that both decreased and increased sleep were associated with constipation among US adults (116).

Digestive health experts have long believed that sleep quality and gastrointestinal symptoms such as bloating, constipation and diarrhea are linked (117).

In the present study, there was a statistically significant weak positive correlation between the participants' total scores on the Constipation Severity Scale and their total scores on the Pittsburgh Sleep Quality Index.

Overall, the exact nature of relationship between constipation and sleep quality is not fully understood, but there is evidence to suggest that poor sleep may increase the risk of constipation and increase symptoms. It is thought that more research is needed to better understand this relationship.

5.8. Constipation and way of operation

Many studies have shown that shift workers tend to report other mental health problems such as insomnia and depression more than other workers [118,119,120].

According to the search results, there is an association between constipation and working hours, especially for shift workers. A study of 17,529 shift workers found that sleep deprivation was significantly associated with constipation, and further adjustment of working hours did not reduce this association (115).

Therefore, shiftworkers may be prone to increased risks of other medical conditions (121).

According to the results of the study, the scores of the participants working with the shift system on the “*Pain*” sub-dimension of the Constipation Severity Scale were found to be statistically significantly higher, but the scores of the participants on the “*Bowel Laziness*” and “*Fecal Obstruction*” sub-dimensions of the Constipation Severity Scale and the total scale did not differ statistically significantly according to their working styles.

The reason for the lack of significant results in all subunits may be that our study was not conducted only on individuals with chronic constipation..

5.9.Relationship Between Sleep Quality and Alcohol Consumption

Alcohol has sedative effects that can trigger feelings of relaxation and sleepiness, which can help you start to fall a sleep and help you fall a sleep faster (124). However, consuming alcohol, especially excessive amounts, has been associated with poor sleep quality and duration (123,124).

Specifically, we found that alcohol consumption patterns were associated with subjective sleep quality, sleep duration and sleep maintenance. In contrast, sleep latency was not associated with alcohol consumption level. In other words, men who consume more alcohol appear to suffer from poor sleep quality in general, have difficulty maintaining sleep rather than falling a sleep, have shorter overall sleep duration, and thus have worse subjective sleep quality (123).

The correlation between alcohol consumption and sleep quality among men in the study was consistent with results previously reported by Roehrs and Roth (122) that alcohol generally impairs sleep.

The study concluded that drinking increases sleepiness momentarily, but then causes sleep disruption and decreases sleep quality (123).

Higher alcohol consumption is associated with lower sleep quality and higher snoring and shorter sleep duration (125).

It is important to remember that although alcohol can help with sleep onset, it can negatively affect the quality and duration of sleep and should not be relied upon as a sleep aid.

In another population-based study with 11,905 participants, a significant linear relationship was observed between alcohol intake and poor overall sleep quality after 6

years. Specifically, people with higher alcohol consumption were more likely to have short sleep duration and snoring (126).

In the current study, the scores of the participants on the Pittsburg Sleep Quality Index sub-dimensions and the total scale did not show a statistically significant difference according to alcohol use. This may be due to the small number of participants in the study or the fact that individuals who do not use alcohol (n=232) outnumber individuals who use alcohol (n=65).

5.10. Relationship between Sleep Quality and Physical Activity

According to various studies, there is a strong relationship between sleep quality and physical activity. A study of Saudi Arabian university students concluded that being physically active is significantly associated with good sleep quality (127).

Across-sectional studies showed that neither intensity nor duration of physical activity was associated with sleep quality or quantity (128).

Another study adopted the idea that moderate physical exercise benefits sleep quality in all age groups in the healthy population, given that physical intensity is well known (129).

In the study, the scores of those who performed regular physical activity on the “*Sleep Duration*” subscale of the Pittsburg Sleep Quality Index were found to be statistically significantly higher.

The scores obtained from the “*Daytime Dysfunction*” sub-dimension of the Pittsburg Sleep Quality Index by those who engaged in regular physical activity were found to be statistically significantly lower.

5.11. Relationship between Constipation and Physical Activity

In a study of inactive middle-aged obese women with chronic constipation symptoms, it was observed that defecation patterns and transit times improved after regular physical activity. Adolescents with constipation were found to have insufficient physical activity and to have an excessively sedentary life, which can be prevented by increasing physical activity (130).

In another study, at the population level, self-reported physical inactivity was not strongly associated with <3 stools/week or hard/lumpy stools. Better designed studies are needed to clarify how physical inactivity affects different forms of constipation (131).

Another study concluded that exercise may be a feasible and effective treatment option for patients with constipation. However, due to methodological shortcomings, the actual effect of this intervention could not be conclusively determined. Therefore, researchers should design more detailed studies to evaluate the effect of exercise on constipation (132).

In the present study, the scores of those who practiced regular physical activity on the “*Bowel Laziness*” sub-dimension of the Constipation Severity Scale were found to be statistically significantly lower.

