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FOOD INSECURITY STATUS AND RELATED FACTORS IN MINIMUM WAGE WORKERS

ASGARİ ÜCRET ÇALIŞANLARINDA GIDA GÜVENCESİZLİĞİ DURUMU VE İLİŞKİLİ FAKTÖRLER

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ABSTRACT

Objective: This study was conducted to determine the food insecurity and nutrition status of individuals working for minimum wage and to identify associated factors.

Method: The study was carried out with 189 voluntary females and 197 males working for the minimum wage in various workplaces in the Üsküdar district of Istanbul between February 01, 2022, and March 31, 2022. Descriptive characteristics, dietary habits and food consumption frequency with quantity were inquired and recorded for all participants. In addition, the Household Food Insecurity Access Scale was administered to individuals. All data were collected through face-to-face interviews. Energy and nutrient intakes were determined utilizing the BeBIS 8.2 program. The obtained data were analyzed using the IBM SPSS 22.0 software package. The significance level was accepted as $p<0.05$.

Results: According to the results, out of the total 386 participants, 52.1% were food secure, while 47.9% were not. The majority of food insecure individuals (45.4%) were university graduates. It was observed that the partcipants who were food secure, consumed more dairy products ($p=0.040$), fruits and vegetables ($p<0.01$) compared to food insecure individuals. In contrast, animal protein sources ($p=0.010$), fats ($p=0.001$), and the bread and cereal group ($p<0.001$) were found to be consumed more by food insecure individuals. Significant associations were identified between food insecurity and age, additional income for nutrition, and smoking status. A unit increase in age was determined to decrease food insecurity by 0.52 units ($p=0.015$).

Conclusion: Determining the food insecurity status of individuals working for minimum wages as well as addressing diseases related to nutrition will be a crucial step in preventing inadequate and imbalanced nutrition. Making healthy foods more affordable or increasing the overall living standard of individuals is necessary for the continuation of proper nutrition and health.

Key Words: Minimum Wage, Nutrition, Food Insecurity

ÖZ

Amaç: Bu çalışma asgari ücretle çalışan bireylerin gıda güvencesizliği ve beslenme durumunun saptanması ve gıda güvencesizliği ile ilişkili faktörlerin belirlenmesi amacıyla yapıldı.

Yöntem: Çalışma 01 Şubat 2022-31 Mart 2022 tarihinde, İstanbul ili Üsküdar ilçesinde çeşitli iş yerlerinde asgari ücret karşılığında çalışan, gönüllü 189 kadın ve 197 erkek ile yürütüldü. Çalışmaya katılan tüm bireylerin tanımlayıcı özellikleri, beslenme alışkanlıkları ve besin tüketim sıklığı miktarı sorgulanıp kaydedildi. Ayrıca bireylerden Hanehalkı Gıda Güvencesizliği Erişim ölçeğini doldurmaları istendi. Tüm veriler yüz yüze toplandı. Enerji ve besin ögesi alımları BeBİS 8.2 programı ile belirlendi. Elde edilen verilerin analizinde IBM SPSS 22.0 paket programı kullanılarak anlamlılık düzeyi $p<0.05$ kabul edildi.

Bulgular: Çalışmaya katılan toplam 386 asgari ücret çalışanının %52.1'inin gıda güvenceli, %47.9'unun gıda güvencesiz olduğu belirlendi. Gıda güvencesiz bireylerin çoğunluğu (%45.4) üniversite mezunuydu. Gıda güvenceli asgari ücret çalışanlarının süt grubu ($p=0.040$) ile sebze ve meyve grubu ($p<0.01$) besinleri gıda güvencesiz bireylerden daha fazla tükettiği; hayvansal protein kaynakları ($p=0.010$) ile yağ ($p=0.001$), ekmek ve tahıl grubunu ($p<0.001$) ise gıda güvencesiz bireylerden daha fazla tükettiği saptandı. Gıda güvencesizliği ile yaş, ek beslenme geliri ve sigara içme durumu arasında anlamlı ilişki olduğu bulundu. Bir birimlik yaş artışının gıda güvencesizliğini 0.52 birim azalttığı belirlendi ($p=0.015$).

Sonuç: Asgari ücretle çalışan bireylerin gıda güvencesizliği durumunun belirlenmesi yetersiz ve dengesiz beslenmenin ve beslenmeye bağlı oluşabilecek hastalıkların önüne geçilmesinde önemli bir adım olacaktır. Sağlıklı besinlerin daha uygun fiyatlı hale getirilmesi veya refah düzeyinin yükselmesi doğru beslenme ve sağlığın devamı için gereklidir.

