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Yetişkinlerde Beslenme, Fiziksel Aktivite ve Yaşam Kalitesi Arasındaki İlişkiler: Kesitsel Bir Analiz

Relationships Between Nutrition, Physical Activity, and Quality Of Life in Adults: A Cross-Sectional Analysis

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ÖZ

Amaç: Bu çalışmanın amacı, yetişkin bireylerde besin tüketimi, fiziksel aktivite düzeyi ve sağlıkla ilişkili yaşam kalitesi arasındaki ilişkileri değerlendirmektir.

Yöntem: Kesitsel tanımlayıcı tipteki bu çalışmada besin ögesi alımı için 24 saatlik besin tüketim kaydı, fiziksel aktivite seviyesini değerlendirmek için Uluslararası Fiziksel Aktivite Anketi-Kısa Form (IPAQ-SF) ve yaşam kalitesini değerlendirmek için SF-12 Yaşam Kalitesi Ölçeği kullanılmıştır. Veriler IBM SPSS Statistics 26 yazılımı kullanılarak analiz edilmiştir.

Bulgular: Toplam 1650 kişi (%57,3 kadın, %42,7 erkek) gönüllü olarak çalışmaya katılmıştır. Katılımcıların yaş ortalaması 43,5±19,04 yıl, ortalama beden kütle indeksi (BKİ) ise 25,9±5,09 kg/m² olarak belirlenmiştir. Yaş ile Fiziksel Bileşen (PCS-12) (r=-0,530, p<0,001) ve IPAQ-SF (r=-0,355, p<0,001) skorları arasında negatif ve orta düzeyde; BKİ ile PCS-12 (r=-0,302, p<0,001) arasında negatif korelasyon saptanmıştır. IPAQ-SF skoru ile protein (r=0,130, p<0,001) ve enerji (r=0,049, p<0,001) arasında zayıf pozitif korelasyon belirlenmiştir. Regresyon analizi sonuçlarına göre yaş, BKİ, Mental Bileşen (MCS-12), IPAQ-SF toplam skoru ve bazı besin tüketim değişkenlerinden oluşan model, PCS-12 skorundaki varyansın %35,4'ünü açıklamaktadır (R^2=0,354, p<0,001).

Sonuç: Çalışma sonuçları, beslenme ve fiziksel aktivitenin yaşam kalitesinin hem fiziksel hem zihinsel bileşenleri üzerinde etkili olduğunu göstermektedir. Bu bulgular, sağlıklı yaşam biçimlerinin teşvik edilmesi açısından önem taşımaktadır. Bununla birlikte, gelecekte yapılacak boylamsal ve müdahale çalışmalarının, beslenme ve fiziksel aktivite düzeylerinin yaşam kalitesi üzerindeki nedensel etkilerini daha ayrıntılı olarak ortaya koyması yararlı olacaktır.

Anahtar Kelimeler: Beslenme, Fiziksel Aktivite, Yaşam Kalitesi, Yetişkin, Beden Kütle İndeksi.

ABSTRACT

Objective: This study aims to assess the relationships between dietary intake, physical activity level, and health-related quality of life (QoL) in adults.

Method: This cross-sectional and descriptive study utilized a 24-hour dietary recall to assess nutrient intake, the International Physical Activity Questionnaire-Short Form (IPAQ-SF) to measure physical activity levels, and the SF-12 Health Survey to measure QoL. Data were analyzed using IBM SPSS Statistics version 26.

Results: A total of 1,650 individuals (57.3% women) voluntarily participated in the study. The mean age was 43.5±19.04 years, and the mean body mass index (BMI) was 25.9±5.09 kg/m². Negative and moderate correlations were found between age and the Physical Component Summary (PCS-12) (r=-0.530, p<0.001), and between age and IPAQ-SF scores (r=-0.355, p<0.001). BMI was also negatively correlated with PCS-12 scores (r=-0.302, p<0.001). IPAQ-SF scores were weak but positively correlated with protein (r=0.130, p<0.001) and energy intake (r=0.049, p<0.001).

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According to the results of the regression analysis, the model consisting of age, BMI, Mental Component Summary (MCS-12), total IPAQ-SF score, and several nutrient intake variables explained 35.4% of the variance in the PCS-12 score (R^2=0.354, $p<0.001$).