The scores obtained from the “*Fecal Obstruction*” sub-dimension of the Constipation Severity Scale by those who engaged in regular physical activity were found to be statistically significantly lower. The scores obtained from the “*Pain*” sub-dimension of the Constipation Severity Scale by those who practiced regular physical activity were found to be statistically significantly lower. Those who engaged in regular physical activity had statistically significantly lower scores on the total Constipation Severity Scale. However, more studies are needed to provide clearer opinions on this issue.

5.12. Relationship between Probiotic Food Consumption and BMI

Studies in humans have shown that probiotic use can reduce BMI and total body fat, especially visceral fat (133). A meta-analysis of 25 studies concluded that probiotic consumption can reduce body weight and BMI, with the best effect being achieved in a population of overweight and obese people (134). A nationally representative study based on a large population reported that probiotic consumption through food or supplementation was associated with lower body mass (135).

There are more studies showing beneficial effects of probiotic consumption in maintaining BMI, bodyweight, fat mass, waist circumference, lipid profile and inflammatory status (136).

In the present study, BMI and regular consumption of probiotic food did not show a statistically significant difference. The reason for this may be that the number of people who do not use probiotics (54.5%) is higher than the number of people who use probiotics (45.5%).

Overall, these findings suggest that probiotics may have a positive effect on BMI and body weight. However, relationship between gut microbiota and body weight is

complex and further research is needed to fully understand the role of probiotics in the prevention and treatment of obesity (137).

5.13. Relationship of Sleep Quality According to the Type of Bread Consumed

A study in Japan found that bread intake was not associated with sleep quality (138). In the present study, relationship between the type of bread consumed and sleep quality did not show a significant difference. There are almost no studies on this subject in the literature.

5.14. Constipation and Insomnia Severity Index

A study of 85 individuals with sleep deficiency and functional constipation and 193 individuals with functional constipation without sleep deficiency concluded that sleep deficiency is associated with worse constipation-related symptoms, altered anorectal function and perception, and impaired autonomic function in patients with functional constipation (139).

A three-year cross-sectional study reported an association between insomnia and constipation. The study implied that insomnia may be one of the risk factors for constipation and that as the severity of insomnia increases, the likelihood of constipation symptoms increases (140).

There are also studies suggesting a relationship between insomnia and irritable bowel syndrome (IBS), a condition that can cause constipation (141).

In the current study, there was a statistically significant weak positive correlation between the total scores of the participants in the PSQI Insomnia Severity Index and the total scores in the Constipation Severity Scale.

Overall, although there have been studies showing an association between constipation and insomnia, more research is needed to better understand the causal relationship between the two conditions (140).

5.15. Relationship Between Constipation and Meal Frequency and Skipping Meals

Low energy intake may be associated with constipation by slowing colonic transit time. Towers et al. concluded in a study that low energy intake may be associated with constipation (142). Evidence has shown a significant association between adherence to the Mediterranean diet and reduced constipation syndrome scores (142).

In the results of the current study, the scores of the participants from the sub-

dimensions of the Constipation Severity Scale and the total scale did not show statistically significant differences according to meal skipping and meal frequency.

Overall, these studies suggest that there may be an association between meal frequency and constipation and also between dietary habits and constipation. However, more research is needed in terms of data scarcity and clarity on this issue. In studies that found an association, the evidence was based on individuals' lack of energy intake. In addition, it has been noted that skipping meals may lead to nutritional deficiencies that may contribute to constipation (143).



6.CONCLUSIONS AND RECOMMENDATIONS

6.1.Conclusion

In this study, the effects of meal frequency, sleep duration and sleep quality on BMI were examined. In addition, the relationship between sleep quality, physical activity and constipation was examined.

According to the BMI groups, the frequency of meals, skipping meals, regular consumption of probiotic foods, knowing the meaning of dietary fiber and the type of bread they consume most frequently did not show statistically significant differences ($p>0.05$).

There was a statistically significant weak positive correlation between the participants' total scores on the Constipation Severity Scale and their total scores on the Pittsburg Sleep Quality Index ($r=0.255$; $p=0.001$; $p<0.01$).

According to meal frequency, the scores obtained by the subjects from the Pittsburg Sleep Quality Index “Sleep Latency”, “Sleep Duration”, “Habitual Sleep Efficiency”, “Sleep Disorder”, “Sleep Medication Use”, “Daytime Dysfunction” sub-dimensions and the total scale did not show statistically significant difference ($p>0.05$).

According to the BMI groups, the scores obtained by the subjects from the Pittsburg Sleep Quality Index “Subjective Sleep Quality”, “Sleep Latency”, “Sleep Duration”, “Habitual Sleep Efficiency”, “Sleep Disorder”, “Use of sleeping pills” sub-dimensions and the total scale did not show statistically significant difference ($p>0.05$).

