



Associations Between Parenting Styles and Diet Quality and Healthy Nutrition Attitudes in High School Students

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Objective: Parental style is an important determinant in shaping children/adolescents' nutritional characteristics. This study aimed to investigate the relationship among parental styles, and adolescents' diet quality and healthy nutrition attitudes.

Materials and Methods: In this cross-sectional study, a simple and stratified random sampling method was applied and 2417 adolescents aged between 14-17 were included in high school. Attitude Scale for Healthy Nutrition (ASHN), Mediterranean Diet Quality Index (KIDMED), and Parenting Style Scale (PSS) were completed through face-to-face interviews. Linear and logistic regression analyses were used to determine the predictive effect of diet quality and nutrition attitude on parenting style.

Results: Authoritative and indulgent parenting styles were found in 23.7% and 24.2% of the adolescents, respectively. The neglectful and authoritarian groups had a lower odds ratio of medium or high adherence to the Mediterranean diet in comparison to the authoritative parenting style (OR[95%CI]=0.43[0.34-0.54] and 0.55[0.42-0.72], respectively). Individuals with the neglectful and authoritarian parental style were less likely to ideal ASHN than those with the authoritative group after the covariate-adjusted model. There were significant effects of information on nutrition (IN) [β (SE)=0.07(0.01)] and positive nutrition (PN) (β (SE)=0.13(0.02)) for strictness/supervision, malnutrition (MP) (β (SE)=0.14(0.01)) and IN (β (SE)=0.08(0.01)) for psychological autonomy (fully covariate-adjusted model), yet the model's explanation coefficient was found to be low (Total R²= 0.048 for strictness/supervision, 0.076 for psychological autonomy).

Conclusion: The results show that adolescents who defined their parents as authoritative and indulgent had enhanced nutritional characteristics. Still, further studies are needed to clarify the effect of parental styles on adolescent nutrition.

Key Words: Parenting style, dietary behavior, mediterranean diet, adolescent, healthy nutrition

Lise Öğrencilerinde Ebeveynlik Tarzları ile Diyet Kalitesi ve Sağlıklı Beslenme Tutumları Arasındaki İlişkiler

Amaç: Ebeveynlik tarzı, çocukların ve ergenlerin beslenme özelliklerinin şekillenmesinde önemli bir belirleyicidir. Bu çalışma, ebeveynlik tarzları ile ergenlerin diyet kalitesi ve sağlıklı beslenme tutumları arasındaki ilişkiyi incelemeyi amaçlamıştır.

Gereç ve Yöntem: Kesitsel tasarıma sahip bu çalışmada, basit ve tabakalı rastgele örnekleme yöntemi kullanılmış ve 14-17 yaş aralığında lise öğrenimine devam eden 2417 ergen dahil edilmiştir. Veriler, Sağlıklı Beslenmeye İlişkin Tutum Ölçeği (SBİTÖ), Akdeniz Diyeti Kalite İndeksi (KIDMED) ve Ebeveynlik Tarzı Ölçeği (ETÖ) ile yüz yüze görüşmeler aracılığıyla toplanmıştır. Diyet kalitesi ve beslenme tutumunun ebeveynlik tarzı üzerindeki yordayıcı etkisini belirlemek için doğrusal ve lojistik regresyon analizleri uygulanmıştır.

Bulgular: Ergenlerin %23.7'si ebeveynlerini demokratik (authoritative), %24.2'si ise hoşgörülü (indulgent) olarak tanımlamıştır. İhmalkar (neglectful) ve otoriter (authoritarian) ebeveynlik grupları, Akdeniz diyetine orta veya yüksek uyum gösterme olasılığı açısından, demokratik ebeveynlik tarzına kıyasla daha düşük odds oranına sahip bulunmuştur (OR[95%CI]=0.43 [0.34–0.54] ve 0.55 [0.42–0.72]). Kovaryatlarla ayarlanan modelde, ilgisiz ve otoriter ebeveynlik tarzına sahip olanların, otoriter ebeveynlik tarzına sahip olanlara kıyasla SBİTÖ puanlarının ideal olma olasılığı daha düşük bulunmuştur. Tam kovaryat ayarlamalı modelde; Beslenme Bilgisi (IN) (β (SE)=0.07(0.01)) ve Olumlu Beslenme (PN) [β (SE)=0.13(0.02)] alt boyutlarının ETÖ'nün denetleme üzerinde; kötü beslenme (MP) (β (SE)=0.14(0.01)) ve Beslenme Bilgisi (IN) (β (SE)=0.08(0.01)) alt boyutlarının ise psikolojik özerklik üzerinde anlamlı etkileri bulunmuştur. Ancak modelin açıklayıcılık katsayısı düşük bulunmuştur (Toplam R²=0.048 sıklık/gözetim için; 0.076 psikolojik özerklik için).

