

## RESEARCH ARTICLE

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## Evaluation of Associated Factors with Nutrition Behavior and Dietary Self-efficacy for Healthy Food Choice among Primary School Students

### ABSTRACT

**Objective:** The aim of the study was to investigate the associated factors with nutrition behavior and dietary self-efficacy for healthy food choices among primary school students.

**Methods:** The study is a cross-sectional research conducted with 4<sup>th</sup> grade students in the city center of Eskisehir in the 2018 academic year. The study group consisted of 402 students studying in six primary schools in the city center of Eskisehir. Data of the study were collected using a questionnaire including socio-demographic characteristics, Food Behavior Scale (FBS), and Children Dietary Self-efficacy Scale (CDSS).

**Results:** The mean age of the students in the study group was  $9.88 \pm 0.44$  years and 51.0% of the students were female. Of the participants 19.9% were overweight and 10.2% were obese. While female students in CDSS chose healthy food with a mean  $\pm$  SD  $65\% \pm 24$  percentages, male students chose healthy food with a mean  $\pm$  SD  $55\% \pm 25$  percentages ( $p < 0.001$ ). Medium level positive relation ( $r = 0.426$ ,  $p < 0.001$ ) was detected between scores taken from FBS and CDSS in Spearman Correlation Analysis. In the multiple linear regression performed to determine the relationship between FBS and CDSS after controlling the effect of related factors, it was determined that nutrition behavior indicated a positive relation ( $\beta$  (95% CI):  $0.398$  ( $0.301-0.495$ )) with CDSS score.

**Conclusions:** Dietary self-efficacy was determined as a factor influencing nutrition behavior. In this regard, it was concluded that monitoring the close relationship between nutrition behavior and dietary self-efficacy could be useful beginning from early ages.

**Keywords:** Nutrition Behavior, Dietary Self-efficacy, Primary School Students, Turkey

## İlkokul Öğrencilerinin Sağlıklı Gıda Tercihlerinde Beslenme Davranışı ile İlişkili Olabilecek Faktörlerin ve Beslenme Öz-yeterliliği ile İlişkisinin Değerlendirilmesi

### ÖZET

**Amaç:** Bu çalışma, ilkokul öğrencilerinin sağlıklı gıda tercihlerinde beslenme davranışı ile ilişkili olabilecek faktörlerin ve beslenme öz-yeterliliği ile ilişkisinin değerlendirilmesi amacıyla yapılmıştır.

**Gereç ve Yöntem:** Çalışma, 2018 eğitim-öğretim döneminde Eskişehir il merkezinde bulunan ilkokul dördüncü sınıf öğrencilerinde yapılan kesitsel tipte bir araştırmadır. Çalışma grubu, Eskişehir il merkezinde bulunan altı ilkokulda öğrenim gören 402 öğrenciden oluşmaktadır. Çalışmanın verileri sosyo-demografik özellikleri, Beslenme Davranış Ölçeği (BDÖ) ve Çocuk Beslenme Öz-yeterlilik Ölçeği (ÇBÖÖ) sorularını içeren bir anket form kullanılarak toplandı.

**Bulgular:** Çalışma grubundaki öğrencilerin yaş ortalaması  $9,88 \pm 0,44$  yıl olup, öğrencilerin %51,0'ı kız idi. Bireylerin %19,9'u fazla kilolu ve %10,2'si obezdi. ÇBÖÖ'de kız öğrenciler ortalama  $65 \pm 24$  ile sağlıklı besinleri seçerken, erkek öğrenciler ortalama  $55 \pm 25$  ile sağlıklı besinleri seçtiler ( $p < 0,001$ ). Spearman Korelasyon Analizinde BDÖ ve ÇBÖÖ'den alınan puanlar arasında orta düzeyde pozitif ilişki ( $r = 0,426$ ,  $p < 0,001$ ) saptandı. İlişkili faktörlerin etkisi kontrol edildikten sonra BDÖ ve ÇBÖÖ arasındaki ilişkiyi belirlemek için yapılan çoklu lineer regresyonda, beslenme davranışının ÇBÖÖ ile pozitif bir ilişki ( $\beta$  (% 95 CI):  $0,398$  ( $0,301-0,495$ )) gösterdiği belirlendi.

**Sonuç:** Beslenme öz-yeterliliği, beslenme davranışını etkileyen bir faktör olarak saptandı. Bu bağlamda, beslenme davranışı ile beslenme öz-yeterliliği arasındaki yakın ilişkinin izlenmesinin erken yaşlardan itibaren faydalı olabileceği sonucuna varılmıştır.

**Anahtar Kelimeler:** Beslenme Davranışı, Öz-yeterlilik, İlkokul Öğrencileri, Türkiye

## INTRODUCTION

Nutrition is known as one of the most important environmental factors in physical and mental development in the early stages of life (1). Since childhood is a period with rapid mental and physical development, an adequate and balanced diet which is expressed as the intake of sufficient energy, protein, carbohydrate, vitamin, mineral, and other elements, has crucial importance to provide normal and healthy growth (2). In addition, a balanced diet in childhood is a decisive factor for adulthood health conditions as well (3,4). Nutrition more than necessary for healthy growth and development causes obesity starting from childhood and maintaining during all adulthood and later this leads to diseases such as diabetes mellitus, hyperlipidemia, and hypertension (5,6). Therefore healthy nutrition habits during childhood are regarded as having positive effects on life-long disease risks as well as growth and development (7).

