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Evaluation of The Relationship Between Level of Nutrition Knowledge and Sustainable Food Literacy

Beslenme Bilgi Düzeyi ve Sürdürülebilir Gıda Okuryazarlığı Arasındaki İlişkinin Değerlendirilmesi

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Abstract

Aim: The purpose of this study is to evaluate the relationship between level of nutrition knowledge and sustainable food literacy.

Material and Method: It was carried out in 280 people aged 19 to 75 years. Data were collected through face-to-face interviews. The Sustainable Food Literacy Scale and Nutrition Knowledge Questionnaire were applied.

Results: Participants in the low nutrition knowledge group had lower sustainable food knowledge scores than those of the medium and high nutrition knowledge groups ($p<0.05$). There were positive relationships in the total general nutrition knowledge score and the sustainable food knowledge, food skills and action intent and action strategies subscale scores (r: 0.356, $p<0.001$; r:0.347 $p<0.001$; r:0.226 p:0.035, respectively).

Conclusion: Nutrition knowledge should be considered as part of efforts to increase sustainable food literacy and relationship has the potential to be critical in ensuring that future generations inherit a more habitable world.

Keywords: Sustainable food literacy, nutrition knowledge, sustainable diet

Öz

Amaç: Bu çalışmanın amacı, beslenme bilgi düzeyi ile sürdürülebilir gıda okuryazarlığı arasındaki ilişkiyi değerlendirmektir.

Gereç ve Yöntem: Bu çalışmaya 19-75 yaş arası 280 birey katılmıştır. Katılımcılara ait bilgiler yüz yüze görüşmeler yoluyla toplanmıştır. Gıda okuryazarlığının sürdürülebilirlik düzeyini ölçmek için Sürdürülebilir Gıda Okuryazarlığı Ölçeği ve beslenme bilgisini ölçmek için Beslenme Bilgisi Anketi kullanılmıştır.

Bulgular: Beslenme bilgi düzeyi düşük bireylerin sürdürülebilir gıda bilgisi ortalama puanının beslenme bilgi düzeyi orta ve yüksek olan bireylere göre daha düşük olduğu saptanmıştır ($p<0,05$). Genel beslenme bilgisi toplam puanı ile sürdürülebilir gıda okuryazarlığı alt ölçeklerinden sürdürülebilir besin bilgisi, besin becerileri ve eyleme geçme niyet ve eylem stratejileri puanları arasında pozitif yönde anlamlı ilişki saptanmıştır (sırasıyla; r:0,356, $p<0,001$; r:0,347 $p<0,001$; r:0,226 p:0,035).

Sonuç: Gelecek nesillere daha yaşanabilir bir dünya bırakabilmek için beslenme bilgisi, sürdürülebilir gıda okuryazarlığını geliştirmeye yönelik girişimlerin önemli bir parçası olarak değerlendirilmelidir.

Anahtar Kelimeler: Sürdürülebilir gıda okuryazarlığı, beslenme bilgi düzeyi, sürdürülebilir diyet

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INTRODUCTION

Nutrition is the basis of a healthy lifestyle, and its significance is becoming increasingly recognised.[1] Nutrition knowledge involves healthy nutrition recommendations, nutrition resources and nutrition requirements, as well as the relationship between diet and disease.[2-4] A complex and changing combination of nutrition knowledge and food attitudes enhances people's ability to choose healthy foods from the food system.[5]

Nowadays, it is emphasized that nutrition should not only focus on its effects on human health, but also on its effects on the environment.[6] The type and quantity of food consumed has an effect on the environment, and it is believed that healthy eating can promote public health by encouraging more environmentally friendly eating behaviour. In this context, the concept of sustainable diets is offered to characterise diets that avoid excessive damage, contribute to food and nutrition security, have low environmental impacts, and promote a healthy life for current and future generations.[7, 8] Sustainable food literacy not only supports dietary changes but also enables individuals to understand the impact of food choices on the environment, society, and the preservation of food systems through sustainable dietary behaviours.[9]

To our knowledge, to date there has been no research on the association between nutrition knowledge and sustainable food literacy in the literature. The purpose of this study is to evaluate the relationship between nutrition knowledge and sustainable food literacy.

MATERIAL AND METHOD

Participants

In this study, 280 individuals, aged 19 to 75, living in the districts in the center of Gaziantep were selected using a simple random sampling method. People with chronic diseases, those who follow special diets or those who declined to participate were excluded from the investigation. Participants who agreed to contribute voluntarily to this study were asked to sign a written consent form in accordance with the Declaration of Helsinki. This study was approved by the Local Ethics Board (No:2022-157).