Sonuç: Ebeveynlerini otoriter ve hoşgörülü olarak tanımlayan ergenlerin daha iyi beslenme özelliklerine sahip olduğu görülmüştür. Bununla birlikte, ebeveynlik tarzlarının ergen beslenmesi üzerindeki etkisini netleştirmek için ileri çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: Ebeveynlik tarzı, beslenme davranışı, Akdeniz diyeti, ergen, sağlıklı beslenme

Introduction

The adolescent stage is a special period worldwide known as the transition from childhood to maturity (1, 2). Permanent nutrition and lifestyle habits are formed during this period (3, 4). Nutritional vulnerability increases in adolescents due to increasing daily nutritional requirements (5), however, there is evidence that the quality of their

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diets often deteriorates significantly (5-7). In general, adolescents tend to skip meals, consume unhealthy foods such as sugar-sweetened, energy-dense, and fast foods, snack by staying in front of the screen for a long time, consume fewer fruits and vegetables, and have unsatisfactory meal profiles (8, 9). This tendency reduces the diet quality of adolescents and weakens their adherence to the Mediterranean diet (MD). A systematic review indicating a possible association between MD adherence and diet adequacy and the KIDMED index was the most widely used scoring system concluded that the MD adherence of children and adolescents is low even in Mediterranean countries (10). It is well-known association that diet quality is one of the main determinants of adolescents' health. For this reason, it is thought that it is crucial to better understand the factors affecting the nutritional behaviors, habits, and attitudes of children and adolescents, and parental factors are the primary important ones (11-13).

A growing number of studies have demonstrated the relationship between parental feeding patterns or styles and the nutritional knowledge, eating habits and behaviours of children and adolescents (12-14). It has been stated that parents, who have key effects in the home environment, shape their children's eating behaviors using specific feeding styles (13). On the other hand, parental styles are also critical in the nutrition of children/adolescents. In the current study, it was concluded that the children of mothers who closely monitor their children's nutrition consumed high-quality foods (15). However, the negative effects of being too oppressive and insistent are also known and it has been mentioned that two-way parental excessive control. The first is the type that restricts their children's access to junk food and their total food consumption; The other is the type of pressure that involves forcing them to eat healthy foods (usually fruits and vegetables) and pressure them to eat more (16). The parenting style classification used in this study is as follows; authoritative, indulgent, neglectful, and authoritarian (17).

It is an undeniable fact that parental attitudes have an impact on determining their children's nutritional quality, behavior, and knowledge (16, 18). The hypothesis of this study is that adolescents' nutritional characteristics will differ according to their parenting styles. This study aimed to evaluate the association between parental style and their children's diet quality and healthy nutrition attitudes.

Materials and Methods

Research and Publication Ethics: The study protocol for was approved by Republic of Türkiye Ministry of National Education Labour Commission and Fırat University Non-interventional Research Ethics Committee (Approved no. 22, dated 29/01/2021).

Study Design and Sampling: The verbal and written informed consents were requested from all participants.

This cross-sectional study was conducted in high schools of Adıyaman province between March and April 2022. Simple and stratified random sampling methods were used for the study's sample selection in a two-stage process. According to the data obtained from the web page of Adıyaman Provincial Directorate of National Education with permission, 18147 students from 32 high schools were determined (19). We excluded schools that provide education for only single sex to avoid inequality in sex distribution (n=2) and dormitory schools (n=4). The remaining 26 high schools were numbered alphabetically between 1-26 respectively (20). After determining the baseline column, eight schools were selected using a random number table (total students n=4687). We applied first stratification and then random sampling methods to select equally from the 9th, 10th, 11th, and 12th classes in each school.

Participants: This study included male and female students aged 14–17 years who volunteered to participate with their parents' permission and were living with their parents. The study's exclusion criteria were as follows: 1) being diagnosed with eating behavior disorder(s) within the last 6 months, 2) being on medication for a psychological disorder, 3) receiving nutritional supplements, 4) eating a diet program, 5) having a physical disability, 6) taking medication that affects food intake and body weight (e.g., oral, or inhaled corticosteroid medication), 7) missing data in at least 20% of the questionnaire. 2451 adolescents who met the inclusion criteria for the study were included.

Data Collection Instruments: After the schools and classes were determined and the necessary permissions were obtained, the data were collected by face-to-face interview technique. Eligible participants were recruited in each class. Participants who met the inclusion criteria were given the questionnaires and asked to complete them after signing the voluntary consent form. Each questionnaire was answered approximately in 20-25 minutes.

In this study, the questionnaire created by the authors included four sections: i) demographic information of students and their parents, ii) Attitude Scale for Healthy Nutrition (ASHN), iii) the Mediterranean Diet Quality Index (KIDMED Index), and iv) Parenting Style Scale (PSS).

Attitude Scale for Healthy Nutrition (ASHN): ASHN development and validity-reliability was conducted by Tekkurşun Demir and Cicoğlu (21) in 2019. This five-point Likert scale was developed to measure the attitudes of adolescents and young adults towards healthy eating. ASHN consists of 21 questions and 4 sub-dimensions: Information on Nutrition (IN), Emotion for Nutrition (EN), Positive Nutrition (PN) and Malnutrition (MP) (Cronbach alpha coefficients are 0.90, 0.84, 0.75, and 0.83). The scale's score range is between 21 and 105. The score obtained from the scale is evaluated as <21 = very low, 23-42= low, 43-63 = medium, 64-84 = high, and 85-110 = ideal healthy nutrition attitudes (21).

