





Comparison of obesity and physical activity levels of adult individuals by examining dietary habits with different parameters

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ABSTRACT

Aims: The aim of this study was to examine the dietary habits of adult individuals in detail at the level of different variables and to analyze these habits in depth in terms of obesity and physical activity levels.

Methods: In the study, quantitative research methods and a descriptive survey model from general survey designs were used. The research group consisted of 704 adult individuals in Kırıkkale province. The Three-Factor Eating Questionnaire (TFEQ) was used in the study. This is a questionnaire that measures the eating habits of individuals. It was translated into Turkish by Kırış et al. in 2015 under the name of "TFEQ" and its validity and reliability were proven, and its use in our country was ensured. The questionnaire consists of 18 items. The questionnaire measures the degree of consciously restricting their eating, the level of uncontrolled eating, and the degree of eating when they are emotional. The questionnaire also measures the level of sensitivity to hunger. In this respect, the questionnaire is related to obesity. Since the data were distributed as normal binary, they met the prerequisites for parametric tests. For this reason, an independent sample t test was used for pairwise group comparisons, and an ANOVA test was used for comparisons of three or more groups. In addition, if there was a significant difference in the ANOVA results, the Tukey post hoc test, one of the multiple comparison tests, was applied to determine which groups the difference was between.

Results: It was found that men tended to eat when they were more emotional than women, and those who lived in urban areas, did not smoke or drink alcohol, did not have chronic diseases, had a good economic status, and did more physical activity per week had favorable three-factor nutrition levels.

Conclusion: The findings of the study reveal that variables such as gender, place of residence, smoking and alcohol use, chronic disease, and economic status have significant effects on nutritional behaviors.

Keywords: Three factor nutrition, physical activity, obesity

INTRODUCTION

Obesity, which has caused serious health problems from the past to the present, is defined as the excess of calories obtained through food compared to the calories that the body spends at a normal level, and this excess is stored as fat.¹ Physically sedentary lifestyles, fast-paced work lives, and changes in eating habits cause many adults to experience difficulties in weight control.^{2,3} In recent years, obesity has emerged as a serious health problem worldwide.^{4,5} For this reason, it has become a serious factor that can negatively affect not only the physical health of the individual but also the quality of life and overall life expectancy.⁶

Obesity has negative effects on the endocrine system, cardiovascular system, respiratory system, gastrointestinal system, skin, genitourinary system, and musculoskeletal

system.⁷ According to the World Health Organization, obesity causes cardiovascular diseases, diabetes, cancer, and many musculoskeletal disorders.⁸ Each year, the World Health Organization (WHO) reports that more than 2.8 million adults die due to overweight or obesity-related health problems.⁹ On the other hand, the Public Health Agency of Türkiye concluded that overweight causes more than 1 million deaths in the European Region each year.¹⁰ According to the World Health Organization, obesity is among the main risk factors for cardiovascular diseases, diabetes, skeletal disorders, and some types of cancer.¹¹

According to a study conducted by the OECD, the USA ranks first in terms of the distribution of obesity by country.¹² In addition, according to WHO data, adult obesity reached 650

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million worldwide in 2016.^{13,14} According to the study by Kotseva and colleagues, the proportion of obese individuals in the total adult population is 13.1%; this rate was reported as 11.1% in men and 15.1% in women.¹⁵ According to the results of UBS Research, obesity rates among adults were determined to be 39.8%, which covers approximately 93.3 million adults.^{16,17} According to the 2012 obesity report, the obesity tendency was found to be more common in women with low income and education levels than in men. According to the same report, it was observed that the rate of obesity in men increased faster than in women.¹⁸ Dietary habits are a critical factor affecting this energy balance.¹⁹ The frequent consumption of high-calorie, low-nutrient foods, the spread of fast-food culture, the increasing popularity of processed foods-all these factors are major factors in the increasing prevalence of obesity.²⁰ In this context, a detailed examination of dietary habits is a critical step in developing effective strategies to combat obesity in individuals and societies.²¹