Conclusion: The findings indicate that nutrition and physical activity are significantly associated with both the physical and mental components of health-related QoL. These results underline the importance of promoting healthy lifestyle behaviours. However, future longitudinal and interventional studies would be useful to elucidate the causal effects of dietary habits and physical activity levels on QoL in greater detail.

***Key words**:* Nutrition, Physical Activity, Quality of Life (QoL), Adults, Body Mass Index.

1. INTRODUCTION

The World Health Organization (WHO) defines health as a state of complete physical, mental, and social well-being (1). Health is holistically associated with adequate and balanced nutrition, regular physical activity, and positive changes in other behavioral factors. Accordingly, nutrition and physical activity are key lifestyle determinants that extend beyond body weight control and substantially influence quality of life (QoL), mental health, chronic disease risk, and overall functioning (2).

Adults are recommended to engage in at least 150-300 minutes of moderate-intensity or 75-150 minutes of vigorous-intensity aerobic physical activity per week (3). Globally, however, physical inactivity and unhealthy dietary behaviors are closely associated with an increased risk of non-communicable chronic diseases, particularly obesity (4). Consistent with this global pattern, studies conducted in Türkiye indicate that a considerable proportion of adults do not meet recommended levels of physical activity (5) and fail to achieve adequate nutrient intake (6). Previous research has also shown that macronutrient and dietary fiber intakes frequently fall below the reference values recommended in the Turkish Dietary Guidelines (7,8). In this context, inadequate nutrition has been associated not only with physical health outcomes but also with individuals' perceptions of QoL (9). In particular, unbalanced dietary habits combined with low physical activity levels have been linked to declines in both physical and mental components of QoL (10,11). Moreover, physical activity has been shown to exert beneficial effects on musculoskeletal health, mental well-being, and overall life satisfaction (12,13). Psychological factors such as stress, mood, and general well-being-closely related to perceived QoL-have also been consistently associated with physical activity levels (14). Beyond disease risk, insufficient physical activity and suboptimal nutrient intake may further contribute to impaired physical functioning, metabolic dysregulation, and reduced health-related quality of life (15).

QoL is influenced by sociodemographic factors such as age, gender, body mass index (BMI), education, and income. Limited access to healthy living opportunities among low-income populations may adversely affect health-related behaviors such as physical activity and dietary practices (16,17). Conversely, higher educational attainment is associated with improved access to health information, facilitating healthier lifestyle choices (18). Indeed, evidence suggests that higher socioeconomic status is positively associated with both QoL and physical activity participation (19). Collectively, these findings indicate that sociodemographic characteristics may influence lifestyle behaviors through structural and environmental pathways, thereby indirectly shaping quality of life outcomes (20).

Given these considerations, examining dietary intake and physical activity levels in tandem has become increasingly important for understanding their combined influence on health-related quality of life. While previous studies have largely focused on the independent associations of nutrition and physical activity with QoL, relatively few have examined their joint relationships within the same population, particularly with respect to both physical and mental dimensions of QoL. Furthermore, evidence addressing these interactions among adult populations in Türkiye remains limited. Therefore, this study aims to investigate the associations between daily nutrient intake, physical activity levels, and health-related quality of life in adults, offering an integrated perspective on lifestyle-related determinants of well-being. By addressing these gaps, the study seeks to contribute to a more comprehensive understanding of how dietary and physical activity patterns jointly relate to quality of life outcomes and to inform public health strategies.

2. MATERIAL AND METHODS

Study Population and Sample

This cross-sectional descriptive survey study was conducted between August 2024 and November 2025. The research population consisted of individuals over the age of 18 who were literate, did not have any health conditions that could cause mobility limitations, and voluntarily agreed to participate in the study. The sample was determined using a convenience sampling method, and a total of 1,650 participants were included. To assess the adequacy of the sample size for statistical analyses, a post-hoc power analysis was conducted using the G*Power 3.1.9.7 software. As a result of the correlation analysis, which was conducted using a two-tailed test, 95% power (1-β=0.95), and a 5% significance level (α=0.05), sufficient to detect a small effect size (r=0.10), the power value for the sample of 1650 people was determined to be 1.00. This result demonstrated that the study had sufficient statistical power to detect even low-level relationships between the variables evaluated. Furthermore, the research data were collected using face-to-face interviews. However**,** due to the cross-sectional design of the study, causal relationships between dietary intake, physical activity, and quality of life cannot be established. In addition**,** although the post-hoc power analysis supports the adequacy of the sample size for detecting statistical associations, it does not replace an a priori sample size calculation. Moreover, the use of convenience sampling and self-reported data may limit the generalizability of the findings; therefore, the results should be interpreted with caution.