Mediterranean Diet Quality (KIDMED) Index: The KIDMED scale is a short 16-question form used to assess adolescents' adherence level to the Mediterranean diet and evaluate their dietary habits and diet quality. KIDMED consists of 12 positive and 4 negative items, those who answer yes to the positive items are given +1 point and -1 point for negative items. The scale is classified as follows: ≥ 8 points for an optimal Mediterranean diet (good), 4-7 points for a Mediterranean diet that needs to be improved (moderate), and ≤ 3 points for a very poor nutritional quality (poor) (22, 23). The Turkish validity and reliability study of the KIDMED Index was conducted by Apaydin Kaya and Temiz (2021), who reported a Cronbach's alpha coefficient of 0.857 and an intraclass correlation coefficient of 0.750, indicating good internal consistency and reliability for Turkish adolescents (22).

Parenting Style Scale (PSS): The PSS developed by Lamborn et al. (24) consists of 26 questions and three sub-dimensions. This scale includes nine items each for the acceptance/involvement and psychological autonomy dimensions and eight items for the strictness/supervision. The acceptance/involvement dimension assesses the extent to which children perceive their parents as loving, caring, and participating (Example statement: "If I have any problems, I am sure my parents will help me"). The strictness/supervision seeks to measure the extent to which children perceive their parents as controlling (Example statement: "Do your parents let you go out with your friends at night during school season?"). The psychological autonomy dimension assesses the extent to which parents practice a democratic attitude and encourage the child to express his/her individuality (Example statement: "My parents tell me that I should argue with adults"). When the score of the participant increases for each dimension, it shows that the characteristic feature of the parent specific to the dimension becomes more dominant. In addition, parental styles were evaluated on the acceptance/involvement and strictness/supervision. Participants who scored above the median on the acceptance/involvement and strictness/supervision described their parents as "authoritative" and below the median as "neglectful". The parents of adolescents who scored below the median in the acceptance/involvement dimension and above the median in the strictness/supervision were defined as 'authoritarian', and the parents of children who scored above the median in the acceptance/involvement dimension and below the median in the strictness/supervision dimension were defined as 'indulgent' (17, 24). The Turkish adaptation and psychometric evaluation of the Parenting Style Scale was conducted by Yilmaz (17), who reported Cronbach's alpha coefficients ranging between 0.65 and 0.76 for the acceptance/involvement subscale, 0.66–0.75 for the strictness/supervision subscale, and 0.65–0.67 for the psychological autonomy subscale, indicating acceptable internal consistency and reliability in Turkish samples.

Covariates: Sociodemographic characteristics included age, sex, family type (nuclear family, extended family), and household income level (income more than

or equal to or less than expenditure). The questionnaire also included questions for the parents of the adolescents; age and educational level of parents (illiterate, primary, high school, bachelor). Lifestyle characteristics and health information included physical activity status, screen time, presence of chronic diseases, and use of dietary supplements.

Statistical Analysis: Data analyses were conducted using the JASP Statistical Software version 0.18.2 (<https://jasp-stats.org>). Data obtained from this study was expressed as percentiles for categorical variables and mean for continuous variables. One-way ANOVA was used to compare differences in continuous data among groups of parental styles and Pearson's chi-square test for categorical data. Post-hoc tests were used for pairwise comparisons for continuous data. The effect size calculation was performed with Cohen's *d*. This is a standardized effect size measurement based on standard deviation differences, with 0.2 considered a small effect, and 0.8 standard deviation is a large effect that could be a guide for clinical interpretation of the impact of a variable on an outcome of interest. Pearson correlation coefficients were performed to examine relationships among parental styles, diet quality, and health nutritional attitudes. The correlation coefficients were categorized as 0.00-0.10 (negligible), 0.10-0.39 (weak), 0.40-0.69 (moderate), 0.70-0.89 (strong), and 0.90-1.00 (very strong) (25). We performed hierarchical multiple linear regression analysis to estimate the effect of KIDMED diet quality and sub-dimensions of AHSN on parenting styles, with possible effects of potentially confounding variables such as sex, physical activity, and income level. Moreover, multivariable logistic regression analysis was used to calculate the risk ratio of parental style types on KIDMED diet quality (poor vs medium+high) and AHSN scale (low+medium vs high+ideal) classified as binary, after adjusting for covariates such as sex, physical activity, and income level. We showed β (unstandardized coefficient) (standard error (SE)), 95% confidence interval (CI), ΔF -score (indicating the significance of the model) and ΔR^2 (coefficient of explanation) for linear regression analysis, and odds ratio (OR), 95% CI, wald test and *z* score (indicating the significance of the model) for logistic regression analysis. Statistical significance was set at $p < 0.05$ (26).

Results

According to parental styles, the baseline characteristics of adolescents are shown in Table 1. It was found that 23.7% ($n=582$) of the adolescents described their parenting styles as authoritative, 24.2% ($n=593$) as indulgent, 35.1% as neglectful ($n=860$), and 17.0% ($n=416$) as authoritarian. The mean age of the adolescents belonging to the authoritative group (15.5 ± 1.0) was lower than that of the other groups ($p < 0.001$). Adolescents with authoritative and indulgent parenting styles were found to be associated with lower chronic disease and physical activity ($p < 0.001$). In addition, it was determined that adolescents with authoritative and indulgent parenting styles had higher

education of mother and father and income levels compared to the authoritarian group ($p < 0.001$).