Adopting healthy eating habits, allocating time for regular physical activity, and developing personalized strategies tailored to the individual's lifestyle play a key role in obesity prevention.^{22,23} A balanced diet provides the nutrients the body needs and is important for healthy weight management, and portion control is an effective strategy for obesity prevention.²⁴ Emotional eating has been associated with conditions such as stress and unhappiness, causing a tendency to overeat and triggering obesity. Finally, the combination of regular physical activity and healthy eating habits provides an effective combination for obesity prevention.²⁵

Improving dietary habits can contribute to individuals adopting healthy lifestyles and preventing obesity. The aim of this article is to understand the effects of dietary habits on obesity in adult individuals and to highlight the information and relationships obtained to address this problem.

METHODS

Ethics

The study was carried out with the permission of Kırıkkale University Social and Human Sciences Researches Ethics Committee (Date: 21.02.2024, Decision No: 2024/E.234670). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Research Model

This study aims to examine the eating habits of adult individuals in detail at the level of different variables and to analyze these habits in terms of obesity and physical activity levels. In the study, a quantitative research method and a descriptive screening model, one of the general screening designs, were used for the purpose.

Research Group

The research group of this study consisted of 704 adult individuals in Kırıkkale province. A simple random sampling method was used in the study.

Data Collection

The Three-Factor Eating Questionnaire (TFEQ) is a questionnaire that measures the eating habits of individuals. It was translated into Turkish by Kırac et al.²⁶ in 2015 under the name of "TFEQ" and its validity and reliability were proven, and its use in our country was ensured. The questionnaire consists of 18 items. The questionnaire measures the degree of consciously restricting their eating, the level of uncontrolled eating, and the degree of eating when they are emotional. The questionnaire also measures the level of sensitivity to hunger.

Data Analysis

Cronbach's alpha was analyzed to determine the reliability of the study. Since the data were distributed as normal binary, they met the prerequisites of parametric tests. For this reason, an independent sample t-test was used for pairwise group comparisons, and an ANOVA test was used for comparisons of three or more groups. In addition, in cases of a significant difference in ANOVA results, the Tukey post hoc test, one of the multiple comparison tests, was applied to determine which groups the difference was between. The following thresholds were used to determine the size of the effect of the relationships: <0.1=insignificant; 0.1-0.3=small; >0.3-0.5=moderate; >0.5-0.7=large; >0.7-0.9=very large; and >0.9=almost perfect. For statistical analysis, the Windows-based SPSS 22.0 statistical package was used. Results are presented as frequency distributions, mean values, and standard deviations in tables or text.

RESULTS

Statistical information about the demographic information of the participants in the groups is shown in (Table 1).

Variables	n	%	
Total number of participants	704	100	
Gender	Female	475	67.5
	Male	229	32.5
Place of residence	Urban	543	77.1
	Rural	161	22.9
Smoking	Yes	257	36.5
	No	447	63.5
Alcohol use	Yes	209	29.7
	No	495	70.3
Chronic illness	Yes	138	19.6
	No	566	80.4
Economic situation	Bad	117	16.6
	Middle good	398	56.5
	Nothing	189	26.8
Weekly physical activity	Nothing	179	25.4
	1 per week	88	12.5
	2 per week	123	17.5
	3 per week	121	17.2
	4 per week	101	14.3
	5 per week	92	13.1

According to the table above, 67.7% of the participants were female, and 77.1% lived in urban areas. In addition, 63.5% of the participants did not smoke, 70.3% did not drink alcohol, 80.4% did not have any chronic disease, 56.5% had a medium economic level, 17.5% did physical activity 2 days a week, and 17.2% did physical activity 3 days a week (Table 1).

When Table 2 is examined, it is seen that there is a significant difference between men and women in the emotional eating sub-dimension according to the three-factor nutrition questionnaire scores, and the effect size is low.