Anahtar Kelimeler: Asgari Ücret, Beslenme, Gıda Güvencesizliği

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INTRODUCTION

Food security refers to the physical, social, and economic access to sufficient, safe, and nutritious food by individuals, that meets their food preferences and dietary needs, enabling them to lead an active and healthy life [1]. Conversely, the absence of this condition is defined as food insecurity [1]. The prevalence of moderate or severe food insecurity, predominantly affecting women and rural dwellers worldwide, is reported to be 29.6% (2.4 billion people) [2]. While this figure has remained stable over the past two years, it has been observed that an additional 291 million people are experiencing food insecurity compared to the period before the COVID-19 pandemic [2]. Studies on food insecurity indicate its association with adverse health outcomes and conditions such as increased prevalence of obesity and compromised dietary quality [3-6].

Food insecurity is closely linked to socioeconomic status, with individuals of lower socioeconomic status having a higher likelihood of experiencing food insecurity [7]. In a study where the majority of participants had an annual household income of less than $20,000, it was found that approximately 75% of them experienced low or very low food insecurity [8]. Another study revealed that households with a monthly income of $140.86 were ten times more likely to experience food insecurity compared to those with a monthly income of $234.77 [9].

Minimum wage is defined as the wage paid for a day's work, intended to cover the essential needs of an employee such as food, housing, clothing, health, transportation, and culture, based on prevailing prices [10]. However, issues such as the minimum wage definition focusing solely on the needs of the worker rather than including the needs of dependents, regional variations in the cost of living, high taxation on minimum wage, and increases in wages lagging behind inflation, pose numerous social and economic challenges for minimum wage workers [10].

In a study conducted in Scotland by Newell et al. (2014), it was demonstrated that the minimum wage was insufficient to meet the basic needs of a four-person household or a single mother with three children, requiring these households to compromise on their diets to cover other expenses [11]. A study examining the relationship between wage-setting policies and food insecurity across 139 countries found that the likelihood of moderate or severe food insecurity was 31% in countries without or with low minimum wages, 29% in countries with moderate minimum wages, and 25% in countries with high minimum wages [12]. Furthermore, research conducted on Canadian families with children found that a one dollar increase in the minimum wage was associated with a 0.8% to 1% decrease in the risk of experiencing food insecurity [13].

In Turkey, the proportion of individuals working for minimum wage is 50% in the industrial sector, 53.9% in the construction sector, and 39.1% in the service sector [14]. It is anticipated that earning below the amount required for a four-person household's kitchen expenses (the hunger threshold) would hinder access to adequate nutrition and result in a decline in dietary quality. This study aims to determine the food insecurity status of individuals working for minimum wage and to correlate it with their nutritional status.

METHOD

Study Design

This study is descriptive and cross-sectional in nature.

Population and Sample of the Study

The data for this study were collected between February 01, 2022, and March 31, 2022. The study was conducted with a total of 386 voluntary individuals, including 189 females and 197 males, employed at minimum wages, in various workplaces such as construction sites, private healthcare centers, cafes, markets, hair salons, etc., selected through random sampling method in the Üsküdar district of Istanbul province. The sample size of the study was calculated with a 95% confidence interval, 5% margin of error, and a prevalence value of 50% in the unknown population (n=385). Participants who voluntarily declared that they were earning minimum wages were randomly selected at their workplaces and times.

Data Collection Instruments

The study data were collected through face-to-face interviews conducted at the participants' workplaces using a survey form, a Food Frequency Questionnaire, and the Household Food Insecurity Access Scale (HFIAS).

Survey Form: This form queried participants' demographic information and dietary habits, as well as their self-reported height and weight.

Food Frequency Questionnaire: This questionnaire inquired about the frequency and quantity of food consumption over the past 30 days. It included a total of 103 food items categorized under headings such as dairy and dairy products, meat-eggs-legumes, bread and cereals, vegetables and fruits, fats-sugars-sweets, beverages, and other items. Frequencies were categorized as "every meal", "every day", "once a week", "2-3 times a week", "3-4 times a week", "5-6 times a week", "once in fifteen days", "once a month", and "never". The food consumption frequency form was entered into the Nutrition Information System (BeBIS 18.2) program. Total daily energy and nutrient intakes were obtained. Energy and nutrient intakes were determined utilizing the BeBIS 8.2 program.

Household Food Insecurity Access Scale (HFIAS): This is an 18-item scale designed to measure the degree of food insecurity over the past four weeks (30 days). It was developed by the Food and Nutrition Technical Assistance (FANTA) project and partners to distinguish food-secure households from food-insecure ones [15]. The Turkish validity and reliability study was conducted by Bor (2018), with a Cronbach's Alpha value of 0.876 [16], indicating good reliability of the questionnaire. The items of the questionnaire inquired about experiencing food insecurity situations by participants (no=0 points, yes=1 point) through nine questions, each of which also asked how often this situation occurred in the past four weeks (rarely=1 point, sometimes=2 points, often=3 points). Individuals were classified into four categories based on the degree of food insecurity: food secure, mildly food insecure, moderately food insecure, and severely food insecure. The total score of the scale is determined by summing the scores of the responses given to the questions, and an increase in the total score indicated an increase in the severity of food insecurity [15]. The highest score that could be obtained from the scale was 27 and the lowest score was 0.