The scores obtained from the “Sleep Duration” sub-dimension of the Pittsburg Sleep Quality Index by those who engaged in regular physical activity were found to be statistically significantly higher ($p=0.010$; $p<0.05$).

Those who practiced regular physical activity had statistically significantly lower scores on the total Constipation Severity Scale ($p=0.002$; $p<0.01$).

As a result of our study, no significant relationship was found between meal frequency, sleep duration, sleep quality and BMI. A positive correlation was found between the Constipation Severity Scale and the Pittsburg Sleep Quality Index scales.

In other words, it has been concluded that the severity of constipation increases with the decreasing sleep quality of individuals. In addition, it was observed that individuals' scores on the constipation severity scale decreased with increasing physical activity. Although no direct conclusion was reached regarding BMI values in our study, a significant relationship was found between sleep quality, physical activity and constipation severity. More research is needed on this and many other factors that contribute to obesity, which has become a widespread global problem.



6.2.Recommendations

The current study reveals the effect of Meal Frequency, Sleep Duration and Sleep Quality on Body Mass Index of healthy individuals applying to Sahure Özay Nutrition & Diet Counseling Center. It is known that obesity has a significant impact on human health and that there are many reasons that can cause obesity other than genetic predisposition. In the light of the present study, many studies are needed in the literature, especially on the effects of meal frequency and skipping meals on obesity.



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8.APPENDICES

8.1.Survey in Research

ÖĞÜN SIKLIĞI, UYKU SÜRESİ VE UYKU KALİTESİNİN BKİ ÜZERİNE ETKİSİ

ANKET FORMU

Anket No:

Tarih:

Anketörün Adı ve Soyadı:

Görüşülen Kişinin Adı ve Soyadı:

Tel.No:

GENELBİLGİLER

1-) Cinsiyet:

2-) Yaş:

3-) Antropometrik Ölçümler:

a) Ağırlık(kg):.....

b) Boy(cm):.....

c) BKİ:

d) Bel Çevresi(cm) :

e) Kalça Çevresi(cm) :

4-)Medeni Durum:

a) Evli b) Bekar c) Boşanmış/Dul

5-)Eğitim durumunuz

a)Üniversite altı b)Üniversite üstü

6-)Çalışma durumunuz nedir?

a)Çalışıyor b) Çalışmıyor

7-) Çalışma Şekliniz Nasıldır?

a) Sürekli gündüz b) Sürekli gece c) Gece Gündüz değişken nöbet sistemi

8-)Günlük hangi saatler arasında çalışıyorsunuz?

a) 08:00-17:00 b)08:00-20:00 c)17:00-24:00 d) 17:00-08:00 e) diğer

9-) Aylık Gelir düzeyiniz nedir?

a) 0 -5000 TL b) 5000 – 8500 TL c) 8500 – 12000 TL d) 12000 - 15000 TL e) 15001 TL ve üstü

10-)Doktor tarafından tanısı konulmuş bir hastalığınız var mı?

- | | |
|----------------------------------|----------------------------|
| a) Yok | ı) Kansızlık |
| b) Kalp damar hastalıkları | i) Nörolojik hastalıklar |
| c) Hipertansiyon | j) Böbrek hastalıkları |
| d) Kanser | k) Karaciğer hastalıkları |
| e) Diyabet | l)Eklem/kemik hastalıkları |
| f) Şişmanlık | m) Akciğer hastalıkları |
| g) Sindirim sistemi hastalıkları | n) Bağırsak hastalıkları |
| h) Guatr | o)Diğer:..... |

11-) Sigara içiyor musunuz? Cevabınız evet ise ne kadar süredir içiyorsunuz?

a) Evet (süresi:.....) b) Hayır

12-) Alkol tüketiyor musunuz?

a) Evet b) Hayır

13-) Kiminle birlikte yaşıyorsunuz?

a)Yalnız c) Arkadaş
b) Aile/Akraba d) Diğer.....

14-) Son 6 ay içerisinde özel bir diyet uyguladınız mı? a) Evet b) Hayır

15-) Cevabınız evet ise son 6 ayda ne kadar kilo kaybettiniz?.....kg

16-) Düzenli olarak fiziksel aktivite yapıyor musunuz? a) Evet b)Hayır

BESLENME ALIŞKANLIKLARI

17-)Günde kaç ana öğün tüketirsiniz?

- a)1-2 kez b)2-3 kez c) 3 den daha fazla

18-)Günde kaç ara öğün tüketirsiniz?

- a)1-2 kez b)2-3 kez c)3 den daha fazla

19-)Öğün atlar mısınız?