When Table 3 was examined, it was determined that there was a significant difference between participants living in urban and rural areas in the sub-dimensions of uncontrolled eating, emotional eating, and sensitivity to hunger according to the three-factor nutrition questionnaire scores of the place of residence variable. The largest effect size between the participants living in rural and urban areas was found to be in the emotional eating sub-dimension, while the smallest effect

size was found in the uncontrolled eating sub-dimension.

When Table 4 was examined, it was determined that there was a significant difference in the sub-dimensions of uncontrolled eating, emotional eating, and sensitivity to hunger according to the three-factor nutrition questionnaire scores of smoking and non-smoking participants. It was observed that the highest effect level between smokers and non-smokers was in the sensitivity to hunger sub-dimension, and the lowest effect level was in the emotional eating sub-dimension.

When Table 5 was examined, it was determined that there was a significant difference between alcohol users and non-alcohol users in the sub-dimensions of uncontrolled eating, emotional eating, and sensitivity to hunger according to the three-factor nutrition questionnaire scores of the alcohol use variable. It was observed that the largest effect size between alcohol users and non-alcohol users was in the emotional eating sub-dimension, and the lowest effect size was in the uncontrolled eating sub-dimension.

Table 2. T-test results of TFEQ scores according to gender

Dimension	Female (n=475) Mean±SD	Male (n=229) Mean±SD	t	Cohen's d	p
Uncontrolled eating	12.07±2.08	11.70±2.15	2.110	0.18	0.330
Emotional eating	8.13±2.85	9.40±2.38	-5.859	0.49	0.001*
Conscious eating	17.68±3.16	17.48±3.36	.752	0.07	0.453
Hunger sensitivity	11.30±3.22	11.21±3.41	.322	0.03	0.743

TFEQ: Three-factor eating questionnaire, SD: Standart deviation, *p<0.001

Table 3. T-test results of TFEQ scores according to place of residence

Dimension	Residence	n	Mean	SD	t	Cohen's d	p
Uncontrolled eating	Urban	543	12.11	204	3282	0.31	0.001*
	Rural	161	11.45	227			
Emotional eating	Urban	543	9.06	254	8958	0.84	0.001*
	Rural	161	6.82	284			
Conscious eating	Urban	543	17.72	316	1518	0.14	0.113
	Rural	161	17.26	342			
Hunger sensitivity	Urban	543	11.78	311	7714	0.69	0.001*
	Rural	161	9.59	331			

TFEQ: Three-factor eating questionnaire, *p<0.001

Table 4. T-test results of TFEQ scores according to smoking status

Dimension	Cigarette use	n	Mean	SD	t	Cohen's d	p
Uncontrolled eating	Yes	292	11.62	2.11	-3572	0.28	0.001*
	No	412	12.19	2.09			
Emotional eating	Yes	292	8.15	2.91	-3178	0.25	0.001*
	No	412	8.83	2.66			
Conscious eating	Yes	292	17.28	3.20	-2365	0.19	0.018
	No	412	17.86	3.24			
Hunger sensitivity	Yes	292	10.48	3.49	-5420	0.42	0.001*
	No	412	11.85	3.02			

TFEQ: Three-factor eating questionnaire, *p<0.001

Table 5. T-test results of TFEQ scores according to alcohol use status

Dimension	Alcohol use	n	Mean	SD	t	Cohen's d	p
Uncontrolled eating	Yes	209	11.45	2.17	-4.056	0.35	0.001*
	No	495	12.17	2.06			
Emotional eating	Yes	209	7.44	2.87	-6.873	0.58	0.001*
	No	495	9.02	2.61			
Conscious eating	Yes	209	17.14	3.14	-2.551	0.22	0.010
	No	495	17.82	3.26			
Hunger sensitivity	Yes	209	10.17	3.50	-5.667	0.48	0.001*
	No	495	11.75	3.09			

TFEQ: Three-factor eating questionnaire, *p<0.001

When Table 6 is examined, it is determined that there is a significant difference between the participants with and without chronic disease in the sub-dimensions of emotional eating, conscious eating, and sensitivity to hunger according to the three-factor nutrition questionnaire scores of the chronic disease variable. It was observed that the largest effect size was in the emotional eating sub-dimension, and the lowest effect size was in the conscious eating sub-dimension.