Ethical Approval

The ethical approval of the study was obtained by the Health Sciences University Hamidiye Scientific Research Ethics Committee with the decision number 21/761 on 31.12.2021. The study was conducted in accordance with the Declaration of Helsinki and Informed Voluntary Consent was obtained from all individuals participating in the study.

Statistical Analysis

The statistical analyses of the data obtained from the research were conducted using SPSS 22.0 software. Descriptive statistical analyses (Mean, Standard Deviation, Median, Frequency, Ratio, Minimum, Maximum) were performed, and the distributions of the data were evaluated using the Shapiro-Wilk Test. For comparisons between two groups of quantitative data that did not follow a normal distribution, the Mann-Whitney test was utilized, while the Kruskal-Wallis test was employed for comparisons involving three or more groups. For quantitative data showing a normal distribution, the Student t-test was used for comparisons between two groups, and the Oneway ANOVA test was applied for comparisons involving three or more groups. To determine the relationship between qualitative data, the Chi-square test

was utilized, and logistic regression analysis was employed to identify independent variables affecting the dependent variable. Statistical significance was evaluated at the p<0.05 level for all analyses.

RESULTS

Of the individuals participating in the study, 49% (n=189) were females, 51% (n=197) males, with a mean age of 30.45±9.09 years. The mean Body Mass Index (BMI) was 24.13±4.04. Out of the total 386 minimum wage workers in the study, 201 (52.1%) were food secure, while 185 (47.9%) were food insecure (Table 1). Among the food insecure, 71.9% were classified as mildly food insecure (Figure 1).

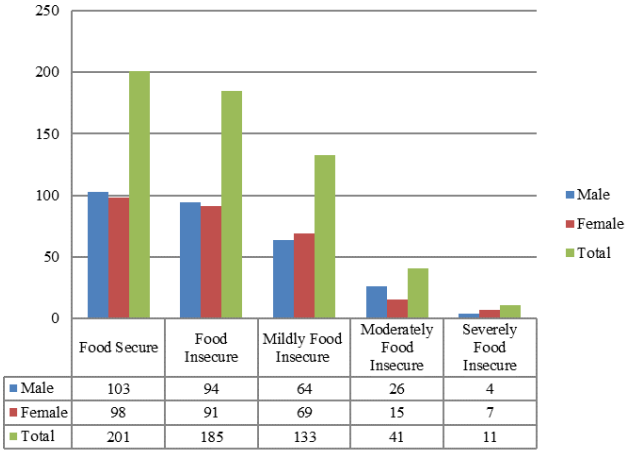

Figure 1. Food insecurity among minimum wage workers and distribution by level of food insecurity

Regarding the participants, 43.5% were university graduates, and 24.2% were married. Individual monthly expenditure on nutrition ranged mostly between 1000-1499 TL for the majority (42.2%) of individuals, and more than half (67.9%) received nutritional assistance outside their income. It was observed that 58.8% of individuals skipped at least one main meal, with 22.5% skipping meals due to economic reasons (Table 1).