The adolescents' mean KIDMED and ASHN scores were 4.09 ± 2.5 and 67.5 ± 11.8 , respectively. Adolescents with authoritative and indulgent parenting styles had higher mean KIDMED and ASHN scores compared to the authoritarian and neglectful groups (mean KIDMED and ASHN scores, respectively: 4.7 ± 2.5 and 70.4 ± 11.3 for authoritative, 4.8 ± 2.4 and 69.2 ± 12.1 for indulgent, 3.6 ± 2.5 and 66.7 ± 11.0 for authoritarian, 3.4 ± 2.3 and 64.8 ± 11.6 for neglectful, $p < 0.05$, Figure 1). It was found that the mean PN score of the authoritative and indulgent group was greater than that of the neglectful

and authoritarian group, a medium effect size was found for this difference between the groups (Cohen's $d = 0.054$). Adolescents with authoritative parenting styles had higher mean MP and IN values when compared to neglectful and authoritarian groups, but the effect size was negligible (Cohen's $d = 0.018$ and 0.015 , respectively). 41.2% of the participants had poor diet quality. The rate of the neglectful group with a poor KIDMED score was 43.4% ($n = 438$), while this rate was 18.4% ($n = 186$) for the authoritative group ($p < 0.001$). In addition, 57.2% of the participants had high ASHN. The ideal ASHN rate of the authoritative group was found to be 32.1% ($n = 52$) and 10.5% for the authoritarian group ($p < 0.001$, Table 2).

Table 1. Comparison of adolescents' characteristics according to parenting styles

	Total (n=2451)	Authoritative (n=582)	Indulgent (n=593)	Neglectful (n=860)	Authoritarian (n=416)	p-value
Age (yrs)	15.7±1.0	15.5±1.0	15.8±1.0 ^a	15.8±1.0 ^a	15.7±1.0 ^a	<0.001***
Sex						
Boys	877 (36.2%)	113 (12.9%)	299 (34.1%)	375 (42.8%)	90 (10.2%)	<0.001***
Girls	1546 (63.8%)	462 (29.9%)	288 (18.6%)	473 (30.6%)	323 (20.9%)	
Type of family						
Nuclear	1818 (74.2%)	416 (22.9%)	442 (24.3%)	654 (36.0%)	306 (16.8%)	0.272
Extended	633 (25.8%)	166 (26.2%)	151 (23.9%)	206 (32.5%)	110 (17.4%)	
Chronic diseases						
Yes	329 (13.4%)	48 (14.6%)	71 (21.6%)	151 (45.9%)	59 (17.9%)	<0.001***
No	2122 (86.6%)	534 (25.2%)	522 (24.6%)	709 (33.4%)	357 (16.8%)	
Physical activity						
Yes	1082 (44.1%)	268 (24.8%)	330 (30.5%)	342 (31.6%)	142 (13.1%)	<0.001***
No	1369 (55.9%)	314 (22.9%)	263 (19.3%)	518 (37.8%)	274 (20.0%)	
Screen time (h/d)	3.7±2.1	3.0±1.6	3.7±2.0 ^a	4.1±2.3 ^{ab}	3.6±1.9 ^{ac}	<0.001***
Income level						
Low	770 (32.8%)	172 (22.4%)	148 (19.2%)	282 (36.6%)	168 (21.8%)	<0.001***
Medium	1075 (45.7%)	280 (26.0%)	274 (25.6%)	355 (33.0%)	166 (15.4%)	
High	506 (21.5%)	106 (20.9%)	149 (29.4%)	182 (36.0%)	69 (13.7%)	
Mother's education						
Illiterate	213 (8.8%)	40 (18.8%)	38 (17.8%)	94 (44.1%)	41 (19.3%)	<0.001***
Primary	1600 (66.7%)	397 (24.7%)	369 (23.1%)	545 (34.1%)	289 (18.1%)	
High school	436 (18.2%)	102 (23.4%)	122 (28.0%)	146 (33.5%)	66 (15.1%)	
Undergraduate	150 (6.3%)	35 (23.3%)	53 (35.3%)	48 (32.0%)	14 (9.4%)	
Father's education						
Illiterate	51 (2.2%)	9 (17.6%)	10 (19.6%)	21 (41.2%)	11 (21.6%)	0.032*
Primary	1217 (51.4%)	286 (23.5%)	273 (22.4%)	429 (35.3%)	229 (18.8%)	
High school	751 (31.7%)	189 (25.2%)	106 (30.5%)	262 (34.9%)	110 (14.6%)	
Undergraduate	347 (4.7%)	83 (23.9%)	579 (24.5%)	106 (30.5%)	52 (15.0%)	

h/d, hours/day; yrs, years.

One way ANOVA for continuous variables

Pearson chi-square test for categorical data

^{a,b,c} Statistically significant difference between groups.