When Table 7 was examined, it was determined that there was a significant difference between the participants in the sub-dimensions of uncontrolled eating and conscious eating according to the three-factor nutrition questionnaire scores of the economic status variable. According to the ANOVA results, it was determined in both sub-dimensions that the

eating habits scores of the participants with good and medium economic status were high, while the eating habits scores of the participants with poor economic status were low. It was observed that there was no significant difference in the emotional eating and hunger tolerance sub-dimensions.

When Table 8 was examined, it was determined that there was a significant difference in the sub-dimensions of uncontrolled eating, conscious eating, and sensitivity to hunger according to the three-factor nutrition questionnaire scores of the weekly physical activity variable. According to the ANOVA results, it was determined that the scores of those who performed physical activity 5 times a week, 4 times a week, and 3 times a week were high, while the scores of those who performed physical activity 2 times a week, 1 time a week, and never a week were low. There was no significant difference in the emotional eating sub-dimension.

Table 6. T-test results of TFEQ scores according to chronic disease status

Dimension	Chronic illness	n	Mean	SD	t	Cohen's d	p
Uncontrolled eating	Yes	138	11.53	2.38	-2.437	0.24	0.008
	No	566	12.06	2.04			
Emotional eating	Yes	138	6.99	2.89	-7.188	0.70	0.001*
	No	566	8.92	2.62			
Conscious eating	Yes	138	16.84	3.49	-2.996	0.30	0.001*
	No	566	17.81	3.15			
Hunger sensitivity	Yes	138	9.50	3.44	-6.900	0.68	0.001*
	No	566	11.72	3.11			

TFEQ: Three-factor eating questionnaire, SD: Standart deviation, *p<0.001

Table 7. ANOVA results of TFEQ scores according to economic status

Dimension	Economic situation	n	Mean	SD	F	p	Tukey
Uncontrolled eating	Bad ¹	117	11.24	2.13	8.160	0.001*	3=2>1
	Middle ²	398	12.09	2.00			
	Good ³	189	12.12	2.27			
Emotional eating	Bad ¹	117	6.49	2.67	49.823	0.393	-
	Middle ²	398	8.70	2.60			
	Good ³	189	9.50	2.59			
Conscious eating	Bad ¹	117	16.90	3.42	3.708	0.001*	3=2>1
	Middle ²	398	17.82	3.11			
	Good ³	189	17.63	3.33			
Hunger sensitivity	Bad ¹	117	9.36	3.38	28.954	0.716	-
	Middle ²	398	11.45	3.17			
	Good ³	189	12.13	3.03			

TFEQ: Three-factor eating questionnaire, SD: Standart deviation, *p<0.001

Table 8. ANOVA results of TFEQ scores according to weekly physical activity status

Dimension	Physical activity status	n	Mean	SD	F	p	Tukey
Uncontrolled eating	Nothing ¹	169	11.72	2.30	2.218	0.001*	6=5=4>3=2=1
	1 per week ²	82	11.54	2.17			
	2 per week ³	129	11.90	1.85			
	3 per week ⁴	131	12.32	2.04			
	4 per week ⁵	111	12.05	1.92			
	5 per week ⁶	82	12.25	2.34			
Emotional eating	Nothing ¹	169	7.25	3.13	11.569	0.393	-
	1 per week ²	82	8.60	2.69			
	2 per week ³	129	8.80	2.52			
	3 per week ⁴	131	8.97	2.58			
	4 per week ⁵	111	9.46	2.22			
	5 per week ⁶	82	8.86	2.59			
Conscious eating	Nothing ¹	169	16.53	3.43	0.766	0.001*	6=5=4>3=2=1
	1 per week ²	82	16.21	3.26			
	2 per week ³	129	16.41	2.63			
	3 per week ⁴	131	18.47	3.12			
	4 per week ⁵	111	18.73	3.20			
	5 per week ⁶	82	18.64	3.86			
Hunger sensitivity	Nothing ¹	169	10.15	3.88	7.346	0.001*	6=5=4>3=2=1
	1 per week ²	82	10.05	3.19			
	2 per week ³	129	10.40	3.16			
	3 per week ⁴	131	11.69	2.88			
	4 per week ⁵	111	12.36	2.45			
	5 per week ⁶	82	12.55	3.27			