Table 1. Descriptive characteristics of minimum wage workers

Variables	Total (n=386) n (%)	Food Secure (n=201) n (%) / X̄±SS (M†)	Food Insecure (n=185) n (%) / X̄±SS (M†)	p
Gender				
Female	189 (49.0)	98 (48.8)	91 (49.2)	[a]0.932
Male	197 (51.0)	103 (51.2)	94 (50.8)	
Age				
18-24	126 (32.6)	71 (35.3)	55 (29.7)	[a]0.663
25-34	161 (41.7)	82 (48.8)	79 (42.7)	
35-44	57 (14.8)	27 (13.4)	30 (16.2)	
45-60	42 (10.9)	21 (10.4)	21 (11.4)	
Educational attainment				
Primary school	30 (7.8)	15 (6.5)	15 (8.1)	[a]0.085
Primary education	31 (8.0)	23 (11.4)	8 (4.3)	
High school	157 (40.7)	79 (39.3)	78 (42.2)	
University	168 (43.5)	84 (41.8)	84 (45.4)	
Marital status				
Married	94 (24.2)	48 (23.9)	48 (25.9)	[a]0.403
Single	268 (68.9)	138 (68.7)	122 (65.9)	
Divorced	27 (6.9)	15 (7.5)	15 (8.1)	
Chronic disease				
Yes	59 (15.3)	23 (14.4)	30 (16.2)	[a]0.626
No	327 (84.7)	172 (85.6)	155 (83.8)	
Smoking				
Yes	144 (37.3)	86 (42.8)	58 (31.4)	[a]0.017*
No	191 (49.5)	96 (47.8)	95 (51.4)	
Sometimes	51 (13.2)	19 (9.5)	32 (17.3)	
BMI (kg/m²)				
Underweight (<18.5)	27 (7.0)	14 (7.0)	13 (7.0)	[a]0.997
Normal (18.5-24.9)	209 (54.1)	108 (53.7)	101 (54.6)	
Overweight (25.0-29.9)	122 (31.6)	64 (31.8)	58 (31.4)	
Obesity (≥30.0)	28 (7.3)	15 (7.5)	13 (7.0)	
Housing status				
Owned by	74 (19.2)	44 (21.9)	30 (16.2)	[a]0.016*
Belongs to a family member	157 (40.7)	68 (33.8)	89 (48.1)	
Tenant	155 (40.2)	89 (44.3)	66 (35.7)	
Nutrition budget (Monthly wage spent on food/individual)				
<500 TL	28 (7.3)	18 (9.0)	10 (5.4)	[a]0.251
500-999 TL	96 (24.9)	54 (26.9)	42 (22.7)	
1000-1499 TL	163 (42.2)	84 (41.8)	79 (42.7)	
≥1500 TL	99 (25.6)	45 (22.4)	54 (29.2)	
Do you have any other source of free food for your diet other than your income (Aid, vineyard-garden, etc.)?				
Yes	264 (67.9)	161 (80.1)	100 (54.1)	[a]<0.001**
No	125 (32.1)	40 (19.9)	85 (45.6)	
Skipping main meals (≥1) (n=227)				
Economic reasons	51 (22.5)	19 (15.3)	32 (31.1)	[a]0.005*
Not economically motivated	176 (77.5)	105 (84.7)	71 (68.9)	
Is there a catering service at work?				
Yes	208 (53.9)	111 (55.2)	97 (52.4)	[a]0.583
No	178 (46.1)	90 (44.8)	88 (47.6)	
Age	30.45±9.09	29.91±9.38 (183.35)	31.03±8.75 (204.53)	[b]0.062
BMI (kg/m²)	24.13±4.04	24.26±4.05 (197.34)	23.99±4.02 (189.33)	[b]0.481
Number of main meals (per day)	2.37±0.57	2.32±0.59 (186.15)	2.42±0.55 (201.49)	[b]0.124
Food insecurity score	3.15±4.56	0.07±0.25 (101.29)	6.50±4.66 (293.68)	[b]<0.001**

*†:Mean Rank, [a]:Chi-square, [b]:Mann-Whitney U test, *p<0.05, **p<0.001.*

Factors associated with food insecurity among the participants were examined (Table 2). According to binary logistic regression analysis, food insecurity was found to be higher among minimum wage workers under the age of 25 (18-24 years).

An increase of one unit in age was associated with a 0.52 unit decrease in food insecurity (p=0.015). Furthermore, having additional nutritional income significantly reduced the likelihood of experiencing food insecurity (p<0.001), with an Odds Ratio (OR) of 0.291. Another variable found to be associated with food insecurity was smoking status. Non-smokers were 1.692 times more likely to experience food insecurity compared to smokers (p=0.025). Factors associated with food insecurity were determined to be age, smoking status, and the presence of additional nutritional income.

Table 2. Factors associated with food insecurity among minimum wage workers

Variables	B	Wald	OR	p	%95 Cl
Gender (Male)	0.069	0.081	1.071	0.776	0.67-1.72
Age (≥25) †	-0.654	5.917	0.520	0.015*	0.31-0.89
Education (University)‡	0.396	2.863	1.486	0.091	0.94-2.35
Marital status (Married)	0.096	0.135	1.101	0.713	0.67-1.84
Disease status (None)	-0.307	1.002	0.736	0.317	0.40-1.34
Housing status (Does not pay rent)	0.275	1.509	1.316	0.219	0.85-2.04
Smoking status (No)	0.526	5.038	1.692	0.025*	1.07-2.68
Supplementary nutrition income (Available)	-1.236	26.627	0.291	<0.001**	0.18-0.47
Food at work (Available)	0.365	2.565	1.441	0.109	0.92-2.25
BMI (kg/m^2)		0.045		0.997	
Poor (<18.5)	0.122	0.042	1.130	0.837	0.35-3.62
Normal (18.5-24.9)	0.043	0.010	1.044	0.921	0.44-2.46
Overweight (25.0-29.9)	0.049	0.012	1.050	0.914	0.44-2.54
Constant	0.236	0.161	1.266	0.688	

*B:Beta, OR:Odds Raito, Cl:Confidence Interval, BMI:Body Mass Indeks, Logistic regression analysis, *p<0.05, **p<0.001,† Age group was analyzed in two groups as under 25 years and 25 years and above. ‡ Education group was analyzed in two groups as high school and below and university graduates.*

The comparison of food consumption by food secure and food insecure minimum wage workers, according to food groups, is presented in Table 3. It was observed that the consumption of plant protein sources and confectioneries did not differ significantly between food secure and insecure individuals. However, dairy products (p=0.040) and fruits and vegetables (p<0.01) were consumed more by food secure individuals compared to food insecure ones. Conversely, animal protein sources (p=0.010), fats (p=0.001), and cereals and bread (p<0.001) were consumed more by food insecure individuals.