* $p < 0.05$, *** $p < 0.001$

Table 2. Pairwise comparison of diet quality and healthy eating attitude scores among parenting style groups

	Total (n=2451)	Authoritative (n=582)	Indulgent (n=593)	Neglectful (n=860)	Authoritarian (n=416)	Cohen's d/ Chi-square
ASHN						
PN	16.9±4.6	18.1±4.3	17.7±4.8	15.7±4.5 ^{ab}	16.5±4.3 ^{ab}	0.054
MP	16.7±4.9	17.5±4.7	17.2±4.9	15.9±4.8 ^{ab}	16.5±5.1 ^a	0.018
EN	16.0±5.1	15.9±5.0	16.3±5.3	15.9±5.1	16.0±5.0	0.001
IN	17.8±4.9	18.7±4.5	18.0±5.3	17.1±5.0 ^{ab}	17.6±4.4 ^a	0.015
ASHN						76.164 ^{***}
Low	63 (2.6%)	8 (12.7%)	13 (20.6%)	32 (50.8%)	10 (15.9%)	
Medium	823 (33.6%)	148 (18.0%)	175 (21.3%)	351 (42.6%)	149 (18.1%)	
High	1403 (57.2%)	374 (26.7%)	345 (24.6%)	444 (31.6%)	240 (17.1%)	
Ideal	162 (6.6%)	52 (32.1%)	60 (37.0%)	33 (20.4%)	17 (10.5%)	
KIDMED						106.614 ^{***}
Poor	1009 (41.2%)	186 (18.4%)	185 (18.4%)	438 (43.4%)	200 (19.8%)	
Medium	1194 (48.7%)	311 (26.0%)	325 (27.2%)	377 (31.6%)	181 (15.2%)	
High	248 (10.1%)	85 (34.3%)	83 (33.5%)	45 (18.1%)	35 (14.1%)	

ASHN, attitude scale for healthy nutrition; EN, emotion for nutrition; IN, information on nutrition; KIDMED, Mediterranean diet quality index; MP, malnutrition; PN, positive nutrition; PSS, parenting style scale Nutrition

One-way ANOVA for continuous variables

One-way ANOVA with pairwise tests for p-value and Cohen's d for effect size in continuous variables

Pearson chi-square test for categorical data

^a Significant with the authoritative group ^b Significant with the indulgent group ^{***} $p < 0.001$

