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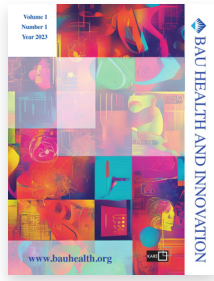

Original Article

The Relationship Between White-Collar Workers' Nutritional Habits, Nutritional Status, and Healthy Eating Index

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Abstract

Objectives: This study was planned to determine the dietary habits, working hours, and anthropometric characteristics of randomly selected white-collar workers from various sectors in Istanbul and Bursa provinces and to investigate their relationship with the Healthy Eating Index (HEI).

Methods: A total of 171 employees participated in the study, with face-to-face assessments using general characteristic forms, nutritional habits, anthropometric measurements, a 24-h dietary recall, and HEI.

Results: A total of 171 white-collar working individuals participated in the study, with ages ranging from 23 to 59 years, consisting of 123 females and 48 males. The overall HEI score for participants was 51.27±11.75, and for females and males, average scores were 52.39±11.63 and 48.39±11.72, respectively ($p<0.05$). No participants in either sex group demonstrated good dietary quality. Males had poorer dietary quality compared to females. It was found that most participants skipped meals, with breakfast being the most skipped meal. After breakfast, morning snacks and lunch were the next most frequently skipped meals. As the number of meals and the daily water intake of participants increased, there was an associated increase in their HEI scores ($p<0.05$). In addition, a decrease in HEI scores was noted with the delay in dinner time and an increase in participants' daily energy intake. It was found a negative correlation between body weight, body mass index, waist circumference, hip circumference, and waist-to-hip ratio with HEI scores; however, this correlation was not statistically significant. When age, sex, education, income level, marital status, smoking, alcohol use, sleep duration, food allergies, presence of diseases, work experience, current job tenure, time spent standing, and time spent sitting were included in Binary Logistic Regression Analysis, it was observed that the only independent variable affecting the HEI score was sex. Female sex was found to reduce the risk of having poor dietary quality. This section is written quite long for the abstract section. The abstract should be a maximum of 250 words. Therefore, the result section should be shortened.

Conclusion: Our study has shown the need to improve the diet quality of white-collar workers. The findings also suggest that late-night dinners negatively affect diet quality. In addition, it appears that male employees have a lower diet quality compared to females, and this difference in dietary approaches should not be overlooked.

Keywords: Diet quality, eating habits, healthy eating index, white collar.

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The term "white-collar workers" refers to a category of employees and professionals who typically perform tasks that involve mental or administrative work, as opposed to manual or industrial labor. They are often characterized by working in office settings, using their knowledge and skills to complete tasks, and frequently wearing white-

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collar shirts or professional attire. White-collar workers are commonly contrasted with "blue-collar workers," who are typically engaged in manual labor or physical tasks.[1] In our country, according to the 2023 data of the Türkiye Strategy and Budget Presidency, there are 31.873.000 employees, approximately 75% of them are blue-collar workers, while 25% are white-collar workers.[2]

Dietary habits and food preferences are influenced by various factors such as individual, environmental, societal, biological, psychological, sociocultural, and socioeconomic factors. The World Health Organization (WHO) also considers workplaces as a significant environment affecting individuals' dietary habits. Working individuals spend two-thirds of their day at the workplace, and during this time, job-related factors such as job description, position, job stress, prolonged sitting, and working hours (overtime and night shifts, etc.) can influence dietary habits, potentially leading to obesity and abdominal fat accumulation.[3] In addition, there are several other important factors that influence food choices, such as the type of food an individual selects, portion sizes of what they eat, whether they eat alone or with others, and meal timing.[4]

It is observed that the psychological state of white-collar workers also influences their eating behavior, and an increase in workload hinders them from taking lunch breaks or attending health education sessions. These circumstances have been found to result in employees feeling tired and consuming unhealthy food choices, both because they are more accessible and because they are perceived as more comforting than healthy foods.[5] High-stress levels in the workplace can lead to emotional eating among white-collar workers. They may seek comfort in snacks, sweets, or high-calorie foods during stressful moments.[6]