The portions of food groups consumed and the percentages of meeting the recommendations of the Turkish Dietary Guidelines (TÜBER), by food secure and food insecure individuals are presented in Table 4 and Figure 2. None of the individuals in the study met the recommended intake of dairy products according to TÜBER. There was no significant difference between food secure and insecure individuals, as far as percentage of meeting the recommended intake of dairy products was concerned (p=0.079). However, food secure individuals met 19.5% of the recommended intake of fruits and vegetables, food insecure individuals met only 15.1%, and the difference between the groups was statistically significant (p<0.001). The meat consumption of both groups met the recommended intakes, in fact consumption was a little bit higher in food insecure individuals. However, the difference was not statistically significant (p=0.075). The portions of cereals and bread consumed by food secure individuals was 116.3% of the recommended intake, while food insecure individuals was 157.6%, difference between them being statistically significant (p<0.001).

The average daily energy and nutrient intake and the extent to which recommended dietary allowances (RDA) energy and nutrient requirements were met according to food security status of individuals were examined and presented as an additional table (Supplementary Table A-B).

DISCUSSION

Food insecurity is a global public health issue that predominantly affects low-income families [17]. If not detected early and addressed, it can lead to various health problems in the future [3-6]. In a study conducted in Turkey, the current status of food security was examined across four dimensions (availability, accessibility, utilization, and stability), revealing that food security could not be ensured across all dimensions [18]. The fact that the minimum wage in Turkey is below the hunger threshold suggests that food insecurity is inevitable for families of four living on minimum wage [19]. In a study aimed at determining the food insecurity status among minimum wage workers and assessing their nutritional status, it was found that 52.1% (n=201) of minimum wage workers were food secure, while 47.9% (n=185) were food insecure.

In a study conducted with seasonal agricultural workers, who were part of the at-risk group for food insecurity due to their low-wage jobs, family size, income, and having children were identified as factors associated with food insecurity [20]. In this study, age, smoking status, and having additional nutritional income were found to be associated with food insecurity. The risk of experiencing food insecurity was 0.5 units lower among minimum wage workers under the age of 25 (18-24 years) compared to individuals over 25 years old. Another study found that the rate of individuals experiencing mildly and severely food insecurity was higher among those under 25 (19-25) years as compared to those in the 26-30 age group [21]. In this study, the prevalence of food insecurity among non-smoking participants was 1.7 times higher compared to smoking participants. These results contradict some other studies in the literature [22,23]. It is speculated that the high taxes on tobacco in Turkey may contribute to this inconsistency.

Food insecurity affects nutritional status of individuals. A study examining the relationship between the prevalence of food insecurity and food consumption found that the rate of food insecurity was 41% in households with individuals under the age of 18, compared to 26.4% in households where all individuals were over 18 [24] years of age. In the same study, it was observed that fruit and vegetable consumption in households experiencing food insecurity was lower compared to food-secure households. Similarly, in this study individuals experiencing food insecurity consumed fewer fruits and vegetables (p<0.001, Z=-3.684) compared to food secure individuals (Table 3). It is known from previous studies that individuals experiencing food insecurity consume less fruits and vegetables (0.44 fewer portions of fruit and 0.43 fewer portions of vegetables per day) [25]. In a study conducted among mothers with children under the age of 18, it was found that mothers experiencing food insecurity consumed more bread and grains, eggs, sweets, and sugary beverages compared to food secure mothers, while consuming fewer nuts, dairy products, fruits, and alcoholic beverages [26]. In this study, the consumption of bread and grains (p<0.001, Z=-4.096), fats (p=0.001, Z=-3.335), and confectioneries (p=0.313, Z=-1.009) was higher among food insecure individuals compared to food secure individuals (Table 3). This may be due to the fact that the cost per calorie of fruits and vegetables is higher than the cost per calorie of cereals, oils and sweets, as shown in another study [27]. Some studies have linked this to a higher prevalence of obesity and BMI in individuals experiencing food insecurity [28-29]. However, in contrast to these studies, our study did not find a statistically significant difference in BMI between food secure and food insecure minimum wage workers. It may be considered that the fact that the anthropometric measurements of individuals were not taken by researchers were self-reported by participants may have influenced this result.

Moderately food insecurity is associated with a decrease in diet quality, diversity, or desirability, while severely food insecurity is associated with disrupted eating patterns and decreased energy and nutrient intake [30]. In this study, it is thought that the higher energy intake among food insecure individuals may be due to the majority of individuals (94%) experiencing mildly or moderately food insecurity. Low-income individuals have heen reported to have stated that the type and quality of food were affected rather than the quantity or frequency of consumption [31]. Hutchinson et al. (2022) did not find a statistically significant relationship between food insecurity and the proportion of energy derived from fat, carbohydrates, sugar, and saturated fat [32]. In this study, it was observed that the percentage of energy derived from carbohydrates was higher in food insecure individuals compared to food secure individuals, with no significant

difference in the percentage of energy derived from fat Supplemantary Table A-B). Additionally, contrary to the study by Hutchinson et al. (2022), this study found that food insecure individuals consumed more fiber. This may be due to the fact that Turkey is an agricultural country, where legumes are relatively cheaper than fruits and vegetables per calorie.