Data Collection

For data collection, face-to-face interviews were used. The questionnaire consists of four parts. The first section consists of questions regarding demographic factors such as gender, age, level of education, income, and anthropometric measures (weight and height). The second section includes questions regarding dietary habits, including the frequency of food purchases, the individuals responsible for food purchases, the frequency of eating outside, and the individuals responsible for cooking. The third part includes the general nutrition knowledge questionnaire, and the last part includes the sustainable food literacy scale. Body mass index was also calculated using self-reported weight and height.

General Nutrition Knowledge Questionnaire

The Turkish version of the General Nutrition Knowledge Questionnaire was validated by Alsaffar in 2012.[2] and updated in 2014.[10] The final version, Cronbach's alpha coefficient was 0.92. The questionnaire consisted of four dimensions: dietary recommendations (11 items), nutrition knowledge (70 items), everyday food choices (11 items), and diet-disease relationships (35 items). The correct answers to each question were valued at 1 point, while incorrect or unsure responses were valued at 0 points. The sum of the points for each item was used to calculate sub-dimension scores. The total general nutrition knowledge score is the sum of all sub-dimension scores. A higher score shows a higher level of knowledge.[2, 10]

Sustainable Food Literacy Scale

The Sustainable Food Literacy Scale.[11] was used to evaluate the level of sustainable food literacy in adults. The scale is comprised of a total of 26 items and four subscales (sustainable food knowledge (9 items), food skills (6 items), attitudes (4 items), action intent and action strategies (7 items). All measurement items were measured using a 7-point Likert scale with scores ranging from 1 (strongly disagree) to 7 (strongly agree). The mean score for each subscale was calculated. Regarding the sustainable food literacy scale, Cronbach's Alpha (α) coefficient was found to be 0.89 for the sustainable food knowledge subscale, 0.86 for the sustainable food skills subscale, 0.72 for the attitude subscale and 0.78 for the action intent and action strategies subscale in this study.

Statistical analysis

Data were analysed using Statistical Package for the Social Sciences software (version 23.0, Chicago, United States). Visual and analytical methods were used to analyse the normality of the data. For continuous and categorical variables, the characteristics of the participants were expressed as mean with standard deviation or frequency with proportions, respectively. For a more detailed interpretation of nutrition knowledge with respect to sustainable food literacy, the total score of general nutrition knowledge of the participants was categorised into three groups. The total general nutrition knowledge score less than or equal to the 33rd percentile (29–75 scores) was evaluated as 'low', the score between the 33rd and 66th percentiles (76–88 scores) was evaluated as 'medium', and the score equal to or greater than the 66th percentile (89–117 scores) was evaluated as 'high'. To compare mean scores, independent sample t test and one-way analysis of variance (ANOVA) with Bonferonni post-hoc tests were considered for two groups and more than two groups, respectively. The relationship age, BMI, general nutrition knowledge, and sustainable food literacy scores were determined with the Pearson correlation test. The value of $p< 0.05$ was established as statistically significant.

RESULTS

The descriptive statistics and scale scores of the participants are presented in **Table 1**. A total of 280 135 (48.2%) men and 148 (51.8%) women volunteered to participate in the study. 41.1% of those who participated were given the responsibility of being the main food purchasers in the family, and 38.5% of those who participated were given the responsibility of being the main cooks in the family.

The sustainable food knowledge score of primary school graduates was significantly lower than high school and university graduates. Furthermore, the sustainable food knowledge score of people who cooked the food themselves was significantly higher than the participants whose mothers, father, spouses or other cooked the food. (**Table 2**).

Based on levels of nutrition knowledge, the mean score of sustainable food literacy scores is shown in **Table 3**. Participants in the low nutrition knowledge group (5.03±1.03) had lower sustainable food knowledge scores than those of the medium (5.42±0.72) and high (5.45±0.88) nutrition knowledge groups ($p<0.05$). However, there were no significant differences between food skills, attitudes, action intent and action strategies scores based on classification of nutrition knowledge ($p>0.05$).