Epidemiologists specializing in nutrition have created multiple predefined dietary patterns to characterize dietary consumption and assess the links between diet and disease. The Healthy Eating Index (HEI) is commonly used in nutritional epidemiology.[5] The HEI assesses the quality of an individual's diet based on various components, such as the consumption of fruits, vegetables, whole grains, dairy, protein foods, and added sugars. The higher scores indicate a higher quality diet. Researchers use HEI to assess and study diet-disease relationships, monitor dietary trends, and inform nutrition policies and interventions. It serves as a valuable tool for promoting healthier eating habits and preventing chronic diseases, including chronic diseases like obesity, heart disease, and diabetes, by examining dietary patterns and their impact on health outcomes.[7]

There have been studies that have assessed the HEI in various populations, including white-collar workers. However, in our country, there are limited studies investigating the HEI in white-collar workers. This study was planned to determine the dietary habits, working hours, and anthropometric characteristics of randomly selected white-collar workers from various sectors in Istanbul and Bursa provinces and to investigate their relationship with the HEI.

Materials and Methods

This cross-sectional study, conducted between February and June 2020, included employees from 11 various private companies. Participants were white-collar workers of at least 3 months' tenure, excluding those on medical diets, with eating disorders, pregnant, or breastfeeding. A total of 171 employees participated in the study, with face-to-face assessments using general characteristic forms, nutritional habits, anthropometric measurements, a 24-h dietary recall (24-HR) and HEI.

Dietary Intake

A 24-HR was collected for dietary assessments. Participants were asked about all the food and beverages they had consumed on the previous day, including how the meals were prepared and their contents. Portion sizes were queried using a food catalog.[8] The daily intake of energy was analyzed using the Computer-Assisted Nutrition Program Nutrition Information System Package Program 8.1 (BEBİS).[9]

Anthropometric Measurements

Anthropometric measurements were collected, encompassing height (in centimeters), body weight (in kilograms), waist circumference (in centimeters), and hip circumference (in centimeters). Participant height was measured using a stadiometer (Tartı, Telescopic Height Meter, Japan) with individuals assuming an upright position, feet placed side by side, and heads positioned according to the Frankfort plane. A scale (Inbody, 720, South Korea) calibrated with a sensitivity of 100 grams was employed for precise body weight measurements. During the body weight assessment, participants were instructed to remove thick clothing and shoes, with measurements conducted before lunchtime and after using the restroom, as outlined by Pekcan.[10] Body Mass Index (BMI) for the employees was calculated using the formula "body weight (kg)/ height (m^2)," taking into account the recorded body weight (kg) and height (m) measurements.[10] The classification of individuals' BMI was carried out in accordance with the criteria established by the WHO.[11] In addition, waist circumference measurements were taken from the midpoint between the lowest rib and the crystalline bone

using a rigid tape measure, while hip circumference was obtained by measuring the highest point of the hip with the same measuring tool.[10] Subsequently, risk groups for chronic diseases were categorized based on waist and hip circumference measurements, with reference to gender-specific criteria and the waist-to-hip ratio calculated as "waist circumference (cm)/hip circumference (cm)," utilizing data from the World Health Organization.[11]

The HEI

HEI is a widely used measure of diet quality developed by the United States Department of Agriculture. The most recent version is the HEI-2015, designed to assess how well an individual's dietary intake aligns with the 2015–2020 Dietary Guidelines for Americans.[12] HEI-2015 evaluates diet quality based on 13 components, including the consumption of fruits, vegetables, whole grains, dairy, protein foods, and added sugars, as well as saturated fats, sodium, and refined grains. The calculation involves summing the component scores to generate an overall HEI score, reflecting the extent to which one's diet adheres to recommended dietary patterns. Higher scores indicate better diet quality. The HEI score was calculated by scoring each component based on the amounts of each component in 1000 kcal of individuals' food consumption records. Each component is scored on a scale of 0–10, with a total maximum score of 100. A total score of ≤50 is defined as "poor diet quality," 51–80 as "needs improvement," and >80 as "good diet quality."[13]

Ethical Approval

This study was carried out in accordance with the Principles of the Declaration of Helsinki, and the ethical committee approval, dated January 15, 2020, and numbered 2020/01, which was obtained from the Scientific Research and Publication Ethics Committee of the University. All patients who volunteered to participate in the study were informed in detail about the study and provided written consent. Ethical principles such as confidentiality, protection of confidentiality, and respect for autonomy were followed throughout the study.