Data Collection Instruments

Demographic Information Form: It includes questions that evaluate sociodemographic characteristics of individuals such as age, gender, body weight, height, income state and education level.

24-Hour Food Recall Method: A 24-hour diet recall method was used to assess participants' dietary intake. Using the retrospective recall method, participants were asked about all foods and beverages consumed in the last 24-hours and recorded on a form prepared by the researcher (21). The energy, macronutrient, and fiber values of participants' diets were calculated using the full version of BeBIS 8.2.

SF-12 Health Survey: The SF-12 Health Survey, which was converted into a 12-item form by Ware et al. (22) to make the SF-36 more practical, is used to assess health-related QoL. The total score of the physical (PCS) and mental (MCS) summary components obtained from the scale provides an assessment of the individual's overall physical and mental health status. The Turkish validity and reliability study of the scale was conducted by Soylu and Kütük, and Cronbach's alpha values were found to be 0.73 for the PCS and 0.72 for the MCS (23).

International Physical Activity Questionnaire (IPAQ)-Short Form: The International Physical Activity Questionnaire Short Form, created by Dr. Michael Booth (24) and later developed by the International Physical Activity Assessment Group, determines individuals' physical activity levels over the past week. The scale includes seven semi-structured, open-ended questions to determine vigorous-intensity, moderate-intensity, walking, and sitting activities by day and duration (minutes). The scale was adapted for Turkish culture by Öztürk and colleagues (25). Individuals' MET scores are calculated using the data obtained from the scale.

Data Analysis

The data obtained in the study were analyzed using IBM SPSS Statistics for Windows, Version 22.0 (SPSS Inc., Chicago, IL, USA). For the analysis of descriptive data, categorical variables were summarized using frequencies and percentages, while continuous variables were described with median, minimum-maximum, mean, and standard deviation values. The normality of data distribution was evaluated using skewness and kurtosis statistics. As the variables did not meet the assumptions of normal distribution, non-parametric statistical methods were applied throughout the analyses.

Differences in physical and mental health-related quality of life scores (PCS-12 and MCS-12) and physical activity levels (IPAQ-SF score) according to gender were analyzed using the Mann-Whitney U test. Comparisons across BMI categories, educational levels, and income status were performed using the Kruskal-Wallis H test. When statistically significant differences were detected in multi-group comparisons, Bonferroni-adjusted post hoc analyses were conducted to identify the source of the differences between groups. Associations between age, BMI, PCS-12 score, MCS-12 score, IPAQ-SF score, daily energy intake, and macronutrient intakes (carbohydrate, protein, fat, and fiber) were examined using Spearman’s rank correlation analysis.

To determine the independent predictors of physical health-related quality of life, multiple linear regression analysis was performed with the PCS-12 score as the dependent variable. MCS-12 score, IPAQ-SF score, BMI, daily energy intake, and macronutrient intakes (carbohydrate, protein, fat, and fiber) were included as independent variables in the regression model. The assumptions of linear regression were evaluated by examining residual plots and variance inflation factors. Model fit and explanatory power were assessed using the coefficient of determination (R^2) and the F statistic. A p-value of less than 0.05 was considered statistically significant in all analyses.

3. RESULTS

Of the participants, 57.3% were women, and the mean age was 43.5±19.04 years. The mean body mass index (BMI) was 25.9±5.09 kg/m². According to BMI classification, 40.7% of participants were classified as normal weight, while 38.1% were classified as overweight. Regarding educational status, 38.4% of participants were university graduates. In terms of income level, 57.7% reported that their income was equal to their expenditures (Table 1).