Table 3. Sustainable Food Literacy Scale scores according to nutrition knowledge classification

	Nutrition Knowledge Classification			p
	Low (n=96)	Medium (n=93)	High (n=91)	
Sustainable food literacy scale				
Sustainable food knowledge	5.03±1.03[a]	5.42±0.72[b]	5.45±0.88[b]	0.002
Food skills	5.75±0.92	5.88±0.66	5.96±0.62	0.157
Attitudes	2.68±1.00	2.78±0.86	2.80±0.99	0.183
Action intent and action strategies	3.28±0.90	3.32±1.01	3.54±1.11	0.161

One-way ANOVA with Bonferroni post-hoc test, different lower letters in the same row indicate a statistically significant difference among groups.

The relationship between age, BMI, general nutrition knowledge, and food literacy scores is presented in **Table 4**. The sustainable food knowledge score was positively correlated with the dietary recommendations (r: 0.305, $p<0.001$), nutrition knowledge (r:0.411, $p<0.001$), everyday food choices (0.318, p: 0.049) and diet-disease relationships (r:0.436, $p<0.001$) scores and the total general nutrition knowledge score (r:0.356, $p<0.001$). In addition, positive correlations were found between food skills and dietary recommendation, nutrition knowledge, diet-disease relationship, total general nutrition knowledge scores (r: 0.272, p: 0.004; r:0.338, $p<0.001$; r:0.294, p:0.001; r:0.347, $p<0.001$, respectively). In addition, there were positive associations between action intent and action strategies and nutrition knowledge score (r:0.334, p:0.025), total general nutrition knowledge score (r:0.226, p:0.035). There was no correlation between the attitude score and the total score or any subscale of general nutrition knowledge (all $p>0.05$) (**Table 4**).

Table 1. General characteristics and scale scores of participants

Variables	
Age (years) *M*±SD	38.71±12.71
Gender n (%)	
Men	135 (48.2)
Women	145 (51.8)
Marital Status n (%)	
Single	104 (37.1)
Married	176 (62.9)
Education Level n (%)	
Literate	
Primary school	22 (7.9)
Secondary school	17 (6.1)
High school	92 (32.9)
University	149 (53.2)
Income n (%)	
Low	53(18.9)
Medium	137(48.9)
High	90(32.1)
Nutritional Habits	
Frequency of food purchase n (%)	
Twice or more per week	56 (20.0)
Once per week	114 (40.7)
Once per two weeks	64 (22.9
Once per three weeks or less	46 (16.4)
People who are responsible for purchasing food n (%)	
Mother	46 (16.4)
Father	26 (9.2)
Spouse	76 (27.1)
Self	115 (41.1)
Others	17 (6.1)
Frequency of eating out n (%)	
Everyday	41 (15.6)
5-6 times per week	40 (14.3)
3-4 times per week	29 (10.4)
1-2 times per week	67 (23.9)
Hardly ever	11 (3.9)
People who are responsible for cooking n (%)	
Mother	56 (20.0)
Father	6 (2.1)
Spouse	62 (29.3)
Self	108(38.5)
Others	48 (17.1)
Anthropometric measurements *M*±SD	
Body weight (kg)	75.13±14.31
BMI(kg/m²)	26.31±4.67
General Nutrition Knowledge *M*±SD	
Dietary Recommendations	6.25±1.50
Nutrition Knowledge	45.42±8.55
Everyday Food Choices	4.43±2.08
Diet-Disease Relationships	24.71±5.13
Total General Nutrition Knowledge	80.80±14.01
Sustainable Food Literacy Scale *M*±SD	
Sustainable Food Knowledge	5.29±0.90
Food Skills	5.86±0.75
Attitudes	2.77±0.95
Action Intent And Action Strategies	3.38±1.01

M: mean, SD: standard deviation, BMI: Body mass index, Income was estimated in three categories: Low (<6000Turkish Liras), Average (6000---12000 Turkish Liras) and High (>12000 Turkish Liras).

Table 2. Sustainable Food Literacy Scale scores according to the general characteristics of participants.