- a)Evet b)Hayır

20-)Evet ise; en sık atladığınız öğün nedir ? (cevabı hayır ise boş bırakılacak)

a. Sabah

b. Öğle

c. Akşam

d. Ara Öğün

21-)Öğün atlama nedeninizi belirtiniz.

a. Zamanım yetersiz

b. Canım istemiyor

c. Zayıflamak istiyorum

d. Hazırlamadığım için

e. Alışkın değilim

22-) En sık hangi çeşit ekmek tüketiyorsunuz? (Tek şık işaretleyiniz.)

a. Beyaz ekmek

- b. Tam buğday ekmek
- c. Kepekli ekmek
- d. Köy ekmeği
- e. Çavdar ekmeği
- f. Ekşi mayalı ekmek
- g. Mısır ekmeği

23-) Probiyotik gıda her gün düzenli tüketiyor musunuz?(yoğurt,kefir gibi)

- a)Evet b)Hayır

24-)Takviye probiyotik kullanıyor musunuz?

- a)Evet b)Hayır

25-) Kurubaklagil hangi sıklıkla tüketirsiniz?

- a)Hiç tüketmem, sevmiyorum.

- b)Haftada en az 1-2 kez tüketirim.

POSA BİLGİ DÜZEYİ

26-)Diyet posasının ne anlama geldiğini biliyor musunuz?

- a. Evet b.Hayır

27-)Diyet posası sağlıklı yaşamın sürdürebilmesi ve bazı hastalıklardan korunmak için şart mıdır?

- a. Evet b.Hayır c. Bilmiyorum

28-)Diyet posası alımının artması ile dışkılama sıklığınız ve dışkı ağırlığınız değişir mi?

- a.Evet b. Hayır c.Bilmiyorum

29-)Posa içeriđi en yksek olan dođal besin grubu hangisidir?

- a. St ve st rnleri
- b. Sebze ve meyveler
- c. Kurubaklagiller
- d. Et ve et rnleri
- e. Ekmek ve tahıl rnleri
- f. Bilmiyorum

30-)Meyve tketir misiniz?

- a. Evet b. Hayır

31-)Cevabınız hayır ise nedenini belirtiniz.

- a. Sevmiyorum
- b. Alıřkanlıđım yok
- c. Hazırlamaya zamanım yok
- d. Pahalı

32-)Meyveyi en sık hangi řekilde tketmeyi tercih ediyorsunuz?

- a. Taze
- b. Kuru
- c. Taze sıkılmıř meyve suyu
- d. Hazır meyve suyu
- e. Hořaf / Komposto

33-)Sebze tketir misiniz?

- a. Evet b. Hayır

34-)Cevabınız hayır ise nedenini belirtiniz (en fazla 3 seçenek seçilebilir).

- a. Sevmiyorum
b. Alışkanlığım yok
c. Hazırlamaya zamanım yok
d. Pahalı

35-)Sebzeyi en sık hangi şekilde tüketmeyi tercih ediyorsunuz?

- a. Çiğ (söğüş, salata, turşu vb..)
b. Pişmiş etli yemek
c. Pişmiş etsiz yemek
d. Haşlama
e. Buharda
f. Kızartma
g. Fırında
h.Közde

8.2.Constipation Severity Scale



Hastanın adı-soyadı:

Tarih:

Konstipasyon Ciddiyet Ölçeği (KCÖ)

Lütfen aşağıdaki sorulardan size en uygun olan tek yanıtı işaretleyiniz.

Dışkı tıkanıklığı alt Ölçeği

1. Yetersiz Dışkılama (Bağırsakları tam boşaltamama):

A) Bağırsakları tam boşaltamama sorununu ne sıklıkta yaşarsınız?

0	1	2	3	4
Asla bu sorunu yaşamam. (2.soruya geçiniz.)	Nadiren bu sorunu yaşarım.	Bazen bu sorunu yaşarım.	Genellikle bu sorunu yaşarım	Her zaman bu sorunu yaşarım.

B) Bu belirti (bağırsakları tam boşaltamama) sizin için ne kadar ciddidir?

1	2	3	4	5
Hiç ciddi değil. (Çoğu zaman bu tür bir dışkılama sorunun yoktur.)	Hafif	Biraz ciddi (Büyük abdeste çıktıktan sonra hala bağırsaklarımda dışkı kalır.)	Ciddi	Son derece ciddi (Dışkı nedeni ile makatımda sürekli basınç hissederim / tekrar tekrar tualete giderim.)

C) Bu durum, sizi ne kadar rahatsız eder?

1	2	3	4	5
Hiç rahatsız etmez.	Biraz rahatsız eder	Oldukça rahatsız eder.	Çok rahatsız eder.	Son derece rahatsız eder

2. Dışkılamada zorluk/güçlük:

A) Dışkılama sırasında zorluğu/güçlüğü hangi sıklıkla hissedersiniz?

0	1	2	3	4
Asla hissetmem. (3.soruya geçiniz.)	Nadiren hissederim.	Bazen hissederim	Genellikle hissederim.	Her zaman hissederim.

B) Bu durum sizin için ne kadar ciddidir?