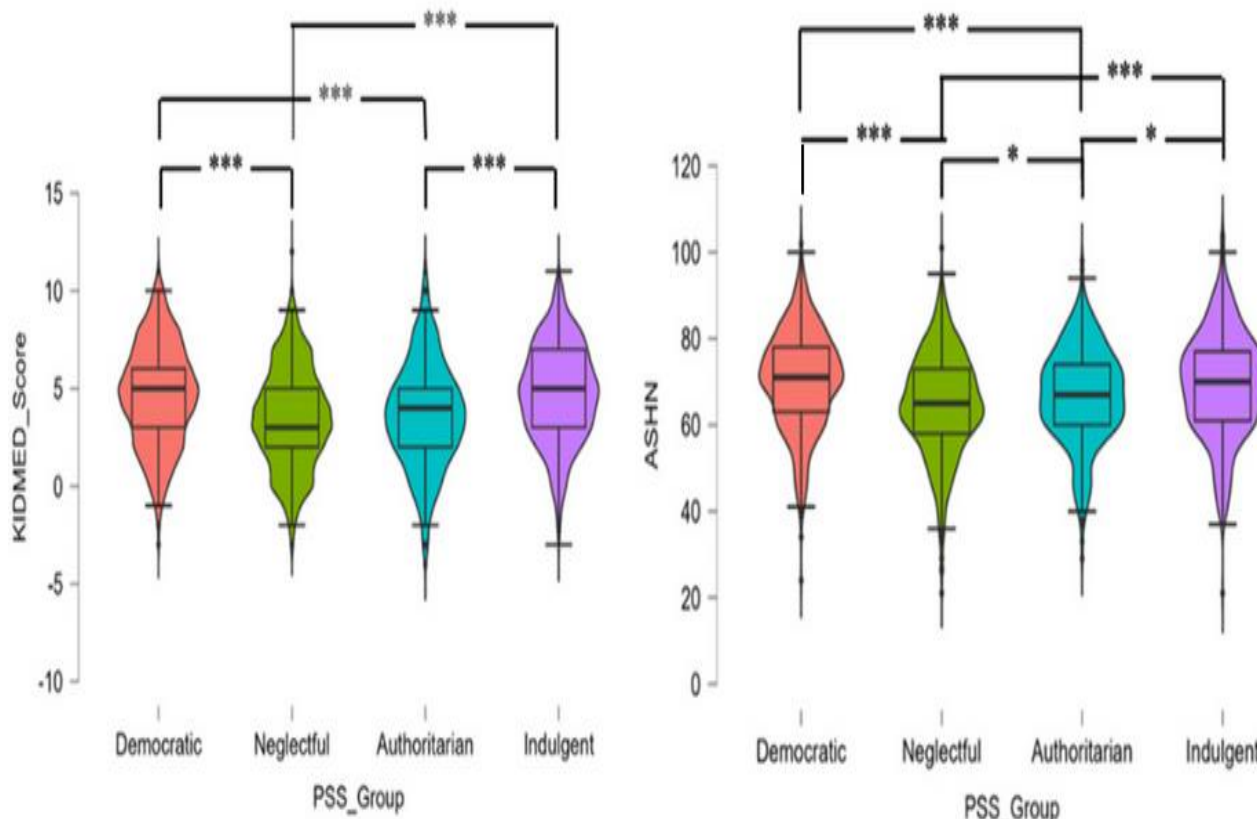


Figure 1. Violin with box plots pairwise comparison of KIDMED diet quality and ASHN scores according to parenting style classification. ASHN, attitude scale for healthy nutrition; KIDMED, Mediterranean diet quality index; PSS, parenting style scale ^{*} $p < 0.05$, ^{**} $p < 0.01$, ^{***} $p < 0.001$

Table 3. Hierarchical linear and logistic regression modeling results for parenting style outcomes using diet quality and healthy eating attitude

Outcome variable	Predictor	Unadjusted model				Covariate-adjusted model†			
		β (SE)	95% CI	ΔF	ΔR ²	β (SE)	95% CI	ΔF	ΔR ²
Acceptance/Involvement									
Step 1	KIDMED	0.54 (0.03)**	0.45-0.62	172.589	0.076	0.48 (0.04)**	0.40-0.56	190.491	0.087
Step 2	KIDMED	0.42 (0.04)**	0.33-0.50	41.765	0.025	0.37(0.03)**	0.28-0.46	53.833	0.041
	PN	0.16 (0.02)**	0.11-0.20			0.15(0.01)**	0.10-0.20		
Strictness/Supervision									
Step 1	IN	0.11 (0.01)**	0.07-0.15	28.473	0.011	0.12(0.00)**	0.08-0.14	36.547	0.037
Step 2	IN	0.08 (0.02)*	0.04-0.12	8.691	0.003	0.07(0.01)*	0.03-0.11	11.599	0.011
	PN	0.07 (0.02)*	0.02-0.11			0.13(0.02)**	0.08-0.16		
Autonomy									
Step1	MP	0.15 (0.01)**	0.11-0.19	60.017	0.034	0.17(0.01)**	0.12-0.21	73.581	0.059
Step 2	MP	0.13 (0.01)**	0.09-0.17	12.103	0.008	0.14(0.01)**	0.10-0.18	17.663	0.017
	IN	0.07 (0.01)*	0.03-0.12			0.08(0.01)*	0.03-0.12		
Logistic regression									
		Unadjusted model			Covariate-adjusted model†				
		Odds ratio [95% CI]	Wald test	z-score	Odds ratio [95% CI]	Wald test	z-score		
KIDMED (Poor vs Medium+High)									
Authoritative		1[Reference]			1[Reference]				
Neclegtful		0.45 [0.36-0.56]**	50.075	-7.076	0.43 [0.34-0.54]**	49.376	-7.027		
Authoritarian		0.51 [0.39-0.65]**	26.276	-5.216	0.55 [0.42-0.72]**	18.550	-4.308		
Indulgent		1.03 [0.81-1.32]	0.079	0.281	0.90 [0.70-1.17]	0.596	-0.772		
AHSN (Low+medium vs High+Ideal)									
Authoritative		1[Reference]			1[Reference]				
Neclegtful		0.45 [0.36-0.57]**	45.177	-6.766	0.41 [0.33-0.53]**	51.035	-7.144		
Authoritarian		0.59 [0.45-0.78]**	14.521	-3.811	0.63 [0.48-0.83]**	10.456	-3.234		
Indulgent		0.79 [0.61-1.01]	3.399	-1.844	0.67 [0.52-0.88]*	8.427	-2.903		

Abbreviation: ASHN, attitude scale for healthy nutrition; KIDMED, Mediterranean diet quality index

Linear regression; β indicates the unstandardized prediction coefficient on the dependent variable. ΔF represents the significance of the model hypothesis. ΔR² coefficient of explanation. In the final model, all independent variables included were statistically significant. Logistic regression: The outcomes were presented as odds ratio [95% CI], wald test, and z-score. The dependent variables, KIDMED and ASHN scale, were categorized as binary to calculate the odds ratios of parenting styles.

†Covariate-adjusted controls for sex, physical activity, income levels

*p<0.05, **p<0.001

Figure 2 shows the correlations among the sub-dimensions of PSS and ASHN, KIDMED scores. There was a weak and positive correlation between the supervision dimension of PSS and ASHN, MP and IN scores. There was a weak and positive correlation between the strictness/supervision to total ASHN, MP and IN scores (r=0.176 and 0.155 and 0.120, respectively; p<0.05). Although a relationship was found between autonomy to total ASHN, IN, and PM score, the effect of the relationship was weak. It was found that there was a moderate correlation between acceptance/involvement and KIDMED score (r=0.257 and p<0.001). In addition, incremental acceptance/involvement score was moderately correlated with ASHN (r=0.203) and PN (r=0.220), but weakly with MP (r=0.135) and IN (r=0.114).