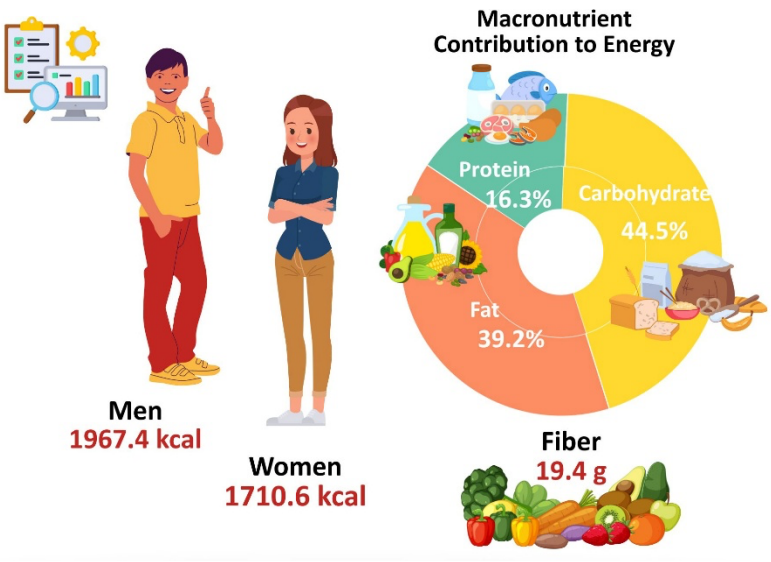
Table 1. Relationship Between Participants' Descriptive Characteristics and SF-12 and IPAQ-SF Score

Descriptive Characteristics		n %	PCS-12 Score Mean±SD Median Min/Max	MCS-12 Score Mean±SD Median Min/Max	IPAQ-SF Score Mean±SD Median Min/Max
Gender	Women	945 57.3	46.4±11.63 50.9 12.6/64.1	46.4±8.20 47.9 15.1/67.7	970.4±1041.14 693.0 33.0/8739.0
	Men	705 42.7	48.0±10.42 52.4 12.6/63.5	48.8±7.37 49.8 13.2/67.3	1227.8±1279.32 792.0 66.0/9198.0
	Z p		-1.647 0.100	-5.846 <0.001	-5,947 <0.001
BMI	<18.5 kg/m²	75 4.5	47.1±13.99[ab] 54.9 14.2/64.1	42.5±10.01[a] 45.9 13.2/57.8	898.9±706.64[a] 735.0 80.0/4158.0
	18.5-24.9 kg/m²	671 40.7	50.1±9.58[a] 53.8 13.0/63.8	47.2±7.54[b] 48.4 14.9/64.0	1166.9±1120.20[a] 809.0 33.0/9168.0
	25.0-29.9 kg/m²	628 38.1	47.0±51.3[b] 51.4 12.6/63.7	48.1±7.55[b] 49.4 22.7/66.7	1046.8±1147.92[b] 693.0 99.0/8739.0
	≥30.0 kg/m²	276 16.7	40.0±11.58[c] 41.0 15.5/62.8	47.5±8.62[b] 48.7 19.6/67.7	996.0±1332.33[c] 594.0 50.0/9148.0
	H p		165.108 <0.001	24.394 <0.001	31.912 <0.001
Education Level	Illiterate	151 9.2	32.7±11.40[a] 31.6 12.6/57.6	47.5±6.95[a] 48.3 19.6/63.6	470.8±321.27[a] 396.0 50.0/1848.0
	Primary School	312 18.9	42.1±11.36[b] 44.3 12.6/60.2	48.3±7.75[a] 48.7 14.9/67.7	911.9±1247.40[b] 578.0 33.0/9198.0
	Middle School	196 11.9	46.3±11.05[b] 51.4 14.0/60.6	48.6±7.49[a] 49.1 24.8/67.3	1002.3±1056.87[b] 693.0 66.0/8640.0
	High School	296 17.9	49.6±9.67[c] 54.0 18.5/64.1	47.6±8.19[a] 49.46 13.2/62.3	1100.9±1133.93[c] 809.0 99.0/9168.0
	Undergraduate	634 38.4	51.6±7.42[c] 54.3 24.1/63.6	46.5±4.19[a] 48.2 15.1/64.0	1320.0±1233.3[c] 975.0 66.0/8586.0
	Master's Degree	58 3.5	52.1±7.81[c] 55.3 30.3/63.3	49.9±7.37[a] 50.2 27.6/57.5	1150.4±849.04[c] 899.0 198.0/3660.0
	Doctorate	3 0.2	46.4±16.31[c] 55.1 27.6/56.5	41.4±14.70[a] 49.3 24.5/50.5	379.7±272.50[c] 248.0 198.0/495.0
	H p		378.036 <0.001	13.264 0.039	194.933 <0.001
Income State	The income is less than his/her expenses	321 19.5	46.5±11.9 51.1 12.6/64.1	46.7±8.90 49.2 14.9/67.8	1136.8±1200.68[a] 777.0 33.0/9198.0
	The income is equal to his/her expenditure	953 57.7	47.5±10.40 51.3 12.6/63.8	47.6±7.42 48.3 13.2/64.7	1021.7±1118.11[a] 693 66.0/9168.0
	The income is more than his/her expenses	376 22.8	46.7±12.28 52.5 13.0/62.3	47.7±8.30 49.2 22.0/67.3	1180.9±1202.91[b] 779.5 66.0/8640.0
	H p		0.013 0.994	1.211 0.546	8.696 0.013
Total			47.1±11.15	47.4±7.93	0.83±1.78