Statistical Analysis

IBM SPSS 22.0 software (Armonk, NY: IBM Corp) was used for conducting the analyses.[14] Participants' demographic and dietary characteristics were analyzed using descriptive statistics, including means, standard deviations, counts, and percentages. Numeric data, such as age, weight, and HEI scores, were compared between female and male participants using the Independent Samples t-test (for $n>30$) and Mann–Whitney U test (for $n<30$) for binary group comparisons. Group comparisons involving more than two categories utilized the Kruskal–Wallis H test. Proportional data were analyzed using Chi-square tests and Fisher's Exact Chi-square Analysis (if %<5.0). Correlations between numeric variables were explored using Pearson and Spearman correlation analyses for normally and non-normally distributed data, respectively. Binary Logistic Regression Analysis identified factors influencing the risk of poor dietary quality. The normality of data distribution was verified based on kurtosis and skewness values (±1.5), and the significance level for all analyses was set at $p<0.05$.

Results

A total of 171 white-collar working individuals participated in the study, with ages ranging from 23 to 59 years, consisting of 123 females and 48 males. The mean age for female participants was 34.40±8.90 years, while for male participants, it was 39.08±10.03 years ($p<0.05$). The general characteristics and anthropometrics of the participants based on sexes are presented in Table 1.

The overall HEI score for participants was 51.27±11.75, and for females and males, average scores were 52.39±11.63 and 48.39±11.72 respectively. Indicating a need for dietary quality improvement based on HEI assessments. According to HEI score and sex differences, the p-value was found 0.045 ($p < 0.05$). No participants in either sex group demonstrated good dietary quality. Males had poorer dietary quality compared to females, ($p<0.05$) (Fig. 1).

While participants with higher educational levels, higher economic status, and a habit of consuming snacks appeared to have better dietary quality, it was determined that these associations were not statistically significant ($p>0.05$) (Table 2).

Although there was a negative correlation between participants' HEI scores and anthropometric measurements, it was not statistically significant ($p>0.05$). It was determined that there was no statistically significant relationship between participants' employment status data and their daily average sleep durations with the HEI score ($p>0.05$). It was observed that as the number of meals and the daily water intake of participants increased, there was an associated increase in their HEI scores ($p<0.05$). In addition, a decrease in HEI scores was noted with the delay in dinner time and an increase in participants' daily energy intake ($p<0.05$) (Table 3).

It was detected that those who preferred muesli and granola for breakfast had higher HEI score averages compared to those who preferred other foods ($p<0.05$).

Table 1. General characteristic of participants according to sexes

	Female (n=123)		Male (n=48)		Total (n=171)		p
	n	%	n	%	n	%	
Marital status							**0.026[b]**
Married	64	52.0	34	70.8	98	57.3	
Single	59	48.0	14	29.2	73	42.7	
Education							0.076[a]
Primary school	0	0.0	2	4.2	2	1.2	
Secondary school	2	1.6	3	6.3	5	2.9	
High school	31	25.2	8	16.7	39	22.8	
University/college	81	65.9	32	66.7	113	66.1	
Master's/PhD	9	7.3	3	6.3	12	7.0	
Income level							**0.042[a]**
<5.000 TL	80	65.0	23	47.9	103	60.2	
5.000–10.000 TL	38	30.9	18	37.5	56	32.7	
10.000–15.000 TL	3	2.4	3	6.3	6	3.5	
15.000–25.000 TL	0	0.0	1	2.1	1	0.6	
More than 25.000 TL	2	1.6	3	6.3	5	2.9	
Smoking							0.258[b]
Yes	42	34.1	20	41.7	62	36.3	
No	81	65.9	28	58.3	109	63.7	
Alcohol use							0.081[b]
Yes	51	41.5	27	56.3	78	45.6	
No	72	58.5	21	43.8	93	54.4	
Body mass index (kg/m^2)							**<0.001[a]**
Underweight	7	5.7	0	0.0	7	4.1	
Normal	83	67.5	10	20.8	93	54.4	
Overweight	22	17.9	29	60.4	51	29.8	
Obese	11	8.9	9	18.8	20	11.7	
Waist circumference (cm)							**<0.001[a]**
No risk	81	65.9	9	18.8	90	52.6	
Risk	21	17.1	24	50.0	45	26.3	
High risk	21	17.1	15	31.3	36	21.1	
Waist/hip ratio							**<0.001[a]**
No risk	115	93.5	16	33.3	131	76.6	
Risk	8	6.5	32	66.7	40	23.4	

[a]: Pearson Chi-square analysis, [b]: Fisher exact Chi-square analysis.