Hierarchical and logistic regression analyses were performed to determine the effect of the Mediterranean diet score and the sub-dimensions of ASHN on PSS based on the correlation matrix output. The final models are shown in Table 3. KIDMED and PN were positively associated with

acceptance/involvement levels after adjusting for sex, physical activity, and income level, and the total rate of explanation was found to be 12.8%. There were significant effects of IN (β (SE)=0.07 (0.01)) and PN (β (SE)=0.13 (0.02)) for strictness/supervision, MP (β (SE)=0.14 (0.01)) and IN (β (SE)=0.08 (0.01)) for psychological autonomy (fully covariate-adjusted model), but the coefficient of explanation of the model was found to be low (Total R²= 0.048 for strictness/supervision; 0.076 for psychological autonomy). The Neglectful and authoritarian groups had a lower odds ratio of medium or high adherence to the Mediterranean diet in comparison to the authoritative parenting style after adjusting for sex, physical activity, and income level (OR [95% CI]= 0.43 [0.34-0.54] and 0.55 [0.42-0.72], respectively). Furthermore, the neglectful and authoritarian groups were lesser associated with high adherence to healthy eating attitudes compared to the authoritative group. In addition, individuals with indulgent parental style were less likely to ideal ASHN compared with those with the authoritative group after the covariate-adjusted model (OR [95% CI]= 0.67 [0.52-0.88], p<0.05).

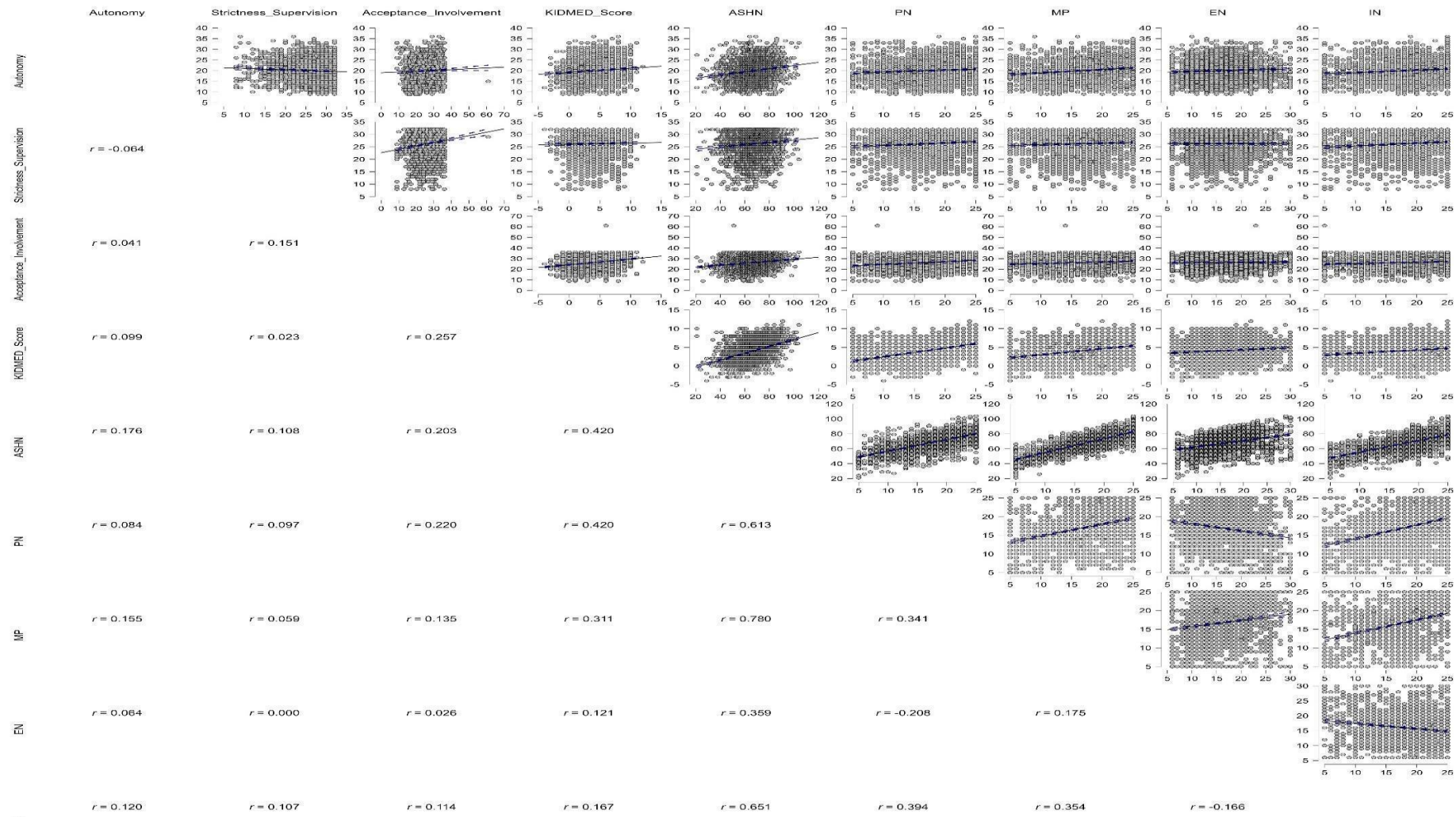


Fig. 2 Pearson correlation scatter plot of ASHN, KIDMED diet quality, and subsdimension of PSS

