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Akdeniz Diyeti Kalite İndeksinin Türkçe Versiyonu (KIDMED)

The Turkish Version of the Mediterranean Diet Quality Index (KIDMED)

Çiğdem Apaydın KAYA[*1], Gözde TEMİZ[2]*

ABSTRACT

Introduction: The purpose of this study was to investigate the reliability of the Turkish version of the KIDMED, which assesses adherence to the Mediterranean diet among children and adolescents, and investigate the relationship between Turkish KIDMED scores and anthropometric measurements. **Methods:** This research was conducted in a public secondary school in Istanbul in 2018. In the first stage of the study, KIDMED was translated into Turkish and a test-retest method was used for reliability research. Then, the relationship between the anthropometric measurements of Turkish adolescents and KIDMED scores was evaluated in a descriptive and cross-sectional manner. In order to evaluate the test-retest reliability of the Turkish version of KIDMED, it was applied to 36 students (18 M, 18 K; mean age 11 ± 0.69 y) at the beginning and two weeks after and determined the "intraclass correlation coefficient" and "internal consistency". After determining the reliability, the index was applied to 504 students (49.2% M, 50.8% F; 11.66 ± 0.84 years of age) and the relationship between the KIDMED scores and the anthropometric measurements (BMI and waist circumference) was evaluated. **Results:** No statistical difference was found between the test-retest scores of KIDMED applied two weeks apart (5.6±2.1; 5.8±2.3 p=0.6) and the intraclass correlation coefficient was found to be 0.750 (p<0.001). Cronbach's alpha coefficient was found to be 0.857. A weak but negative correlation was found between the KIDMED scores and BMI and waist circumference values (r=-0.117; p=0.008; r=-0.112; p=0.012, respectively). **Conclusion:** This is the first study investigating the test-retest reliability of the Turkish KIDMED. Turkish KIDMED can be used in Turkish adolescents to assess the Mediterranean style of eating.

Key words: Obesity, adolescent health, school health, diet, eating, eating behavior.

ÖZET

Giriş: Bu çalışmanın amacı, çocuklar ve ergenlerde Akdeniz diyetine uyumu değerlendiren KIDMED'in Türkçe versiyonunun güvenirliğini ve KIDMED puanları ile antropometrik ölçümler arasındaki ilişkiyi araştırmaktır. **Yöntem:** Araştırma 2018 yılında İstanbul'da bir devlet ortaokulunda yürütülmüştür. İlk aşamada KIDMED Türkçeye çevrilmiş ve test-tekrar test yöntemi ile ölçeğin güvenilirliği araştırılmış, ardından tanımlayıcı ve kesitsel olarak antropometrik ölçümlerle KIDMED arasındaki ilişki değerlendirilmiştir. KIDMED'in Türkçe versiyonunun test-tekrar test güvenilirliğini değerlendirmek için başlangıçta ve iki hafta sonra 36 öğrenciye (18 E, 18 K; 11 ± 0,69 y.) uygulanarak "intraklas korelasyon katsayısı" ve "iç tutarlılık" hesaplanmıştır. Güvenirlik belirlendikten sonra indeks 504 öğrenciye (% 49,2 E; % 50,8 K; yaş ort: 11,66 ± 0,84) uygulanmış ve KIDMED skorları ile antropometrik ölçümler (BKİ ve bel çevresi) arasındaki ilişki değerlendirilmiştir. **Bulgular:** İki hafta arayla uygulanan KIDMED'in test-tekrar test puanları arasında istatistiksel olarak fark bulunmamıştır (5,6 ± 2,1; 5,8 ± 2,3 p = 0,6) ve sınıf içi korelasyon katsayısı 0,750 (p <0,001); Cronbach alfa katsayısı 0.857 olarak bulunmuştur. KIDMED skorları ile BKİ ve bel çevresi değerleri arasında zayıf, ama negatif bir korelasyon saptanmıştır (sırasıyla r = -0.117; p = 0.008; r = -0.112; p = 0.012). **Sonuç:** Bu araştırma, Türkçe KIDMED'in test-tekrar test güvenilirliğini araştıran ilk çalışmadır. Araştırmamız Türkçe KIDMED'in ergenlerde Akdeniz tarzı beslenmeyi değerlendirmek için güvenilir olduğunu düşündürmektedir.