In addition, it was found that there was no statistically significant difference in the relationship between lunch services, meal habits, and other characteristics with HEI score averages (p>0.05) (Table 4).

Participants who had a habit of consuming snacks had higher HEI score averages compared to those who did not (p<0.05). In terms of snack preferences, individuals who chose fruits/dried fruits and dairy products had significantly higher HEI score averages compared to those who did not (55.31–46.19 and 57.69–51.75, respectively) (p<0.05). Additionally, it was observed that individuals who preferred options such as sugar, chocolate, and wafers during snacks had significantly lower HEI score averages compared to those who did not (48.50–55.17) (p<0.05) (Table 5).

When age, sex, education, income level, marital status, smoking, alcohol use, sleep duration, food allergies, presence of diseases, work experience, current job tenure, time spent standing, and time spent sitting were included in Binary Logistic Regression Analysis, it was observed that the only independent variable affecting the HEI score was

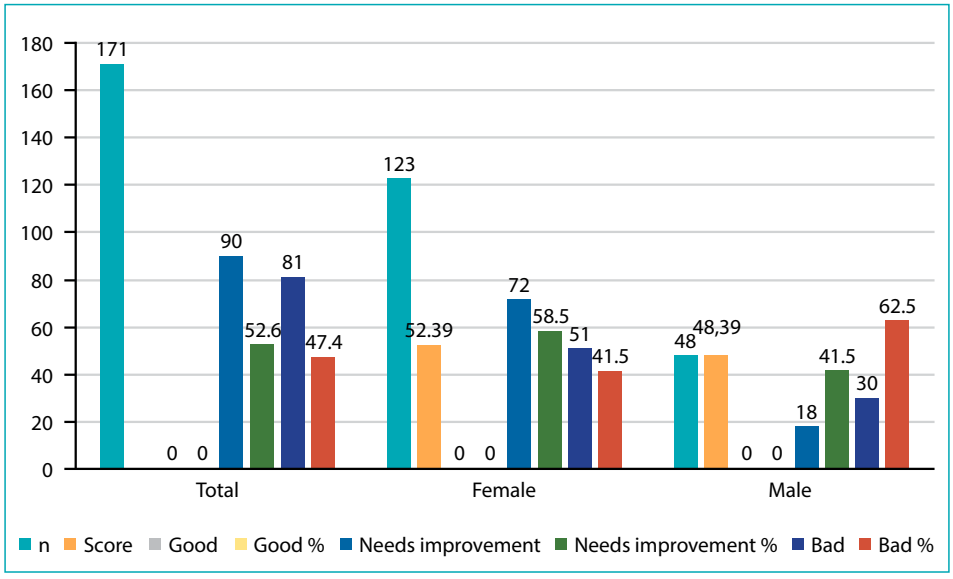

Figure 1. HEI scores and classification according to sexes.

HEI: Healthy Eating Index.

Table 2. Possible factors within HEI classification

	Healthy eating index				p
	Needs improvement (n=90)		Bad (n=81)		
	n	%	n	%	
Education					
High school and below	22	47.8	24	52.2	0.643[b]
University/college MSc/PhD	68	54.4	57	45.6	
Income level					
<5.000 TL	50	48.5	53	51.5	0.550[b]
More than 5.000 TL	40	58.8	28	41.2	
Marital status					
Married	53	54.0	45	46.0	0.660[a]
Single	37	50.7	36	49.3	
Smoking status					
Yes	33	53.2	29	46.8	0.907[a]
No	57	52.3	52	47.7	
Alcohol drinking status					
Yes	42	53.8	36	46.2	0.771[a]
No	48	51.6	45	48.4	
Skipping meals					
Yes	53	54.1	45	45.9	0.660[a]
No	37	50.7	36	49.3	
Snacking status					
Yes	64	57.7	47	42.3	0.073[a]
No	26	43.3	34	56.7	

[a]: Pearson Chi-square analysis, [b]: Fisher exact Chi-square analysis. HEI: Healthy Eating Index.