SS: Standard deviation; BMI: Body Mass Index; %: Percentage; n: Frequency; Z:Mann whitney U Test, H: Kruskal Wallis H Test, Post Hoc: Bonferroni, Means not sharing a common letter differ significantly at $p < 0.05$; MCS-12 (Mental Component Summary) and PCS-12 (Physical Component Summary) are the two summary scores of the SF-12; IPAQ-SF: International Physical Activity Questionnaire-Short Form.

Significant differences were observed between descriptive characteristics and SF-12 Health Survey and IPAQ-Short Form scores. Male participants had higher MCS-12 and total IPAQ-SF scores compared with women ($p<0.001$). Differences across BMI categories were

also significant for PCS-12, MCS-12, and total IPAQ-SF scores ($p<0.001$), with the highest PCS-12 and IPAQ-SF scores observed in the 18.5-24.9 kg/m² BMI category. Educational level was significantly associated with PCS-12, MCS-12, and total IPAQ-SF scores ($p<0.001$), with participants who had completed high school or higher education demonstrating higher PCS-12 and total IPAQ-SF scores. With respect to income level, a significant difference was observed only for total IPAQ-SF scores ($p=0.013$), indicating higher physical activity levels among individuals whose income exceeded their expenditures (Table 1).

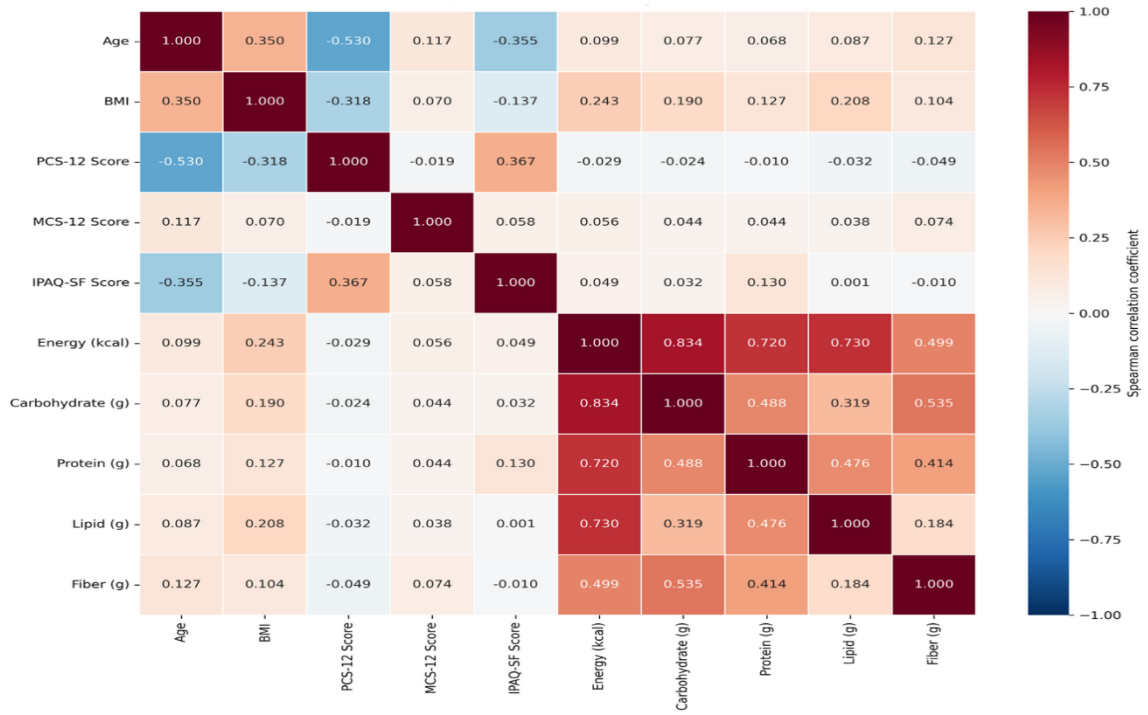


Figurel 1. Dietary Intake Assessment of Participants

Analysis of dietary intake records showed that the mean daily energy intake was 1967.4 kcal for men and 1710.6 kcal for women. The daily intake of macronutrients was determined as follows: for women, 68.6 g of protein, 186.8 g of carbohydrates, and 74.5 g of fat; for men, 79.4 g of protein, 186.8 g of carbohydrates, and 74.5 g of fat. The mean daily fiber intake was 18.9 g in women and 20.1 g in men. All dietary intake parameters differed significantly by sex, with higher values observed among men ($p<0.001$) (Figure 1).