Anahtar kelimeler: Obezite, ergen sağlığı, okul sağlığı, diyet, yeme, yeme alışkanlığı.

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[1]Marmara University School of Medicine, Department of Family Medicine, Istanbul (ORCID: 0000-0003-4786-6760)
[2]Marmara University School of Medicine, Department of Family Medicine, Current adress of the author: Bahçelievler 16.th Family Health Center, Istanbul (ORCID: 0000-0002-6745-7211)

***Address for Correspondence / Yazışma Adresi**: Marmara Üniversitesi Tıp Fakültesi, Başıbüyük Mahallesi, Başıbüyük Yolu Caddesi 34854, Maltepe, İstanbul, TURKIYE
E-mail: cigdemapaydin@yahoo.com, Tel: +90(532)3766896, Fax: +90(216)4144731

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INTRODUCTION

Childhood obesity prevalence is increasing in Turkey as it is worldwide.[1,2] An unbalanced diet and insufficient physical activity are the major causes of obesity. In reducing obesity, it is important to ensure that the right eating and physical activity habits are adopted starting from childhood. Since obesity and habits that cause obesity in adulthood can be traced back to adolescence.[3] Therefore, it is very important that healthy nutrition and physical activity are monitored at an early age and the appropriate interventions are made on the basis of an evaluation of individuals' eating habits. But the restricted time in clinical practice, especially in Primary Health Care, makes it difficult to implement comprehensive nutritional assessments. So, brief screening instruments are useful tools to identify individuals' and groups' eating habits.

There are many questionnaires and scales used to evaluate nutritional habits and eating behavior in terms of recommended nutrition strategies. One of these is the Mediterranean Diet Quality Index (KIDMED) developed by Majem et al. that is used for assessing the Mediterranean style of eating adopted by adolescents.[4] The Mediterranean type of nutrition was first described by Angel Keys.[4,5] It is a diet that is based on the consumption of vegetables, fruits, and whole grain foods.

Studies have shown that the Mediterranean diet is a preventive regime for cardiovascular disease and that it lowers the risk of diabetes, obesity, and cancer.[6-9] In studies that have applied KIDMED to children and adolescents, it is reported that individuals who display a higher adherence to the Mediterranean diet are less obese, and their health-related quality of life is better.[10-12]

The advantages of the scale are that there is a known relationship between the scores and anthropometric measurements and it provides ease of use due to the fact that it consists of closed-ended questions.[13] It can be administered through the use of the face-to-face interviewing technique by a health worker or can be based on self-reporting.

This index, which can be applied to children and adolescents ages 2-24, was used in some studies conducted with Turkish children, without Turkish validity and reliability study.[14-18] Different languages and cultural characteristics may give rise to problems with reliability and validity when KIDMED is employed in different countries.

The aim of this study, therefore, was to investigate the test-retest reliability of the Turkish version of the Mediterranean Diet Quality Index (KIDMED), which assesses adherence to the Mediterranean diet among children and adolescents. The secondary aim was to investigate the relationship between Turkish KIDMED scores and anthropometric measurements. This study is a part of a project conducted by the authors named "The Effect of Providing Opportunities for Obesity Preventive Experiential Learning on Healthy Nutrition, Body Mass Index and Exercise".

MATERIALS AND METHODS

This is a study of methodological research design, conducted to investigate the reliability of the Turkish version of KIDMED. After obtaining formal authorization from the main author of KIDMED, Lluis Serra-Majem, by e-mail, the research was carried out with the students of a secondary school in Istanbul in October 2017. After receiving approval Local Ethics Committee (Approval No: 09.2016.477), the students were administered, through face-to-face interviews, a questionnaire covering the respondents' sociodemographic characteristics, and the Turkish KIDMED.

To adapt KIDMED into the Turkish language, it was translated into Turkish by the researchers, then translated back into English by a bilingual translator. The back-translated scale was then compared with the original English version. The Mediterranean Diet Quality Index consists of 16 questions, each of which can be answered as "Yes" or "No." Of the questions included in the index, 12 are positive, 4 are negative questions. This means that +1 point is scored if a positive question is answered as Yes while -1 point is scored if a negative question is answered as Yes; the sum of these points amounts to a score of 0-12. A score of ≥8 indicates the optimal Mediterranean diet (good), a score of 4-7, that adherence to the Mediterranean diet needs to be improved (moderate), while a score of ≤3 indicates very poor nutritional quality (low). The KIDMED used is shown in Table 1.