Table 3. Correlation of individuals' HEI scores with age and anthropometric measurements, work- and diet-related characteristics

Related characteristics	Healthy eating index	Work-related characteristics	Healthy eating index
Age (years)		Time spent in the current position (years)	
r[a]	0.005	r[b]	−0.022
p	0.946	p	0.772
Body weight (kg)		Daily seated working time (hours)	
r[a]	−0.067	r[a]	−0.007
p	0.383	p	0.923
Height (cm)		Daily standing/walking working time (hours)	
r[a]	−0.076	r[a]	−0.054
p	0.321	p	0.480
Body Mass Index (kg/m^2)		Average sleep duration per day (hours)	
r[a]	−0.038	r[a]	0.064
p	0.624	p	0.405
Waist circumference (cm)		**Diet-related characteristic**	
r[a]	−0.055	Number of meals consumed per day	
p	0.475	r[a]	0.151
Hip circumference (cm)		p	0.049
r[a]	−0.097	Dinner time	
p	0.206	r[b]	−0.202
Waist-to-Hip ratio		p	0.008
r[a]	−0.009	Amount of water consumed per day (mL)	
p	0.902	r[a]	0.176
Work-related characteristics		p	0.021
Duration of becoming a white-collar employee (years)		Energy (kcal)	
r[a]	0.024	r[a]	−0.213
p	0.760	p	0.005

[a]: Pearson correlation analysis, [b]: Spearman correlation analysis.

sex. Female sex was found to reduce the risk of having poor dietary quality (OR=0.316, p=0.005) (Table 6).

Discussion

In this cross-sectional study, we aimed to examine the relationship between HEI scores and dietary habits in white-collar workers. The findings revealed that the participants had low overall HEI scores, indicating a need for dietary quality improvement. Female workers had higher HEI scores than men. The average HEI score was found to be 51.27±11.75. When compared to studies in both our country (HEI: 62.5 and 65.9) and foreign populations (HEI: 63.7 and 56.5), this score was determined to be low.[3,4] White-collar workers might have a lower risk of HEI compared to the general population. Furthermore, our study found that none of the participants had a good diet quality, which was associated with high simple sugar and saturated fat consumption, as well as frequent consumption of packaged products containing added sugars like chocolates and biscuits during snacks.

Many studies investigating the diet quality of adults have found that women tend to have higher HEI scores than men.[7,15] Similar to these studies, our research also yielded a similar result. This was attributed to male participants in the study group having fewer snacking habits and higher saturated fat intake than females. Moreover, being female was identified as the only significant factor affecting HEI scores.

Skipping breakfast, meal frequency, snack preferences, irregular meals, and large portion consumption were related to body weight.[16] Skipping breakfast was associated with higher energy intake during lunch, and skipping lunch was associated with higher energy intake during dinner, which was linked to obesity.[6] On the other hand, adults who consumed breakfast had a lower BMI compared to those who did not. Therefore, skipping breakfast can increase the risk of obesity.[7]

Table 4. Comparison of HEI scores with lunch service and meal habits in the facility

	Healthy Eating Index score		
	n	**Mean±SD or median**	**p**
Skipping meals			
Yes	98	51.12±12.15[x]	0.851[a]
No	73	51.47±11.29[x]	
The most skipped meal			
Morning	35	48.10[y]	0.336[b]
Midday	21	55.10[y]	
Evening	10	51.18[y]	
Snack	33	53.53[y]	
Foods that are usually preferred for breakfast			
Granola	5	64.25[y]	**0.023[b]**
Eggs, cheese, olives, etc.	100	53.44[y]	
Sandwich, toast	21	51.51[y]	
Bakery products	45	47.63[y]	
Lunch service in the institution			
Catering company	90	52.38[y]	0.928[b]
There is a food preparer in the office	28	49.72[y]	
Ticket/Sodexo	46	51.86[y]	
I bring it from home	7	47.46[y]	

[x]: Mean±hr., [y]: Median, [a]: Independent Groups t test, [b]: Kruskal Wallis H test. SD: Standard deviation.