Correlation analyses revealed negative and moderate associations between age and both PCS-12 ($r=-0.530$) and total IPAQ-SF scores ($r=-0.355$) ($p<0.001$). BMI was negatively and moderately correlated with PCS-12 ($r=-0.318$, $p<0.001$) and negatively but weakly correlated with total IPAQ-SF scores ($r=-0.137$, $p<0.001$). A positive and moderate correlation was observed between PCS-12 and total IPAQ-SF scores ($r=0.367$, $p<0.001$). Weak but significant positive correlations were identified between total IPAQ-SF scores and energy intake ($r=0.049$,

p<0.001) as well as protein intake (r=0.130, p<0.001). In addition, weak positive correlations were observed between MCS-12 scores and age (r=0.117), BMI (r=0.070), and fiber intake (r=0.074) (p<0.001). The overall pattern and direction of the correlations between the study



variables are visually summarized in Figure 2 using a heatmap visualization, while exact correlation coefficients and statistical significance levels are presented in Supplementary Table S1.

Figure 2. Heatmap of Spearman Correlation Coefficients Between Study Variables

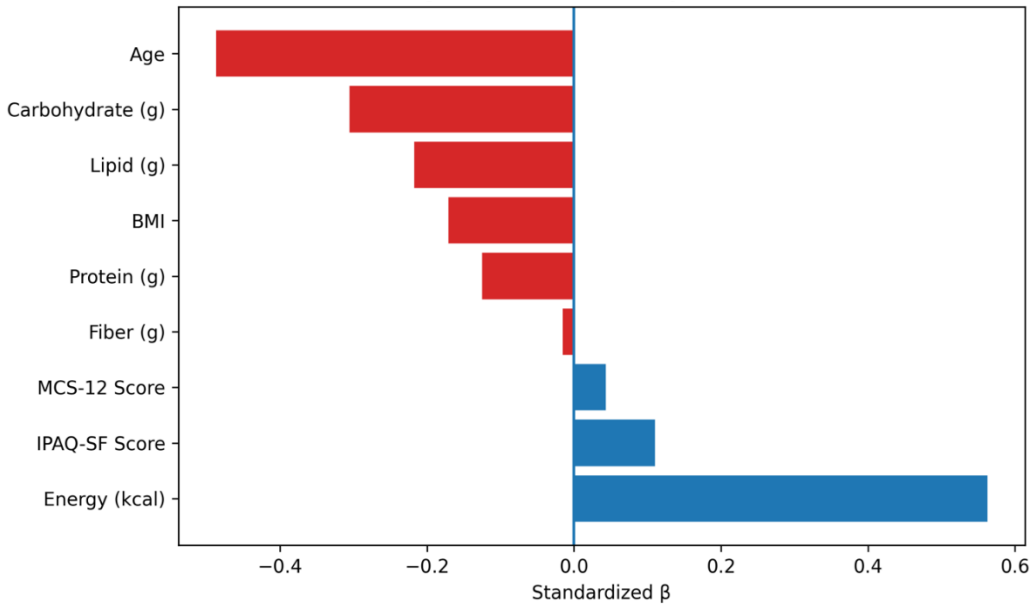
Color intensity represents the magnitude and direction of Spearman correlation coefficients, with warmer colors indicating positive correlations and cooler colors indicating negative correlations. Diagonal values represent self-correlations (r = 1.00). Exact correlation coefficients and significance levels are reported in Supplementary Table S1.