TFEQ: Three-factor eating questionnaire, SD: Standart deviation, *p<0.001

DISCUSSION

The aim of this study is to examine the dietary habits of adult individuals in detail at the level of different variables and to analyze these habits in depth in terms of obesity and physical activity levels. When the results obtained from the study were analyzed, it was determined that the majority of the participants were female, lived in urban areas, did not smoke or drink alcohol, and did not have chronic diseases. It was determined that the individuals with moderate economic status and weekly physical activity rates were scattered and that the individuals who mostly performed physical activity 2 or 3 days a week were included in the study.

According to the three-factor nutrition questionnaire scores between men and women, it was observed that there was a significant difference between genders in the emotional eating sub-dimension, and the scores of men were higher than the scores of female participants. It is thought that men tend to eat more than women due to the fact that they share their emotional state less than women. Düz, Taşkıran, and Sadık²⁷ found that female basketball players developed uncontrolled eating behavior due to unbalanced nutrition in their study. Tayfun et al.²⁸ found that there was no difference between genders in the emotional eating and uncontrolled eating sub-dimensions of eating habits. Seremet Kürklü et al.²⁹ reported that the uncontrolled eating and emotional eating scores of females were higher than those of males in a study conducted on adolescents. In the study conducted by İskender and Yıldırım³⁰ it was determined that women had higher values of uncontrolled eating behavior than men. It was observed that there were studies in the literature that were not similar to our study.

According to the three-factor nutrition questionnaire scores of the variables of place of residence, smoking and alcohol use, it was determined that there was a significant difference between the participants living in urban and rural areas in the sub-dimensions of uncontrolled eating, emotional eating, and sensitivity to hunger, and between smokers and alcohol users and non-users. According to the place of residence, it was determined that those living in urban areas and those who said no to smoking and alcohol use had low scores in the sub-dimensions of uncontrolled eating and emotional eating and in favor of them, and those who said no to smoking and alcohol use had low scores in the sub-dimensions of sensitivity to hunger but against them. Those who lived in rural areas and smoked and drank alcohol had high scores in the sub-dimensions of uncontrolled eating and emotional eating, and high scores in the sub-dimensions of sensitivity to hunger and favorable scores. No significant difference was found in the conscious eating sub-dimension. It is thought that those who do not smoke and drink alcohol have high awareness and consciousness about eating habits. Since individuals living in cities have easier access to information, it is thought that they develop awareness in order to acquire nutritional habits and are informed about nutrition. Acemioğlu and Doğan³¹ stated that there was no difference in attitudes towards healthy eating according to the place of residence variable in their study for science teachers. In Çakar and Arslan's³² study on emotional nutrition in 2023, they stated that place of residence, smoking and alcohol use were effective on eating behavior.