Table 3. Comparison of food security and precarious minimum wage workers according to their consumption of food groups

	Food Secure (n=201)			Food Insecure (n=185)			Z	p
Food Group	**X̄±SS(M†)**	**Lower value**	**Upper value**	**X̄±SS(M†)**	**Lower value**	**Upper value**		
Milk (g)	262.4±206.15 (204.68)	0.0	1618.0	213.2±145.86 (181.35)	0.0	1134.0	-2.052	0.040*
Meat (g)	216.6±126.00 (182.32)	6.0	702.0	234.4±121.12 (205.65)	28.0	733.0	-2.052	0.040*
Animal (g)	167.0±107.90 (179.55)	0.0	623.0	188.3±108.46 (208.65)	0.0	674.0	-2.560	0.010*
Vegetable (g)	49.6±44.72 (197.13)	0.0	283.0	46.1±42.61 (189.56)	0.0	234.0	-0.666	0.505
Vegetables and Fruit (g)	388.9±244.01 (213.57)	0.0	1500.0	301.5±1025.0 (171.69)	0.0	1025.0	-3.684	0.000**
Bread and Cereals (g)	374.8±186.32 (171.19)	22.0	991.0	472.7±1170.0 (217.74)	73.0	1170.0	-4.096	0.000**
Oil (g)	49.8±30.20 (175.33)	0.0	157.0	61.1±134.0 (213.24)	1.0	134.0	-3.335	0.001*
Confectionery (g)	38.3±39.70 (188.00)	0.0	308.0	39.7±376.0 (199.47)	0.0	376.0	-1.009	0.313

*†:Mean Rank, Mann-Whitney U testi, *p<0.05, **p<0.001.*

Table 4. Comparison of food group intakes of food-insecure and food-insecure minimum wage workers according to the recommendations of Turkey-specific nutrition guidelines

Food Group	**Food Secure (n=201)**				**Food Insecure (n=185)**				**p**
	X̄±SS (M†)	**Lower value**	**Upper value**	**%‡**	**X̄±SS (M†)**	**Lower value**	**Upper value**	**%‡**	
Milk (servings)	2.02±1.53 (203.06)	0.00	9.42	67.2	1.63±1.02 (183.11)	0.00	9.18	54.3	0.079
Meat (servings)	3.02±1.75 (183.78)	0.20	9.93	109.9	3.28±1.77 (204.06)	0.36	9.02	119.2	0.075
Vegetable-Fruit (servings)	0.97±0.61 (213.57)	0.00	3.75	19.5	0.75±0.45 (171.69)	0.00	2.56	15.1	<0.001*
Bread and Cereals (servings)	5.82±3.13 (169.80)	0.23	14.29	116.3	7.88±4.27 (219.25)	1.00	17.93	157.6	<0.001*

*†:Mean Rank, ‡: Percent Coverage, Mann-Whitney U testi, *p<0.001.*

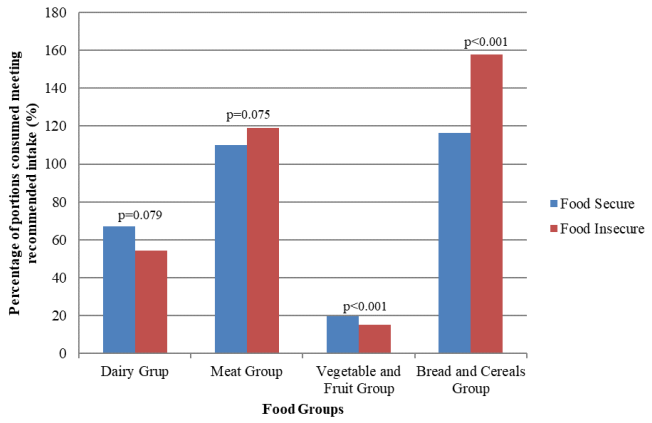

Figure 2. *Percentage of food groups consumed by food-secure and food-insecure individuals meeting the recommendation according to the Turkey Specific Dietary Guidelines (TÜBER). Statistical analysis was performed using Mann-Whitney U test.*

Food insecurity is inversely related to income status. However, not every poor individual experience food insecurity. For example, approximately 65% of households near the poverty line were reported to be food secure [33]. This situation may have been associated with the implementation of certain supplementary nutrition programs. In this study, 80% of food secure individuals received nutritional assistance, supporting this hypothesis. In the United States, the implementation of supplementary nutrition assistance programs (SNAP) for unemployed adults resulted in a 2.2% reduction in food insecurity among low-income households [34]. In another study, it was found that individuals not benefiting from SNAP were 81% more likely to report food insecurity [35].