Table 2. Regression Analysis of the Impact of Factors on the PCS-12 Score

	PCS-12 Score				
Variables	B	Beta	t	p	
Age	-0.284	-0.486	-22.352	<0.001	
BMI	-0.374	-0.170	-8.034	<0.001	
MCS-12 Score	0.059	0.042	2.111	0.035	
IPAQ-SF Score	0.001	0.109	5.296	<0.001	R^2=0.354, F=99.66, p=<0.001
Energy (kcal)	0.012	0.561	3.074	0.002	
Carbohydrate (g)	-0.047	-0.304	-2.803	0.005	
Protein (g)	-0.053	-0.124	-2.576	0.01	
Lipid (g)	-0.090	-0.216	-2.491	0.013	
Fiber (g)	-0.018	-0.014	-0.598	0.55	

BMI: Body Mass Index; g: gram; kcal: kilocalorie; MCS-12 (Mental Component Summary) and PCS-12 (Physical Component Summary) are the two summary scores of the SF-12; IPAQ-SF: International Physical Activity Questionnaire.

Multiple linear regression analysis indicated that age, BMI, MCS-12 score, total IPAQ-SF score, and selected nutrient intake variables together explained 35.4% of the variance in PCS-12 scores (R^2=0.354, p<0.001). Age (β=-0.486, p<0.001) and BMI (β=-0.170, p<0.001) were identified as significant negative predictors of PCS-12. In contrast, MCS-12 score (β=0.082, p=0.035), total IPAQ-SF score (β=0.109, p<0.001), and energy intake (β=0.074,



p=0.002) emerged as significant positive predictors. Protein intake (β=-0.124, p=0.010) and fat intake (β=-0.216, p=0.013) were also identified as significant negative predictors of PCS-12 (Table 2, Figure 3).

Figure 3. Standardized Regression Coefficients (β) for Predictors of PCS-12 Score
Bars represent standardized beta coefficients obtained from multiple linear regression analysis. Positive values indicate variables positively associated with PCS-12 scores, whereas negative values indicate inverse associations.

4. DISCUSSION

This study examined the relationships between dietary intake, physical activity levels, and health-related quality of life in adults. The findings indicate that dietary patterns and physical activity behaviors are meaningfully associated with both physical and mental health indicators.

Significant differences in physical activity levels and QoL were observed across several sociodemographic characteristics. Male participants exhibited higher MCS-12 and total IPAQ-SF scores than women**,** suggesting more favorable mental health-related QoL and higher physical activity levels among men. These findings are consistent with reports from the World Health Organization indicating that men are generally more physically active than women (3). Similarly, previous research conducted among university students has shown that men tend to report higher physical activity motivation and self-efficacy, which may contribute to greater engagement in physical activity (26). Together, these findings highlight the importance of considering gender-specific strategies in interventions aimed at improving physical activity and QoL.

Comparisons based on body mass index (BMI) revealed that individuals within the normal weight range (18.5-24.9 kg/m²) had higher PCS-12 and IPAQ scores than those with obesity. This observation aligns with existing evidence showing that the inverse association between obesity and health-related QoL is particularly evident for physical health components (27). Moreover, previous studies have emphasized that physical activity plays an important mediating role in the relationship between BMI and QoL (28), supporting the patterns observed in this study.

Educational attainment also emerged as a relevant determinant of both physical activity and QoL. Participants with a high school education or higher demonstrated better physical QoL and higher physical activity levels. These findings are consistent with previous systematic reviews and cross-sectional studies showing that increasing education level is associated with improved health perception, greater engagement in physical activity, and higher QoL (17, 29).

With respect to income level, variations in physical activity across income groups suggest that socioeconomic resources may influence individuals' capacity to maintain an active lifestyle. Higher IPAQ scores among participants whose income exceeded their expenditures may reflect more supportive environmental and social conditions that facilitate physical activity. Similar associations between income level and physical activity participation have been reported in both self-reported and objectively measured studies (30). In addition, data from the 2020 National Health Interview Survey indicate that individuals with higher household income are more likely to meet recommended physical activity guidelines (18).