1	2	3	4	5
Hiç ciddi değil. (Biraz ıkınıyorum.)	Hafif	Oldukça ciddi (Ciddi şekilde ıkınıyorum.)	Ciddi	Son ciddi (Karnımı bastırıyorum inliyorum ve ciddi şekilde ıkınıyorum.)

C) Bu durum sizi ne kadar rahatsız eder?

1	2	3	4	5
Hiç rahatsız etmez.	Biraz rahatsız eder.	Oldukça rahatsız eder.	Çok rahatsız eder.	Son derece rahatsız eder.

3. Kalın Bağırsak Tembelliği Alt Ölçeği

Bağırsak alışkanlığında sıkıntı yaşadığınız bir dönemi düşünün: Bir ay boyunca, genellikle kaç kez büyük abdeste çıkarsınız? (Lütfen sadece bir tanesini işaretleyiniz.)

- ☐₁ Bağırsak alışkanlığımda asla sıkıntı yaşamam.
- ☐₂ Her gün büyük abdeste çıkarım.
- ☐₃ Haftada birkaç kez büyük abdeste çıkarım.
- ☐₄ Haftada bir kez büyük abdeste çıkarım.
- ☐₅ İki haftada bir kez büyük abdeste çıkarım.
- ☐₆ Ayda bir kez büyük abdeste çıkarım.

4. 3 günde bir kereden daha az dışkılama:

A) "3 günde bir kereden daha az dışkılama" sorununu hangi sıklıkla hissedersiniz?

0	1	2	3	4
Asla hissetmem. (4.soruya geçiniz.)	Nadiren hissederim.	Bazen hissederim	Genellikle hissederim.	Her zaman hissederim.

B) Bu belirti (dışkılamanın sık olmaması) sizin için ne kadar ciddidir?

1	2	3	4	5
Hiç ciddi değil. (Hemen hemen her gün büyük abdeste çıkarım.)	Hafif	Biraz ciddi. (Haftada 1-2 kez büyük abdeste çıkarım.)	Ciddi	Son derece ciddi (4 haftaya kadar büyük abdeste çıkamadığım olur.)

C) Bu belirti (dışkılamanın sık olmaması) sizi ne kadar rahatsız eder?

1	2	3	4	5
Hiç rahatsız etmez.	Biraz rahatsız eder.	Oldukça rahatsız eder.	Çok rahatsız eder.	Son derece rahatsız eder.

5. Boşaltım Gerekisini Hissinde Yetersizlik:

A) Büyük abdestinizin geldiğini hissetmeme sorununuz, sizin için ne kadar ciddidir?

0	1	2	3	4
Asla böyle sorunum olmaz.	Hiç sorun değil. (Boşaltım ihtiyacımı gayet iyi hissederim.)	Hafif	Biraz ciddi bir sorun (Boşaltım ihtiyacını belli belirsiz hissedebilirim.)	Ciddi bir sorun

B) Büyük abdestinizin geldiğini hissetmeme sorununuz, sizi ne kadar rahatsız eder?

0	1	2	3	4
Asla rahatsız etmez.	Hiç rahatsız etmez.	Biraz rahatsız eder.	Oldukça rahatsız eder.	Çok rahatsız eder.

Ağrı Alt Ölçeği:

Bağırsak Sorunlarına Bağlı Makat Ağrısı:

6. Geçen ay boyunca, ortalama olarak, makatınızdaki ağrı ne kadar şiddetliydi?

0	1	2	3	4
Ağrı hissetmedim.	Hafif	Biraz şiddetli	Şiddetli	Son derece şiddetli

7. Şu an, makatınızdaki ağrı düzeyini belirtiniz?

0	1	2	3	4
Ağrı yok	Hafif	Biraz şiddetli	Şiddetli	Son derece şiddetli

8. Makatınızdaki ağrıdan dolayı ne kadar rahatsızsınız?

0	1	2	3	4
Hiç rahatsız değilim.	Hafif	Biraz rahatsızım	Ciddi	Çok ciddi rahatsızım.

9. Geçen ay boyunca, büyük abdeste çıkarken veya sonrasında ne sıklıkta kanamanız oldu?

0	1	2	3	4
Asla	Nadiren	Ara sıra	Genellikle	Her zaman

KCÖ skoru:

KCÖ Nasıl Hesaplanır?

Ölçek kapsamında toplamda 16 adet soru bulunmaktadır. KCÖ, Kalın Bağırsak Tembelliği, Dışkı Tıkanıklığı ile Ağrı alt boyutu kapsamaktadır. Kalın Bağırsak Tembelliği boyutu kapsamında puan 0 ile 29 arasında, Dışkı Tıkanıklığı boyutu kapsamında puan 0 ile 28 arasında, Ağrı boyutunda puan ise 0 ile 16 arasında olmaktadır. Bu bağlamda KCÖ kapsamında alınabilecek en düşük puan 0 iken en yüksek puan ise 73 olmaktadır. Ölçekten alınmış olan puanların fazla olması semptomların ciddi seviyede olduğunu ortaya koymaktadır.