Limitations

The study data were collected from individuals working with minimum wage in Üsküdar district of Istanbul province. It cannot be generalized to all minimum wage earners. In addition, the body weight and height of the participants were not measured by the researchers but were taken on the basis of self-declaration by individuals.

CONCLUSION

According to the results of this study conducted with minimum wage workers, the prevalence of food insecurity was 47.9%. The risk of food insecurity was found to be associated with age, supplementary nutrition income and smoking habits. Although not statistically significant, individuals with food insecurity consumed more bread and cereals, fat and meat group foods and confectionery. In addition, it was observed that the consumption of vegetables, fruits and milk group of all minimum wage earners who participated in the study did not meet the recommendations of TÜBER. Therefore, it is necessary to evaluate minimum wage workers in terms of food insecurity and to ensure access to affordable healthy foods in order to prevent health problems that may occur due to inadequate and unbalanced nutrition.

Ethical Approval: *2021/21-761 Hamidiye Scientific Research Ethics Committee of Health Sciences University*

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Supplemantery Tables

Table A. Average daily energy and nutrient intake of minimum wage workers and comparison of averages according to food security status

Variables	Total (n=386)		Food Security (n=201)		Food Insecurity (n=185)		
	X̄±SS	Lower-Upper Value	X̄±SS	Lower-Upper Value	X̄±SS	Lower-Upper Value	*ap*
Energy (kcal)	2673.1±1100.15	738.91-9085.41	2546.21-1094.54	738.91-9085.41	2810.97-1092.5	819.75-5803.28	0.011*
Carbohydrate (g)	307.6±137.83	47.00-969.25	289.24-140.27	47-969.25	327.63-132.62	78.19-762.38	0.002*
Carbohydrate (%)	46.6±7.74	23-72	45.64-8.13	23-65	47.6-7.163	27-72	0.025*
Protein (g)	93.2±40.18	23.03-305.77	90.01-40.39	28.58-305.77	96.65-39.77	23.03-257.97	0.044*
Protein (%)	14.3±2.78	8-28	14.58-3.16	8-28	14.01-2.27	8-21	0.170
Oil (g)	116.6-51.43	22.35-438.35	112.04-50.17	25.43-438.35	121.51-52.45	22.35-296.17	0.054
Oil (%)	39.0-7.76	14-65	39.63-8.19	22-65	38.27-7.21	14-59	0.168
Fiber (g)	31.1-14.90	6.12-110.30	29.41-14.51	6.12-110.3	32.82-15.13	7.99-81.39	0.014*
Alcohol (g)	0.4-1.33	0.00-11.33	0.48-1.53	0-11.33	0.37-1.05	0-8.47	0.392
PUFA	32.2-18.20	3.30-107.71	29.13-17.144	3.3-107.71	35.616-18.75	4.5-73.84	0.001*
Cholesterol (mg)	420.8-215.32	2.31-1863.16	412.95-217.42	21.52-1501.12	429.36-213.28	2.31-1863.16	0.072
Vitamin A (meg)	1911.7-2157.81	21.00-21619.25	1816.85-2309.05	21-21619.25	2014.76-1981.57	137.16-9887.66	0.240
Carotene	3.9-3.31	0.00-33.16	4.39-3.72	0-33.16	3.39-2.7	0.17-16.64	<0.001**
Vitamin E (mg)	31.3-18.18	2.88-81.42	27.3-16.01	2.88-79.43	35.68-19.39	3.59-81.42	<0.001**
Thiamine (mg)	1.3-0.57	0.38-5.99	1.29-0.62	0.43-5.99	1.31-0.51	0.38-3.56	0.253
Riboflavin (mg)	1.9-0.93	0.35-8.56	1.89-1.02	0.46-8.56	1.83-0.8	0.35-6.07	0.820
Pyridoxine (mg)	1.9-1.15	0.40-8.94	1.99-1.36	0.4-8.94	1.74-0.84	0.47-6.12	0.567
Folate (mg)	347.4-167.93	82.10-1740.01	347.33-188.18	128.84-1740.01	347.4-143.24	82.1-1151.63	0.312
Vitamin C (mg)	89.3-57.87	0.00-557.01	100.30-67.08	0-557.01	77.43-42.93	4.08-290.03	<0.001**
Sodium (mg)‡	3270.6-1752.35	491.26-11526.16	3032.02-1593.88	515.76-11526.16	3529.89-1879.89	491.26-10516.2	0.018*
Potassium (mg)	2986.2-1227.02	948.44-12615.06	3023.95-1368.11	1083.89-12615.06	2945.09-1054.75	948.44-7752.23	0.962
Calcium (mg)	1048.7-432.30	251.71-3800.74	1067.92-471.11	415.61-3800.74	1027.73-385.92	251.71-3761.41	0.996
Magnesium (mg)	409.8-161.03	116.79-1403.25	404.7-175.29	130.83-1403.25	415.41-144.2	116.79-960.52	0.116
Phosphorus (mg)	1500.5-644.54	417.41-5689.20	1491.77-699.53	421.37-5689.2	1510.02-580.65	417.41-4561.96	0.261
Iron (mg)	13.2-5.94	2.99-41.79	12.62-6.00	2.99-41.79	13.77-5.83	3.29-34.11	0.210
Zinc (mg)	13.2-5.53	3.47-42.28	13.05-5.92	4.45-42.28	13.39-5.075	3.47-37.44	0.154