According to the three-factor nutrition questionnaire scores of the chronic disease variable, it was determined that there was a significant difference between the participants with and without chronic disease in the sub-dimensions of emotional eating, conscious eating and sensitivity to hunger. This difference was found to be high in favor of those who said yes to conscious eating and sensitivity to hunger in those without chronic disease. In the emotional eating sub-dimension, it was found to be high in favor of those who said yes. It is thought that the eating habits of individuals without chronic diseases are also regular and that this order contributes to them not to develop chronic diseases. Bolayır et al.³³ evaluated the differences that cause obesity and stated that the most important factors that cause obesity are eating habits, insufficient physical activity, and lack of awareness of healthy eating. In the study conducted by Tuncel et al.,³⁴ the most important factors causing obesity are nutrition and physical inactivity. Acemioğlu and Doğan³¹ stated that there was no difference in attitudes towards healthy eating according to the variable of having a chronic disease.

According to the three-factor nutrition questionnaire scores of the economic status variable, it was determined that there was a significant difference between the participants in the sub-dimensions of uncontrolled eating and conscious eating. In both sub-dimensions, it was determined that the nutritional habit results of the participants with good and medium economic status were high, while the nutritional habit scores of the participants with poor economic status were low. It is thought that individuals with good economic status can make choices according to their awareness status because they have many opportunities in the sub-dimensions of uncontrolled eating and conscious eating on behalf of eating habits. Taşçene and Koçoğlu³⁵ found that balanced nutrition did not differ according to economic status in their study on eating habits. In the study conducted by İskender et al.,³⁶ it was concluded that the balanced nutrition status of university students did not differ according to economic status. In the study conducted by Songur et al.³⁷ on the nutritional status of patients receiving health services, it was seen that healthy eating status does not differ according to economic factors. Acemioğlu and Doğan,³¹ in their study for science teachers, stated that the monthly income level of families did not make a difference in their attitudes towards healthy nutrition. It was seen that these studies did not overlap with our research. In their study on eating habits in 2020, Gül and Gül³⁸ found that the nutritional problems of individuals with low economic levels increased.

It was determined that there was a significant difference in the sub-dimensions of uncontrolled eating, conscious eating, and sensitivity to hunger according to the three-factor nutrition questionnaire scores of the weekly physical activity variable. It can be concluded that those who do more physical activity are more conscious of nutrition, have higher levels of awareness, and according to these results, those who do more activity are attentive to nutrition. This situation can also be associated with obesity. Since individuals who do more activity can also develop sensitivity to hunger, it is thought

that they are far away from obesity. In the study, it was concluded that individuals who show sensitivity to hunger can make healthy and conscious dietary choices, so they may be less likely to develop obesity. Kıymaz and Süel,³⁹ in their study on physical activity and nutritional habits of university students in 2024, stated that individuals who do more physical activity have more regular eating habits. In a study conducted by Dinç et al.⁴⁰ in 2017 on the nutritional habits of individuals who exercise, it was concluded that individuals who engage in physical activity have a more balanced diet. In the study conducted by Güldal et al.⁴¹ on the students of the faculty of sports sciences in 2023, it was determined that the nutritional habits of individuals who regularly engage in physical activity are at a good level. The results of the study are similar to ours. Cheng et al.,⁴² in their study on eating and physical activity behaviors, found that weight-related self-stigma was significantly associated with both healthy eating and physical activity behaviors.

CONCLUSION

This study reveals that dietary habits are influenced by variables such as gender, place of residence, smoking and alcohol use, chronic disease, and economic status, and that these habits are linked to obesity and physical activity levels. According to the findings of the study, it was concluded that these variables have significant effects on nutrition behaviors. In particular, lifestyle factors such as healthy eating and regular physical activity were found to play an important role in reducing obesity. It is important to organize nutrition education and awareness programs, especially for economically disadvantaged groups. These groups should be provided with support and resources to develop healthy eating habits and regular physical activity. For these reasons, it is inevitable that health policies and individual health programs should take these factors into account. Taking these important factors into account will increase the effectiveness of health services and improve the overall health of the population.

ETHICAL DECLARATIONS

Ethics Committee Approval

This study was carried out with the permission of Kırıkkale University Social and Human Sciences Researches Ethics Committee (Date: 21.02.2024, Decision No: 2024/E.234670).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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