8.3.Pittsburgh Sleep Quality Index

Pittsburgh Uyku Kalite İndeksi (PUKi) Pittsburgh Sleep Quality Index (PSQI)

Hastanın Adı Soyadı: _____ Tarih: ____/____/____

Aşağıdaki sorulara vereceğiniz cevaplar için son bir ayı göz önünde bulundurun.
Lütfen tüm soruları cevaplandırın.

- Geçen ay geceleri genellikle ne zaman yattınız? _____
- Geçen ay geceleri uykuya dalmamız genellikle ne kadar zaman (dakika) aldı? _____ dakika
- Geçen ay sabahları genellikle ne zaman kalktınız? _____
- Geçen ay geceleri kaç saat uyudunuz (bu süre yatakta geçirdiğiniz süreden farklı olabilir) _____ saat
- Geçen ay aşağıdaki durumlarda belirtilen uyku problemlerini ne sıklıkla yaşadınız?

	Haftada	Hiç	1'den az	1 - 2 kez	3'ten Çok
a	30 dakika içinde uykuya dalamadınız	☐	☐	☐	☐
b	Gece yansı veya sabah erkenden uyanınız	☐	☐	☐	☐
c	Tualete gittiniz	☐	☐	☐	☐
d	Rahat bir şekilde nefes alıp veremediniz	☐	☐	☐	☐
e	Aşırı derecede üşüdünüz	☐	☐	☐	☐
f	Aşırı derecede sıcaklık hissettiniz	☐	☐	☐	☐
g	Kötü rüyalar gördünüz	☐	☐	☐	☐
h	Ağrı duydunuz	☐	☐	☐	☐
i	Diğer nedenler	☐	☐	☐	☐
j	Öksürdünüz veya gürültülü bir şekilde horladınız	☐	☐	☐	☐
- Geçen ay uyku kalitenizi bütünü ile nasıl değerlendirirsiniz.

☐	Çok iyi	☐	Oldukça iyi	☐	Oldukça kötü	☐	Çok kötü
--------------------------	---------	--------------------------	-------------	--------------------------	--------------	--------------------------	----------
- Geçen ay uyumanıza yardımcı olması için ne sıklıkta (reçeteli veya reçetesiz) uyku ilacı aldınız?

☐	Hiç	☐	Haftada 1'den az	☐	Haftada 1 - 2 kez	☐	Haftada 3'ten çok
--------------------------	-----	--------------------------	------------------	--------------------------	-------------------	--------------------------	-------------------
- Geçen ay araba sürerken, yemek yerken veya sosyal bir aktivite esnasında ne kadar sıklıkla uyanık kalmak için zorlandınız?

☐	Hiç	☐	Haftada 1'den az	☐	Haftada 1 - 2 kez	☐	Haftada 3'ten çok
--------------------------	-----	--------------------------	------------------	--------------------------	-------------------	--------------------------	-------------------
- Geçen ay bu durum işlerinizi yeteri kadar istekle yapmanızda ne derecede problem oluşturdu?

☐	Hiç problem oluşturmadı	☐	Bir dereceye kadar problem oluşturdu
☐	Yalnızca çok az bir problem oluşturdu	☐	Çok büyük bir problem oluşturdu
- Bir yatak partneriniz veya oda arkadaşınız var mı?

☐	Bir yatak partneri veya oda arkadaşı yok	☐	Partneri aynı odada fakat aynı yatakta değil
☐	Diğer odada bir partneri veya oda arkadaşı var	☐	Partner aynı yatakta
- Eğer bir oda arkadaşı veya yatak partneriniz varsa son bir ayda ona aşağıdaki durumları ne sıklıkta yaşadığınızı sorun.

	Haftada →	Hiç	1'den az	1 - 2 kez	3'ten çok
a	Gürültülü horlama	☐	☐	☐	☐
b	Uykuda nefes alıp verme arasında uzun aralıklar	☐	☐	☐	☐
c	Uyurken bacaklarda seğirme veya sıçrama	☐	☐	☐	☐
d	Uyku esnasında uyumsuzluk veya şaşkınlık	☐	☐	☐	☐
e	Diğer huzursuzluklarınız:	☐	☐	☐	☐

Buyssse D.J., Reynolds CF 3rd, Monk TH (1989) Psychiatry Res. 1989 May;28(2):193-213



**Skorlama yönergesine
ftronline.com 'dan
ulaşabilirsiniz.**

8.4. Insomnia Severity Index

Uykusuzluk Şiddeti İndeksi

1. Lütfen su andaki (örn., son 2 hafta içinde) uykusuzluk probleminizin/problemlerinizin

ŞİDDETİNİ değerlendiriniz.