All of the participants were verbally informed about the study, and their parents provided their written informed consent for their participation. All of the students were involved in the study of their own volition. The students who had not fully completed the survey sheets or KIDMED were excluded.

Test-retest reliability was determined using the intraclass correlation coefficient and internal consistency. For the test-retest method, the scale was applied to 36 adolescents of the same class at the baseline and again after two weeks.

To determine the relationship between the KIDMED scores and the anthropometric measurements (BMI and waist circumference), the index was applied to 504 students in Grades 6 and 7. Then, the height, weight, and waist circumference of the students were measured and the relationship between KIDMED scores and obesity was evaluated. A height-weight meter scale having a telescopic measuring height rod weighing up to 300 kg with 50-100 g precision and measuring height up to 200 cm and with a telescopic measuring rod with a 1-mm space was used for measuring weight and height. The students were told to take off their shoes and juxtapose their feet in an upright position for height measurement. For the weight measurement, they were weighed without shoes and after all weight carried except the school uniform was removed. A stretch-resistant tape was used to measure waist circumference. The waist circumference measurement protocol of WHO was applied during these measurements.[19] This protocol requires that the student stands with arms at the sides, feet positioned close together, and with minimal clothing. Waist circumference was measured at the midpoint between the lower margin of the last palpable rib and the top of the iliac crest, at the end of the expiration. The tape measure was held snugly without constricting and at a level parallel to the floor.

The body mass index and Z scores were calculated. Accordingly, +3SD and higher were classified as obese, between +2SD and +3SD was considered overweight, between -1SD +2SD normal, between -2SD -1SD thin and -2SD and lower was considered very thin.[20] Waist circumference in the 90th percentile and higher was accepted as abdominal obesity.[21]

Permissions and Ethics

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

The study was approved by the Institutional Review Board of the MU University School of Medicine, Research Ethics Board (Approval no: 09.2016.477) and conducted with the approval of the Ministry of National Education (Approval no 2017/2197965).

Analysis

After the descriptive statistics and frequency distributions, the normality distributions of the data were evaluated with the Kolmogorov-Smirnov test. The McNemar test was used for the test-retest comparison because the answers to the KIDMED questions are dichotomic. Test-retest reliability was determined using the intraclass correlation coefficient and internal consistency. Spearman's correlation coefficients between anthropometric measurements and KIDMED scores were calculated. The Mann-Whitney U test was used for the KIDMED scores of two different groups and the Kruskal-Wallis test for more than two groups. The SPSS 11.0 package program was used for the analysis of the data and $p<0.05$ was accepted as statistically significant.

RESULTS

Thirty-six students (18 F, 18 M) who were at a mean age of 11.00±0.69 participated in the study for the test-retest reliability research and 504 students (49.2% M, 50.8% F) for the correlation with BMI and KIDMED.

No statistical difference was found between the test-retest scores on the KIDMED applied 2 weeks apart (5.6±2.16; 5.8±2.26 $p=0.461$). The Cronbach alpha coefficient for KIDMED was 0.857. The intraclass correlation coefficient was 0.750 ($p<0.001$). The test-retest reliability evaluation for the answers given to each item of KIDMED is shown in Table 1. The answers given to all of the items after the retest are similar ($p>0.05$).

The KIDMED was found to be reliable in terms of test-retest reliability and was applied to 504 students (49.2% M, 50.8% F) who were a mean 11.66 ± 0.84 years of age. Some of the health indicators and mean KIDMED scores of the students participated in the study are shown in Table 2.

KIDMED scores and related parameters are shown in Table 3. A weak but negative correlation was found between the KIDMED scores and BMI and waist circumference values ($r=-0.117$; $p=0.008$; $r=-0.112$; $p=0.012$, respectively).