Discussion

This current study was conducted to investigate adolescents' diet quality and attitudes for healthy nutrition according to their parental styles. Nutritional characteristics of participants' parents divided into four main parental styles were compared. It was determined that parents were mostly neglectful (35.1%), yet parents with higher education and income levels were authoritative and indulgent. Adolescents' characteristics differed according to their parental styles. While the mean KIDMED score of the adolescents was moderate, the ASHN score was high. However, KIDMED and ASHN scores were higher in the authoritative and indulgent groups. There were weak or moderate relationships between the PSS subscale and KIDMED and ASHN scores. Analysis of ASHN and KIDMED to predict PSS score yielded poor results.

Baumrind's theoretical approach to child rearing formed the basis in this field, and Baumrind (27) suggested there are three basic parental attitudes: authoritarian, authoritative, and permissive. Different classifications have been made throughout the historical process, and MacCoby and Martin discussed parental attitudes in terms of two dimensions: responsiveness and demandingness/control. They defined four parenting styles at the intersection of these two dimensions: authoritative (parents who are strict but also involved), authoritarian (parents who are strict but uninvolved), indulgent (parents who are involved, but not strict), and neglectful (parents who are neither strict nor involved) (28, 29). Lamborn et al. (24) developed the Parenting Style Scale by considering these parental types, and Yılmaz (17) proved the validity of the scale in Turkish. In the original scale study, while the academic and psychosocial development of adolescents who evaluated their parents as authoritative were more enhanced than those with other parenting attitudes, and no difference was found between neglectful and authoritarian parenting styles (17).

Parental attitudes might affect their children's health and nutritional status. Tao et al. revealed that left-behind children had more malnutrition, and had problematic health status (30). In this study, adolescents who described their parents as authoritative and indulgent had a lower rate of having chronic diseases than other parenting style. However, interestingly, physical activity levels were also found to be lower. Research, investigating the effect of parenting style on adolescents' health and nutrition, mostly did not evaluate the relationship between parental attitude and their children's physical activity level. However, a study found that an authoritative parenting style was positively associated with physical activity levels in girls (31).

Scientific results often have shown that children/adolescents of authoritative parents have better consumption of fruit and vegetables, fewer unhealthy snacks, and have breakfast on more days per week than those who described their parents as neglectful and authoritarian (32, 33). It has even been reported that children who were left behind hate fruits and vegetables (30). In this study, diet quality was measured with the

KIDMED index and healthy eating attitudes were evaluated. No study has been found in the literature that examines the relationship between parental style and adherence to the Mediterranean diet. Fruit and vegetable consumption, breakfast and other main meals habits, consumption of protein-rich foods (dairy products, legumes, fish), consumption of fast food, fried food, sugar-sweetened foods, high energy foods, carbonated beverage were measured in detail with both the KIDMED index and ASHN. Children of authoritative and indulgent parents had higher KIDMED and ASHN (and PN subscale) scores. Additionally, children of authoritative parents were more likely to be in the high KIDMED group than those of neglectful parents. The situation was similar for the ASHN groups. When gender, physical activity, and income level were included in the model, adolescents with the authoritative parenting style were more likely to have ideal KIDMED and ASHN scores.

There was a significant relationship between the PSS subdimension scores (acceptance/involvement, psychological autonomy, strictness/supervision) and the KIDMED and ASHN scores, but a strong relationship was not found. On the other hand, it is known that parents play a pivotal role in the development of their child's food preferences. It is stated that there are two primary aspects of parental control: 1) restriction, which involves restricting children's access to junk foods and restricting the total amount of food, and 2) pressure, which refers to pressuring children to eat healthy foods and eat more (16). Thus, a cross-sectional study conducted with secondary school students resulted in more restrictive parenting practices were associated with lower consumption of sugar-sweetened beverages (34). In this study, moderate relationships were found between the PSS acceptance/involvement and the KIDMED, total ASHN, and PN subscale scores. Therefore, these results indicate that parents' involvement in their children's nutrition processes increases their diet quality. However, since this study employed a cross-sectional design, it only identifies associations between variables and does not establish any causal (cause-effect) relationships. In addition, as the data were collected through face-to-face interviews, participants might have provided socially desirable responses, which could have introduced response bias.

Implications: In conclusion, this study reveals that adolescents' nutritional characteristics are affected by parental styles. As far as is known, this is the first study to evaluate adolescents' adherence to the Mediterranean diet and their attitudes towards healthy eating according to their parental styles. The current study's results reveal how adolescents' KIDMED and ASHN scores are based on parental styles. The results support the need to focus on parents to create ideal environments for improving adolescents' diet quality and nutritional characteristics. Further longitudinal and intervention studies are required to determine the efficacy of parental style on their children's nutritional characteristics. A major limitation of the present study is its cross-sectional nature, which precludes any inference of causality between parenting styles and adolescents' diet quality or nutrition attitudes.

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