Dietary intake patterns also revealed noteworthy findings**.** The mean daily energy intake for both women and men was below the levels recommended in the Turkish Dietary Guidelines (31). In addition, the macronutrient distribution reflected a relatively high proportion of energy intake from fat, while the mean fiber intake was lower than recommended. Insufficient fiber intake has been widely associated with adverse digestive health outcomes and an increased risk of chronic diseases (31). Gender-based analyses further indicated that men had significantly higher total energy and macronutrient intakes than women, consistent with findings from the Turkey Demographic and Health Survey 2018 (6).

Age demonstrated a strong inverse association with physical quality of life and a moderate negative association with physical activity levels. These findings are consistent with previous evidence indicating that age-related physiological changes-such as loss of muscle mass, reduced mobility, and increased chronic disease risk-may negatively affect both physical activity and QoL (32, 33). Similarly, BMI was negatively associated with physical quality of life and physical activity, reflecting patterns of physical limitation and reduced motivation commonly observed among individuals with overweight and obesity (33, 34).

Conversely, higher physical activity levels were associated with better physical quality of life, and physical activity emerged as a significant positive predictor of PCS-12 scores. This association is well supported in the literature, suggesting that regular physical activity enhances physical QoL through improvements in musculoskeletal health and overall functional capacity (35).

In addition to weak positive associations between physical activity and energy and protein intake, energy intake emerged as a positive predictor of PCS-12, whereas protein intake predicted PCS-12 in a negative direction These findings likely reflect broader dietary patterns and overall diet quality, rather than isolated effects of individual macronutrients. Recent evidence suggests that dietary patterns characterized by higher total fat intake and suboptimal macronutrient balance are associated with increased inflammatory burden, reduced physical functioning, and poorer physical QoL (36, 37). Similarly, higher protein intake accompanied by insufficient fiber and micronutrient intake may indicate an imbalanced dietary profile, which has been linked to metabolic stress and low-grade inflammation (38, 39).

Finally, weak positive associations were identified between age, BMI, fiber intake, and mental health-related QoL. Although the relationship between dietary fiber intake and mental

health remains inconclusive, emerging evidence suggests that dietary fiber may play a beneficial role in psychological well-being through modulation of the gut-brain axis and gut microbiota (40).

Overall, these findings indicate that health-related quality of life and physical activity are shaped not only by sociodemographic characteristics but also by nutritional factors related to energy balance and diet quality. Taken together, the results emphasize the importance of integrated lifestyle approaches that address both nutrition and physical activity in promoting and maintaining a healthy lifestyle.

Limitations and Strengths of the Study

The primary limitation of this study is its cross-sectional design, which restricts the ability to establish causal relationships between variables. Future longitudinal studies may provide clearer insights into the causal links among physical activity, dietary habits, and quality of life. Additionally, the use of a single 24-hour dietary recall may not fully capture individuals' habitual dietary patterns and usual food consumption. Another limitation is the unequal gender distribution, with a higher proportion of women than men, which may limit the generalizability of the findings. Finally, the reliance on self-reported data represents an additional limitation, as it may be subject to recall bias and reporting errors.

One of the main strengths of this study is its relatively large sample size and inclusion of a wide age range, enhancing the robustness of the findings. Moreover, the use of validated and reliable instruments to assess both physical and mental components of quality of life, as well as physical activity levels (IPAQ-SF), strengthens the methodological quality of the study. In addition, the assessment of energy and macronutrient intake allowed for a more comprehensive evaluation of lifestyle-related factors. Finally, the identification of predictive factors through regression analysis provided deeper insight into the relationships among variables and contributed to the analytical strength of the study.

5. CONCLUSION

This study demonstrated statistically significant associations between dietary patterns, physical activity levels, and quality of life in adults. The findings suggest that sociodemographic characteristics such as gender, age, body mass index, and dietary intake patterns are associated with quality of life, while physical activity levels and energy intake show positive relationships with quality of life measures. These results highlight the potential importance of promoting healthy lifestyle behaviors. However, due to the cross-sectional design of the study, causal inferences cannot be made. Therefore, future longitudinal and interventional studies are needed to clarify the causal pathways underlying these associations.

Ethical Considerations

This research adhered to the principles of the Declaration of Helsinki. Ethical approval was obtained from the Ethics Committee for Research and Publication in Health Sciences at Istanbul Kent University (Date: 8 December 2023, Approval No: 2023/08) prior to the commencement of data collection. All participants provided written informed consent.

Conflict of Interest

The authors declare no conflicts of interest with the research or writing of this paper.

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