	Hiç	Hafif	Orta	Şiddetli	Çok şiddetli
a) Uykuya dalmakta güçlük:	0	1	2	3	4
b) Uykuyu sürdürmekte güçlük	0	1	2	3	4
c) Çok erken uyanma problemi:	0	1	2	3	4

2. Son zamanlardaki uyku düzeninizden ne kadar memnunsunuz/memnuniyetsizsiniz?

Çok memnun	Memnun	Nötr	Memnun değil	Hiç memnun değil
0	1	2	3	4

3. Uyku probleminizin gün içindeki işlevselliğinizi (örn., gün içinde tükenmişlik, işte/günlük uğraşlarda çalışma potansiyeli, konsantrasyon, hafıza, duygu durum, vb.) ne ölçüde engellediğini düşünüyorsunuz?

Kesinlikle	Biraz	Oldukça	Çok	Çok fazla
Engelleyici değil	engelleyici	engelleyici	engelleyici	engelleyici değil
0	1	2	3	4

4. Yaşam kalitenizin bozulması anlamında uyku probleminizin başkaları tarafından ne kadar fark edilebildiğini düşünüyorsunuz?

Kesinlikle fark	Biraz fark	Oldukça fark	Çok fark	Çok fazla
Edilemez	edilebilir	edilebilir	edilebilir	fark edilebilir
0	1	2	3	4

5. Son zamanlardaki uyku probleminiz sizi ne kadar endişelendiriyor/strese sokuyor?

Kesinlikle	Biraz	Oldukça	Çok	Çok fazla
endişelendirmiyor	endişelendiriyor	endişelendiriyor	endişelendiriyor	endişelendiriyor
0	1	2	3	4

8.5.Ethics Committee Approval



T.C. YEDİTEPE ÜNİVERSİTESİ
GİRİŞİMSSEL OLMAYAN KLİNİK ARAŞTIRMALAR
ETİK KURULU

Versiyon No
1.0
Sayfa 1 / 2

KARAR FORMU

15.10.2021

ETİK KURUL BİLGİLERİ	Etik Kurulun Adı	Yeditepe Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu
	Açık Adres	Yeditepe Üniversitesi Dış Hekimliği Fakültesi, Bağdat Cad. No. 238 Göztepe 34728 Kadıköy, İstanbul
	İnternet Sayfası	
	Telefon	
	E-posta	

DEĞERLENDİRİLEN BELGELER	Islak imzalı başvuru dosyası, CD'si ve elektronik başvuru	☒
	Araştırma başlığı ve araştırmacıların isimleri	☒
	Başvuru dilekçesi	☒
	Araştırmanın;	☒
	• Niteliği	☒
	• Önemi ve özgün değeri	☒
	• Amaç ve hedefleri	☒
	• Yöntemi	☒
	• Yönetimi	☒
	• Yaygın etkisi	☒
	• Araştırma bütçesi (Mevcutsa)	☒
	• Süresi ve uygunluğu (Zaman cetveli)	☒
	• Kaynakları	☒
	Araştırma izin belgesi / belgeleri	☒
	Bilgilendirilmiş Gönüllü Olur Formu (yapılan araştırmaya özel olarak hazırlanmış)	☒
	Taahhütname-1 Dünya Tıp Birliği Helsinki Bildirgesinin son versiyonunun ve Sağlık Bakanlığı'nın ilgili tüm kılavuzlarının okunmasına dair taahhüt	☒
	Taahhütname-2 Daha önce yapılmış etik kurul başvuruları mevcut olup olmadığına dair taahhüt	☒
	Taahhütname-3 Araştırma sırasında araştırma bütçesinde yer almayan ve gönüllünün kendisine veya Sosyal Güvenlik Kurumuna ek yük getirecek hiçbir işlem uygulanmayacağına dair taahhüt	☒
	Taahhütname-4 COVID-19 hastalarında tedavi yaklaşımları ve bilimsel araştırmalar genelgesi okunmasına dair taahhüt	☒
	Araştırmacıların her birisine ait özgeçmiş formu	☒
	Ek belgeler (Varsa kullanılan ölçek izinleri vb.)	☒

KARAR BİLGİLERİ	Başvuru Numarası	202106074
	Toplantı Tarihi	05.10.2021
	Toplantı Yeri	Çevirim içi (Google Meet)
	Karar No	2

Araştırmanın Başlığı: Öğün sıklığı, uyku süresi ve uyku kalitesinin beden kütle indeksi üzerine etkisi

Araştırmacılar: Temür N, Demir H.