	Sustainable Food Literacy Scale			
	Sustainable Food Knowledge	Food Skills	Attitudes	Action Intent And Action Strategies
Gender				
Men	5.19±0.82	5.88±0.78	2.81±0.96	3.37±1.03
Women	5.40±0.97	5.84±0.73	2.73±0.95	3.39±1.00
p*	0.054	0.675	0.474	0.896
Marital Status				
Single	5.20±0.86	5.90±0.73	2.85±1.02	3.43±0.98
Married	5.35±0.93	5.84±0.77	2.72±0.91	3.35±1.03
p*	0.197	0.508	0.279	0.489
Education Level n (%)				
Primary school	5.37±1.56[a]	5.39±1.06	2.78±0.72	3.34±0.96
Secondary school	5.77±0.83[ab]	4.97±1.30	2.84±1.07	2.89±0.76
High school	5.93±0.61[b]	5.25±0.90	2.64±0.90	3.33±0.91
University	5.89±0.67[b]	5.35±0.82	2.84±1.00	3.47±1.09
p**	0.040	0.365	0.462	0.142
Income				
Low	5.22±0.91	5.89±0.85	2.78±0.90	3.39±1.04
Medium	5.39±0.91	5.88±0.69	2.67±0.97	3.26±0.97
High	5.20±0.89	5.82±0.79	2.92±0.96	3.55±1.03
p**	0.354	0.823	0.109	0.084
Nutritional Habits				
Frequency of food purchase				
Twice or more per week	5.04±0.76	5.85±0.71	2.83±0.95	3.28±0.92
Once per week	5.33±0.97	5.79±0.83	2.81±0.92	3.50±1.08
Once per two weeks	5.38±0.74	5.97±0.47	2.71±1.11	3.24±1.02
Once per three weeks or less	5.41±1.07	5.91±0.91	2.67±0.81	3.39±0.92
p**	0.106	0.473	0.761	0.345
People who are responsible for purchasing food				
Mother	5.03±0.73[a]	5.61±0.86	2.83±0.96	3.16±1.02
Father	5.04±0.97[a]	5.87±0.82	2.78±1.06	3.44±0.95
Spouse	5.27±0.89[a]	5.79±0.86	2.72±0.91	3.33±1.03
Self	5.67±0.85[b]	5.90±0.66	2.79±1.02	3.36±0.94
Others	5.01±0.93[a]	6.00±0.57	2.79±0.79	3.50±1.17
p**	0.042	0.376	0.991	0.779
Frequency of eating out				
Everyday	5.19±0.85	5.90±0.93	2.93±1.03	3.48±1.00
5-6 times per week	5.37±0.95	5.80±0.96	2.92±1.19	3.34±0.93
3-4 times per week	5.20±1.08	6.09±0.35	2.92±1.08	3.43±0.71
1-2 times per week	5.19±0.83	5.81±0.68	2.63±0.90	3.38±1.21
Hardly ever	5.40±0.90	5.84±0.70	2.70±0.80	3.34±0.99
p**	0.474	0.467	0.293	0.949

*Independent sample t-test, * * One-way ANOVA with Bonferroni post-hoc test. Different lower letters in the same column indicate a statistical difference among the groups.

Table 4. Correlation of age, BMI, General Nutrition Knowledge and Food Literacy Scale scores

		Sustainable Food Knowledge	Food Skills	Attitudes	Action Intent and Action Strategies
Age	r	0.083	-0.077	0.033	-0.084
	p	0.165	0.199	0.585	0.162
BMI	r	0.053	-0.034	0.103	-0.028
	p	0.379	0.574	0.084	0.643
Dietary Recommendations	r	0.305**	0.272**	-0.066	0.112
	p	<0.001	0.004	0.273	0.062
Nutrition Knowledge	r	0.411**	0.338**	0.007	0.334*
	p	<0.001	<0.001	0.911	0.025
Everyday Food Choices	r	0.318*	0.087	-0.068	0.075
	p	0.049	0.146	0.258	0.211
Diet-Disease Relationships	r	0.436**	0.294**	-0.092	0.058
	p	<0.001	0.001	0.126	0.333
Total General Nutrition Knowledge	r	0.356**	0.347**	-0.046	0.226*
	p	<0.001	<0.001	0.439	0.035

BMI: Body mass index, *p< 0.05, **p< 0.01

DISCUSSION

The purpose of this study was to assess the associations between level of nutrition knowledge and sustainable food literacy. Past research has focused on factors affecting food literacy, nutrition literacy, or food and nutrition literacy or the impact of these literacy levels on food intake and diet quality; or the relationship between nutrition education and sustainable and healthy eating behaviours.[12-19] To our knowledge, this is the first study to investigate the relationship between level of nutrition knowledge and sustainable food literacy. The results of this study indicated that participants with low nutrition knowledge had lower sustainable food knowledge scores than those in the medium and high nutrition knowledge groups. In addition, it was found that nutrition knowledge had a positive correlation with sustainable food knowledge, food skills and action intent and action strategies, all of which are subscales of sustainable food literacy.