Table 1. The test-retest reliability evaluation for the answers given to each item of KIDMED

	Test (n=36)		Retest (n=36)		p**
	Yes	No	Yes	No	
Takes a fruit or fruit juice everyday (Her gün meyve veya taze sıkılmış meyve suyu tüketirim)	23 (63.9%)	13 (36.1%)	21 (58.3%)	15 (41.7%)	0.727
Has a second fruit everyday (Her gün ikinci bir meyve daha tüketirim)	26 (72.2%)	10 (27.8%)	20 (55.6%)	16 (44.4%)	0.146
Has fresh or cooked vegetables regularly once a day (Düzenli olarak günde birkez taze veya pişmiş sebze tüketirim)	21 (58.3%)	15 (41.7%)	22 (61.1%)	14 (38.9%)	<.999
Has fresh or cooked vegetables more than once a day (Günde birden fazla taze veya pişmiş sebze tüketirim)	7 (19.4%)	29 (80.6%)	11 (30.6%)	25 (69.4%)	0.344
Consumes fish regularly (at least 2–3 times per week) [Düzenli olarak balık tüketirim (haftada en az 2-3 kez)]	19 (52.8%)	17 (47.2%)	20 (55.6%)	16 (44.4%)	<.999
*Goes more than once a week to a fast-food (hamburger) Restaurant (Fast-food tarzı restorantlara (hamburger) haftada bir kereden fazla giderim)	4 (11.1%)	32 (88.9%)	5 (13.9%)	31 (86.1%)	<.999
Likes pulses and eats them more than once a week (Baklagilleri severim ve haftada bir kereden fazla tüketirim)	21 (58.3%)	15 (41.7%)	25 (69.4%)	11 (30.6%)	0.289
Consumes pasta or rice almost everyday (5 or more times per week) [Makarna ve pilavı hemen hemen her gün tüketirim (haftada 5 veya daha fazla)]	12 (33.3%)	24 (66.7%)	14 (38.9%)	22 (61.1%)	0.687
Has cereals or grains (bread, etc.) for breakfast [Kahvaltıda tahıl (ekmek) veya tahıl ürünleri (tahıl gevreği) tüketirim]	23 (63.9%)	13 (36.1%)	26 (72.2%)	10 (27.8%)	0.375
Consumes nuts regularly (at least 2–3 times per week) [Düzenli olarak kuruyemiş tüketirim (haftada en az 2-3 kez)]	22 (61.1%)	14 (38.9%)	20 (55.6%)	16 (44.4%)	0.774
Uses olive oil at home (Evde zeytinyağı kullanırım)	22 (61.1%)	14 (38.9%)	20 (55.6%)	16 (44.4%)	0.625
*Skips breakfast (Kahvaltı yapmam)	3 (8.3%)	33 (91.7%)	4 (11.1%)	32 (88.9%)	<.999
Has a dairy product for breakfast (yoghurt, milk, etc.) [Kahvaltıda süt ve süt ürünleri tüketirim (süt, yoğurt, vb)]	25 (69.4%)	11 (30.6%)	28 (77.8%)	8 (28.6%)	0.581
*Has commercially baked goods or pastries for breakfast (Kahvaltıda hazır fırın ürünleri veya hamur işleri tüketirim)	18 (50.0%)	18 (50.0%)	19 (52.8%)	17 (47.2%)	<.999
Takes two yoghurts and/or some cheese (40 g) daily [Günlük olarak 2 bardak süt/yoğurt ve/veya 1 büyük dilim (40 g) peynir tüketirim]	29 (80.6%)	7 (19.4%)	31 (86.1%)	5 (13.9%)	0.727
*Takes sweets and candy several times everyday (Tatlı, şeker ve şekerlemeleri günde birkaç kez tüketirim)	23 (63.9%)	13 (36.1%)	21 (58.3%)	15 (41.7%)	0.754

*: Negative questions not accordance for the Mediterranean diet
**: McNemar test

Table 2. Some of the health indicators and average KIDMED scores of the students participated in the study

n=504	n (%)
Any chronical disease	103 (20.4%)
DM	2 (0.4%)
Fat individual in the family	190 (37.7%)
According to WHO	
Obese	94 (18.7%)
Overweight	131 (26.0%)
Normal	273 (54.2%)
Thin	6 (1.2%)
Abdominal obesity	
Exist	211 (41.9%)
Absent	293 (58.1%)
KIDMED score (Mean ± SD)	5.49 ± 2.67
KIDMED score groups	
Good	114 (22.6%)
Moderate	279 (55.4%)
Poor	111 (22.0%)