In studies evaluating the dietary habits of white-collar workers in our country, it was found that most of them consumed 3–4 meals per day and had a habit of skipping meals.[17,18] Both white-collar workers and the general adult population tended to skip lunch and breakfast the most.[17–19] White-collar workers often face time constraints due to their busy morning routines. Many rely on quick and convenient breakfast options, such as cereal, yogurt, granola bars, or fast-food breakfast items. Some may also skip breakfast altogether.[20,21] Similarly, in our study, it was observed that most participants skipped meals, with breakfast being the most skipped meal. After breakfast, morning snacks and lunch were the next most frequently skipped meals.

Eating breakfast was associated with a lower BMI and higher HEI score, and the choice of foods at breakfast also had an impact on HEI scores.[22,23] A study investigating the relationship between obesity risk and HEI scores and the consumption of breakfast cereals found that consuming breakfast cereals such as oats and muesli was associated with a decreased risk of obesity.[23] Our study results also supported this, as participants who preferred muesli and granola for breakfast had significantly higher HEI scores than those who preferred foods such as eggs, cheese, olives, sandwiches, toast, and pastry products. In conclusion, consuming breakfast and choosing nutrient-rich foods for breakfast can help prevent obesity and improve diet quality.

In previous studies, higher BMI values are associated with lower HEI scores.[15,24] In a study investigating the impact of diet composition on BMI, it was observed that individuals following a higher-quality diet had lower BMI values compared to those following a lower-quality diet.[25] In our study, we found a negative correlation between body weight, BMI, waist circumference, hip circumference, and waist-to-hip ratio with HEI scores; however, this correlation was not statistically significant. This may be attributed to the relatively small size of the study population.

According to the 2016 WHO data, 39% of the global adult population is overweight, with 13% classified as obese.[26] In our study, 11.7% were obese, and males exhibited a notably higher prevalence than females, particularly among white-collar workers (18.8% vs. 8.9%). Elevated waist measurements indicated an increased risk of chronic diseases. Women faced a higher obesity risk compared to men, with 73.4% of females in risk or high-risk categories, in contrast to 47.8% of males. Breakfast skipping was linked to increased obesity, especially among males. These findings suggest that males in our study had a greater prevalence of obesity and susceptibility to chronic diseases compared to national data, possibly influenced by their high-calorie snack preferences.

Meal frequency was found to be positively associated with HEI scores for both genders, with consuming an additional meal

Table 5. HEI values according to snack alternatives

	Number	HEI Mean±SD/ median	p
Snack			
Yes	111	52.76±11.95[x]	**0.024[a]**
No	60	48.51±10.96[x]	
Snack preferences			
Fruit/dried fruit			
Yes	80	55.31±11.08[x]	**<0.001[a]**
No	31	46.19±11.79[x]	
Cookies, cakes, pastries, etc.			
Yes	28	45.68[y]	0.201[c]
No	83	55.10[y]	
Dairy products			
Yes	19	61.93[y]	**0.019[c]**
No	92	52.76[y]	
Carbonated drinks			
Yes	6	43.97[y]	0.426[c]
No	105	54.66[y]	
Oil seeds			
Yes	46	55.33[y]	0.171
No	65	50.25[y]	
Candy, chocolate, wafers, etc.			
Yes	40	48.50±11.41[x]	**0.004[a]**
No	71	55.17±11.65[x]	
Muesli bar/granola			
Yes	9	61.93[y]	0.184[c]
No	102	53.10[y]	
Sandwiches, toasts, pies, etc.			
Yes	12	45.68[y]	0.170[c]
No	99	54.86[y]	

[x]: Mean±hr., [y]: Median, [a]: Independent groups t-test, [c]: Mann–Whitney U test.

per day increasing HEI scores by 1.77 points in men and 2.22 points in women. Skipping at least one meal was observed to lead to a decrease in HEI scores, especially when breakfast and lunch were skipped, resulting in inadequate intake of fruits, whole grains, and dairy products. Furthermore, an increase in meal frequency was consistently associated with diet quality.[5] In our study, similar to other studies, an increase in the number of meals consumed was associated with higher HEI scores. Another significant finding was that delaying the timing of the evening meal was associated with lower HEI scores. Studies have shown that having a late-night dinner may negatively affect diet quality, potentially increasing the risk of obesity and chronic diseases.[27,28]