BAŞVURU NUMARASI: 202106074

KARAR

15.10.2021

☒ KABUL	☐ RET ☐ KAPSAM DIŞI (GİRİŞİMSEL) ☐ BİLİMSEL VE/VEYA ETİK KURALLARA AYKIRI ☐ BİR SORUMLU ARAŞTIRMACININ (TEZ İŞE TEZ DANIŞMANI), BİR TOPLANTIYA İKİ (2) ADETEN FAZLA ÇALIŞMA BAŞVURUSUNDA BULUNMASI ☐ KURUM İÇİ BAŞVURULARINDA YEDİTEPE UZANTILI E-POSTA HESABI İLE GİRİŞ YAPILMAMIŞ OLMASI ☐ ŞARTLI KABULDE BELİRTİLEN REVİZYONLARIN ZAMANINDA VE/VEYA İSTENİLDİĞİ ŞEKİLDE YAPILMAMIŞ OLMASI
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Prof. Dr. Didem ÖZDEMİR ÖZENEN Başkan <u>Katılım</u> ☐ Var ☐ Yok ☐ Var ☐ Yok <u>İlişki</u> ☐ Var ☐ Yok ☐ Var ☐ Yok	Doç. Dr. Gökhan ERTAŞ Başkan Yardımcısı <u>Katılım</u> ☐ Var ☐ Yok ☐ Var ☐ Yok <u>İlişki</u> ☐ Var ☐ Yok ☐ Var ☐ Yok	Doç. Dr. Elif SUNGURTEKİN EKÇİ Raportör <u>Katılım</u> ☐ Var ☐ Yok ☐ Var ☐ Yok <u>İlişki</u> ☐ Var ☐ Yok ☐ Var ☐ Yok
Prof. Dr. Feryal SUBAŞI Üye <u>Katılım</u> ☐ Var ☐ Yok ☐ Var ☐ Yok <u>İlişki</u> ☐ Var ☐ Yok ☐ Var ☐ Yok	Doç. Dr. Mehmet Engin CELEP Üye <u>Katılım</u> ☐ Var ☐ Yok ☐ Var ☐ Yok <u>İlişki</u> ☐ Var ☐ Yok ☐ Var ☐ Yok	Dr. Öğr. Üyesi E. Çiğdem KELEŞ Üye <u>Katılım</u> ☐ Var ☐ Yok ☐ Var ☐ Yok <u>İlişki</u> ☐ Var ☐ Yok ☐ Var ☐ Yok
Dr. Öğr. Üyesi Binnur OKAN BAKIR Üye <u>Katılım</u> ☐ Var ☐ Yok ☐ Var ☐ Yok <u>İlişki</u> ☐ Var ☐ Yok ☐ Var ☐ Yok	Dr. Öğr. Üyesi E. Nur ÖZDAMAR Üye <u>Katılım</u> ☐ Var ☐ Yok ☐ Var ☐ Yok <u>İlişki</u> ☐ Var ☐ Yok ☐ Var ☐ Yok	Dr. Öğr. Üyesi SEVİM ŞEN Üye <u>Katılım</u> ☐ Var ☐ Yok ☐ Var ☐ Yok <u>İlişki</u> ☐ Var ☐ Yok ☐ Var ☐ Yok

Araştırmanın Başlığı: Öğün sıklığı, uyku süresi ve uyku kalitesinin beden kütle indeksi üzerine etkisi

Araştırmacılar: Temür N, Demir H.

8.6. Curriculum Vitae

Kişisel Bilgiler

Adı	Nazile Nur	Soyadı	Temür
Doğum Yeri		Doğum Tarihi	
Uyruğu		TC Kimlik No	
E-mail		Tel	

Öğrenim Durumu

Derece	Alan	Mezun Olduğu Kurumun Adı	Mezuniyet Yılı
Doktora			
Yüksek Lisans	Beslenme ve Diyetetik	İstanbul Yeditepe Üniversitesi	2024
Lisans	Beslenme ve Diyetetik	İstanbul Medipol Üniversitesi	2018
Lise	Sayısal	Suluova Şehit Metehan Atmaca Anadolu Lisesi	2013

Bildiği Yabancı Dilleri	Yabancı Dil Sınav Notu (#)
İngilizce	76.25 (yökdil)

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

İş Deneyimi (Sondan geçmişe doğru sıralayın)

Görevi	Kurum	Süre (Yıl - Yıl)
Diy eti sy en	Nazile Nur Temur Beslenme&Danışmanlık Merkezi	2021-Halen
		-

Bilgisayar Bilgisi

Program	Kullanma becerisi
Microsoft Office Programları	İyi

*Çok iyi, iyi, orta, zayıf olarak değerlendirin

Bilimsel Çalışmaları**SCI, SSCI, AHCI indekslerine giren dergilerde yayınlanan makaleler**

Diğer dergilerde yayınlanan makaleler

Uluslararası bilimsel toplantılarda sunulan ve bildiri kitabında (*Proceedings*) basılan bildiriler

Hakemli konferans/sempozyumların bildiri kitaplarında yer alan yayınlar

Diğer (Görev Aldığı Projeler/Sertifikalari/Ödülleri)