In the study conducted in Taiwan on sustainable food literacy[9], the subscale scores ranged from 5.043 to 5.687. According to the results of that study, gender was not associated with sustainable food literacy. Furthermore, in the same study conducted by Chen et al.[9] it was found that level of education and food skills, attitudes and action intent and action strategies were not related, but sustainable food knowledge was significantly related to education, but the correlation was very weak. In addition, in that study it was found that frequency of cooking and food purchase connected with sustainable food literacy. In the current research, sustainable food knowledge and food skills score is between the means reported in a previous study.[9] However, the scores for the attitudes (2.77±0.95) and action intent and action strategies (3.38±1.01) subscales are lower than the scores found in the Taiwan study. Furthermore, our findings indicated that, there were no significant differences between sustainable food literacy scores according to gender, marital status, income level, frequency of food purchase and eating out. There were significant differences in sustainable food knowledge scores based on education level or the person responsible for preparing the food ($p<0.05$). Those with a high school degree or university degree, or who prepare their own meals, have better scores of sustainable food knowledge. The results of this study regarding gender and education level are consistent with the previous study.[9] Additional research is required to investigate the specific characteristics of individuals that would have an impact on their attitudes regarding sustainable food literacy.

Using the general nutrition knowledge questionnaire to assess nutrition knowledge, the mean general nutrition knowledge score was found to be 37.86±0.25 in the study with Syrian students[20], 61.9±16.68 in the study with people residing in Cyprus[21], and 98.8±8.1 in dietetic students in England.[22] When the results of this study were compared with those of other studies, it was found that the mean general nutrition knowledge score of this study was higher than that of Syrian students[20], Cyprus adults[21] and lower than the mean scores obtained with English students.[22] Differences in scores among countries may be related to the countries' plans and policies to promote the nutrition knowledge of the population.

The focus of earlier research has been the relationship between nutrition knowledge and food intake or diet quality. According to a study by Almasi et al. on university students[23], those with higher nutrition knowledge scores consumed less energy, carbohydrates, and sugar. The nutrition knowledge and total general nutrition knowledge scores of women with poor food quality were found to be lower in an adult study.[21] According to the findings of another study[24] carried out in Australia, a higher total general nutrition knowledge score is associated with a higher quality. A similar study.[25] indicated that improved attitudes toward healthy eating are a direct result of increased nutrition knowledge, which in turn is associated to higher diet quality.

Furthermore, some research has found that nutrition knowledge influences sustainable and healthy eating behaviours. In a study conducted with university students in Turkey, it was determined that students educated in the department of nutrition and dietetics had a higher mean score for the factor 'healthy and balanced nutrition' on the scale of sustainable and healthy eating behaviours than students educated in other departments.[18] In another study with Australian nutrition and dietetics students, it was found that the students understood the value of sustainability and applied their knowledge to their advocacy and interest behaviour.[19] The current study's results showed that high levels of nutrition knowledge were associated with higher scores on all subscales of the sustainable food literacy scale, but the difference was statistically significant only for the sustainable food knowledge subscale. In addition, positive associations were demonstrated between nutrition knowledge and sustainable food literacy subscales, except the attitude subscale. The results of this study indicated that increasing nutrition knowledge among individuals can improve sustainable food literacy.

This study has some limitations. First limitation of this study is that there is a wide age range. Future research should target certain age groups. The second limitation of this study is that it was only carried out in a single city and it was a cross-sectional investigation. Multi-central large sample studies would be beneficial for establishing a stronger relationship between nutrition knowledge and sustainable food literacy.

CONCLUSION

The results of this study showed that individuals with high levels of nutrition knowledge had higher scores on the sustainable food knowledge subscale. Another impressive finding was that nutrition knowledge is positively associated with sustainable food knowledge, food skills and action intent

and action strategies, which are subscales of sustainable food literacy. Our findings suggest that increasing the level of nutrition knowledge among individuals can increase sustainable food literacy. Therefore, nutrition knowledge should be considered as part of efforts to increase sustainable food literacy. This relationship has the potential to play a crucial role in ensuring that future generations inherit a more habitable world.

ETHICAL DECLARATIONS

Ethics Committee Approval: This study was approved by the Ethics Board of Gaziantep Islam Science and Technology University (Date: 03.11.2022 and No:2022-157).

Informed Consent: All participants signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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