*PUFA: Polyunsaturated fatty acid, ‡:Dietary salt consumption is not included, a:Mann Whitney U test, *p<0.05, **p<0.001.*

Table B. Distribution of minimum wage workers meeting recommended daily allowance (RDA) energy and nutrient requirements and relationship analysis

Variables	Total (n=386)			Food Security (n=201)			Food Insecurity (n=185)			ap
	Insufficient (<%67) n (%)	Adequate (%67-110) n (%)	Excess (>%110) n (%)	Insufficient (<%67) n (%)	Adequate (%67-110) n (%)	Excess (>%110) n (%)	Insufficient (<%67) n (%)	Adequate (%67-110) n (%)	Excess (>%110) n (%)	
Energy (kcal)	94 (24.4)	253 (65.5)	39 (10.1)	51 (25.4)	133 (66.2)	17 (8.5)	43 (23.2)	120 (64.9)	22 (11.9)	0.515
Carbohydrate (g)	170 (44)	204 (52.8)	12 (3.1)	97 (48.3)	96 (47.8)	8 (4.0)	73 (39.5)	108 (58.4)	4 (2.2)	0.920
Protein (g)	66 (17.1)	217 (56.2)	103 (26.7)	35 (17.4)	111 (55.2)	55 (27.4)	31 (16.8)	106 (57.3)	48 (25.9)	0.918
Oil (g)	50 (13)	198 (51.3)	138 (35.8)	25 (12.4)	105 (52.2)	71 (35.3)	25 (13.5)	93 (50.3)	67 (36.2)	0.914
Fiber (g)	103 (26.7)	198 (51.3)	85 (22)	65 (32.3)	98 (48.8)	38 (18.9)	38 (20.5)	100 (54.1)	47 (25.4)	0.025*
Cholesterol (mg)	51 (13.2)	128 (33.2)	207 (53.6)	27 (13.4)	77 (38.3)	97 (48.3)	24 (13.0)	51 (27.6)	110 (59.5)	0.060
Vitamin A (mg)	38 (9.8)	110 (28.5)	238 (61.7)	16 (8.0)	64 (31.8)	121 (60.2)	22 (11.9)	46 (24.9)	117 (63.2)	0.192
Vitamin E (mg)	23 (6)	106 (27.5)	257 (66.6)	16 (8.0)	58 (28.9)	127 (63.2)	7 (3.8)	48 (25.9)	130 (70.3)	0.146
Thiamine (mg)	59 (15.3)	219 (56.7)	108 (28)	34 (16.9)	113 (56.2)	54 (26.9)	25 (13.5)	106 (57.3)	54 (29.2)	0.627
Riboflavin (mg)	26 (6.7)	141 (36.5)	219 (56.7)	13 (6.5)	79 (39.3)	109 (54.2)	13 (7.0)	62 (33.5)	110 (59.5)	0.498
Pyridoxine (mg)	43 (11.1)	173 (44.8)	170 (44)	22 (10.9)	94 (46.8)	85 (42.3)	21 (11.4)	79 (42.7)	85 (45.9)	0.718

Vitamin C (mg)	112 (29)	178 (46.1)	96 (24.9)	50 (24.9)	84 (41.8)	97 (33.3)	62 (33.5)	94 (50.8)	29 (15.7)	<0.001**
Calcium (mg)	74 (19.2)	245 (63.5)	67 (17.4)	44 (21.9)	117 (58.2)	40 (19.9)	30 (16.2)	128 (69.2)	27 (14.6)	0.082
Magnesium (mg)	54 (14)	218 (56.5)	114 (29.5)	33 (16.4)	113 (56.2)	55 (27.4)	21 (11.4)	105 (56.8)	59 (31.9)	0.295
Phosphorus (mg)	2 (0.5)	73 (18.9)	311 (80.6)	1 (0.5)	42 (20.9)	158 (78.6)	1 (0.5)	31 (16.8)	153 (82.7)	0.584
Iron (mg)	112 (29)	139 (36)	135 (35)	63 (31.3)	78 (38.8)	60 (29.9)	49 (26.5)	61 (33.0)	75 (40.5)	0.089
Zinc (mg)	31 (8)	156 (40.4)	199 (51.6)	20 (10.0)	85 (42.3)	96 (47.8)	11 (85.9)	71 (38.4)	103 (55.7)	0.177

*Cramer's V correlation test, *p<0.05, **p<0.001.*