For snack foods in between meals to be appropriate in terms of nutrient adequacy or excess, they need to contain an adequate amount of macronutrients.[29] Snack foods consumed between meals, especially those high in energy such as pastries, crackers, chocolates, and biscuits, are thought to be potential risk factors for obesity.[16] The consumption of fruits, whole grains, dairy products, and legumes lowers cardiovascular risk, while foods like pastries, sweets, and fast food contribute to the risk of cardiovascular diseases.[30] Our study demonstrated that participants who had snacks between meals had higher HEI scores compared to those who did not. Furhermore, individuals who consumed fruits/dried fruits and dairy products as snacks had higher HEI scores, while those who consumed foods such as sugar, chocolate, and wafers had lower scores. In conclusion, both having snacks and choosing nutrient-rich foods for snacks can help prevent obesity and other chronic diseases. Studies have shown that higher water consumption is associated with lower daily intake of fats, saturated fats, added sugars,

Table 6. Binary logistic regression analysis associated with nutritional quality risk factors

	p	Odds ratio	95% CI	
			LL	UL
Age	0.934	1.003	0.938	1.072
Sex (female)	**0.005**	0.316	0.143	0.700
Education (undergraduate)	0.283	2.238	0.513	9.755
Education (graduate)	0.877	1.109	0.300	4.102
Income level (below 5.000 TL)	0.174	1.710	0.789	3.706
Marital status (married)	0.321	0.689	0.330	1.438
Smoking (yes)	0.515	1.271	0.617	2.616
Alcohol use (yes)	0.630	1.199	0.573	2.507
Sleep duration (hours)	0.092	0.756	0.547	1.047
Food allergy (no)	0.800	0.867	0.287	2.619
Illness (no)	0.211	1.653	0.752	3.635
Time spent working in an office (hours)	0.813	1.009	0.937	1.086
Duration of employment in the current position (years)	0.363	0.969	0.907	1.036
Time spent sitting (hours)	0.054	1.378	0.994	1.910
Time worked standing up (hours)	0.139	1.344	0.909	1.988

X2=20.00, p=0.172, Nagelkerke R2=0.15. Overall percentag=62.6. AL: Lower limit, UL: Upper limit.

and sodium, leading to better overall dietary quality.[5,31] In our study, an increase in individuals' water consumption was positively correlated with HEI scores, indicating a similarity between our results and these findings.

In conclusion, our study has shown the need to improve the diet quality of white-collar workers. Increasing meal frequency, and consuming fruits, whole grains, dairy products, and muesli for snacks and breakfast can improve diet quality. The findings also suggest that late-night dinners negatively affect diet quality. In addition, it appears that male employees have a lower diet quality compared to females, and this difference in dietary approaches should not be overlooked.

Limitations

This study exhibits several limitations that warrant consideration when interpreting the findings. Foremost, the cross-sectional nature of this research design restricts our ability to establish causal relationships between variables. The data collected at a single point in time merely provides a snapshot of the studied population's characteristics, precluding us from making temporal or cause-and-effect inferences. In addition, the study is constrained by a relatively small sample size. The limited number of participants may restrict the generalizability of our findings to broader populations. Furthermore, the distribution of participants across sexes is uneven, with a notable disparity in the number of male and female participants. This sex imbalance may introduce biases and impact the statistical power for sex-specific analyses. Furthermore, the study faced limitations related to available facilities and resources. The research was conducted with constrained access to facilities and equipment, potentially affecting the accuracy and comprehensiveness of data collection. Finally, the study focused on a small population subset, which may not fully represent the diversity of larger populations. As a result, caution should be exercised when extending the study's conclusions to broader demographic groups.

In summary, while this study offers valuable insights into its research objectives, the aforementioned limitations emphasize the need for caution when generalizing findings and highlight avenues for future research with larger and more diverse samples, longitudinal designs, and improved resource allocation.

Conclusion

As a result, factors such as stress brought about by excessive workload, the intensity of working hours, sedentary working conditions, the inability to find suitable meal options, and insufficient knowledge about nutrition can adversely affect the health of white-collar workers.

In summary, white-collar workers often face time constraints and may prioritize convenience when it comes to their eating habits. However, there is a growing awareness of health and nutrition, leading many to make healthier choices. Social and workplace factors, as well as stress levels, can influence their food choices.

Disclosures

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