Table 3. KIDMED scores and related parameters

	KIDMED score (Mean ± SD)	p
Sex		
Male (n=248)	5.35 ± 2.59	
Female (n=256)	5.63 ± 2.34	0.253*
Obesity classification according to WHO		
Obese (n=94)	4.86± 2.528	0.055**
Overweight (n=131)	5.54 ± 2.19	
Normal (n=273)	5.67 ±2.57	
Thin (n=6)	5.82 ±1.47	
Any chronical disease		
Yes(n=103)	5.30 ± 2.37	0.414*
No (n=399)	5.54 ± 2.49	
BMI	r=-0.117	0.008***
Waist circumference	r=-0.112	0.012***

**Man Whitney U test*
*** Kruskal Wallis test*
****Spearman correlation test*

DISCUSSION/CONCLUSION

This study investigated the reliability of the Turkish KIDMED which evaluates Mediterranean-style eating habits among children and adolescents. The test-retest reliability of the Turkish KIDMED is good (Cronbach alpha coefficient: 0.857; intraclass correlation coefficient: 0.750).

The first requirement for a scale to be valid is that it is reliable.[22] But studies about the validity of KIDMED are limited because a gold standard for assessment of adherence to the Mediterranean Diet does not exist. Some studies, however, have investigated the relationship between anthropometric measurements and KIDMED and have shown that KIDMED is a valid tool of evaluation.[10-12] In our study, the Turkish version of KIDMED showed a negative but very weak correlation between BMI and waist circumference, which suggests that KIDMED has a low level of validity. Differently, in some studies performed with the same age groups, it was indicated that there were no coherent relationship between KIDMED scores and weight.[17,23]

KIDMED scores were found to be "Good" for 22.6% of the adolescents in our study. This figure is similar to the results reported in the studies of Şahingöz et al. and Kabaran et al. conducted with Turkish adolescents (22.9% and 22.7%).[14,16] But it is higher than the other study reported by Cömert et al. performed with the same age group in Turkey. In another study conducted in Greece, only 4.3% of children ages 10-12 had "Good" KIDMED scores.[17,23] In a systematic review by Garcia Cabrera et al. compliance to the Mediterranean diet was stated as 10%.[24] The differences between the studies may a result of cultural differences or because of the different characteristics of the groups investigated.

In general, these studies show that adherence to the Mediterranean diet is low in adolescent groups. But there are differences in KIDMED scores according to urbanization. Children from semi-urban areas had higher adherence to the Mediterranean diet compared with those from large urban areas.[23] But this study was conducted with adolescents living in an urban area.

Study Limitations

One of the limitations of our study was that it was carried out with only students 11-14 years of age in two schools, and therefore the study cannot be generalized to different groups.

Some of the questions in the scale may have led to misinterpretations by the students (e.g., cooking style of the foods or amount of the meal portions). The scale questions the frequency of consumption of some of the foods, but it does not query amounts consumed. Also, some of the statements may have led to misunderstandings. For example, the statement “consuming cereals or grains (e.g. bread) for breakfast" assesses grain-rich eating behavior appropriate to the Mediterranean type diet. However, in our country, bread made of refined white flour is usually preferred instead of whole grain products.[25] This suggests that a different Mediterranean Diet Compliance Scale should be developed for Turkish children. Even though most of the existing studies have been carried out in Mediterranean countries, different languages and cultural characteristics may give rise to validity problems about the use of KIDMED in different countries. Developing another Mediterranean diet quality index specific to different cultures may solve the problems of validity.

CONCLUSIONS

In conclusion, our research is the first study investigating the test-retest reliability of the Turkish KIDMED used for evaluating adherence to the Mediterranean diet among adolescents. The results of the study show that the reliability of the Turkish KIDMED is “good” but has a low level of validity. Future studies should nonetheless be conducted on the reliability of Turkish KIDMED in other different age groups.

Conflicts of Interest

The authors declare that they have no conflict of interest

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