Parents have a crucial role in shaping children's eating habits (8). They realize this through their eating behaviors and table or nutrition management practices. In addition, they provide their children to experience from first hand by determining their children's eating preferences, consumption patterns, and food that their children have access. Although when children grow up and start education, their teachers and peers become more important, the family at the heart of the social environment plays a crucial role in shaping the eating behavior of children (9,10).

Individuals are accepted as learners who both create a social environment and influenced by this. Social cognitive learning theory (SCLT) analyze individuals learning by monitoring others and process that they succeed to control their behaviors progressively by considering continuous interaction between individual and environmental determinants causing changes in individuals psychology. This theory is based on reciprocal determinism, symbolizing capability, forethought capability, vicarious capability, self-regulatory capability, self-reflective capability, and self-efficacy principles (11). SCLT heavily used in health behavioral researches is also used for interventions encouraging healthy eating among children (12-16). SCLT emphasizes the importance of individual, environmental, and behavioral factors and their roles on affecting behaviors. Faith on individuals' ability to realize a significant behavior, self-efficacy which is defined as self-confidence about realizing a behavior and one of the fundamental principles within SCLT is acknowledged as central determinants of behaviors in SCLT. Self-efficacy revealed as a key concept in SCLT by Bandura is based on four interacting information sources (17). This is explained as the first-hand experience of similar behavior (mastery experience), finding an opportunity to monitor

others similar behaviors (vicarious experience), convinced by an authority (verbal or social persuasion) and perception of the individual's own physiological and emotional situation (physiological and emotional experience) (18). Self-efficacy has a crucial role in many health behaviors (4). For example, dietary self-efficacy is perceived sufficiency level in order to make healthy nutrition choices even he/she meets potential obstacles and eating habits are indicated as indirect body mass index determinants (19,20). Researches about this issue include adolescents and beyond periods and there is not enough data for the primary school period.

The aim of the study was to investigate the associated factors with nutrition behavior and dietary self-efficacy for healthy food choices among primary school students.

## MATERIAL AND METHODS

The study was a cross-sectional research conducted with 4th grade students in the city center of Eskisehir in the 2018 academic year. Primary schools of the city were divided into 3 layers in line with the socio-economic conditions of the society living there. All the 4th grade students from one or more selected schools from all layers were included in the study. The selection was made with a population-weighted draw. The study group consisted of 402 students studying in six primary schools in the city center of Eskisehir.

Schools were visited an appropriate day and time. After asserting details of the study and verbally explaining about the research process in a way that they could understand, it was expressed that participation was voluntary and they could leave the research if they wanted. Verbal approvals of the students accepted participating to the research were obtained. Students themselves filled the questionnaire prepared before under the supervision of the researchers. These took about 20-25 minutes.

**Research Instrument:** A questionnaire was prepared for the aim of the study by using appropriate literature (3,8,21-24). The questionnaire was composed of 3 sections including socio-demographic characteristics, Food Behavior Scale (FBS), and Children Dietary Self-efficacy Scale (CDSS).

**Food Behavior Scale:** The food consumption of children was evaluated with FBS. The scale was composed of 14 illustrated elements consisting of low fat/salt and high fat/salt foods in order to determine the food consumption of the children. Children were showed comparable foods and asked which of them he/she eat (frequently). Scale elements took -1 for unhealthy food and took +1 for healthy food, total value is between -14 and +14. If the total score obtained from the scale was higher than 1, this indicated that healthy eating

behavior was more positive (21,22). The Turkish validity and reliability study of the scale was realized by Haney and Erdogan (23).

**Children Dietary Self-Efficacy Scale:** CDSS measured self-efficacy in children’s habits of eating low fat and low salt food. Scale items were composed of various food and nutrient groups with oil and salt content. Foods in the scale were selected among frequently consumed foods by children in this age group. Scale measured self-confidence that allowed children to choose less fatty and less salty food in spite of fatty and salty food choices. The scale was composed of 15 items and it was a three-point Likert type. Scale items were in the range of -1 and +1 (-1: I am not sure, 0: I am a little bit sure, +1: I am very sure) and the total score was between -15 and +15. The higher point taken from the scale indicated higher self-efficacy value (21,22). Turkish validity and reliability study was realized by Haney and Erdogan (23).

**Definitions:** Body mass index (BMI) of children were classified as 'severe thinness, thinness, normal, overweight, and obesity' based on the definition World Health Organization (WHO) determined for this age and gender group (24). Those who were previously diagnosed with chronic disease by the physicians were considered as 'having chronic disease". The family type of students was divided into "nuclear family, extended family, and single-parent family".

**Statistical Analysis:** The data obtained from the research were evaluated in IBM SPSS (version 15.0) statistical package program. Descriptive

statistics, Mann-Whitney U, and Kruskal Wallis tests were used for data analysis. Multiple linear regression analysis was applied to determine the factors affecting the FBS score. The logarithm of the dependent variable FBS scores were taken into consideration and adapted to normal distribution. Multiple linear regression model was applied and the model was created with statistically significant values. Gender, mother’s education status, father's education status, mother’s employment status, and CDSS were considered as independent variables. The statistical significance value was accepted as  $p < 0.05$ .

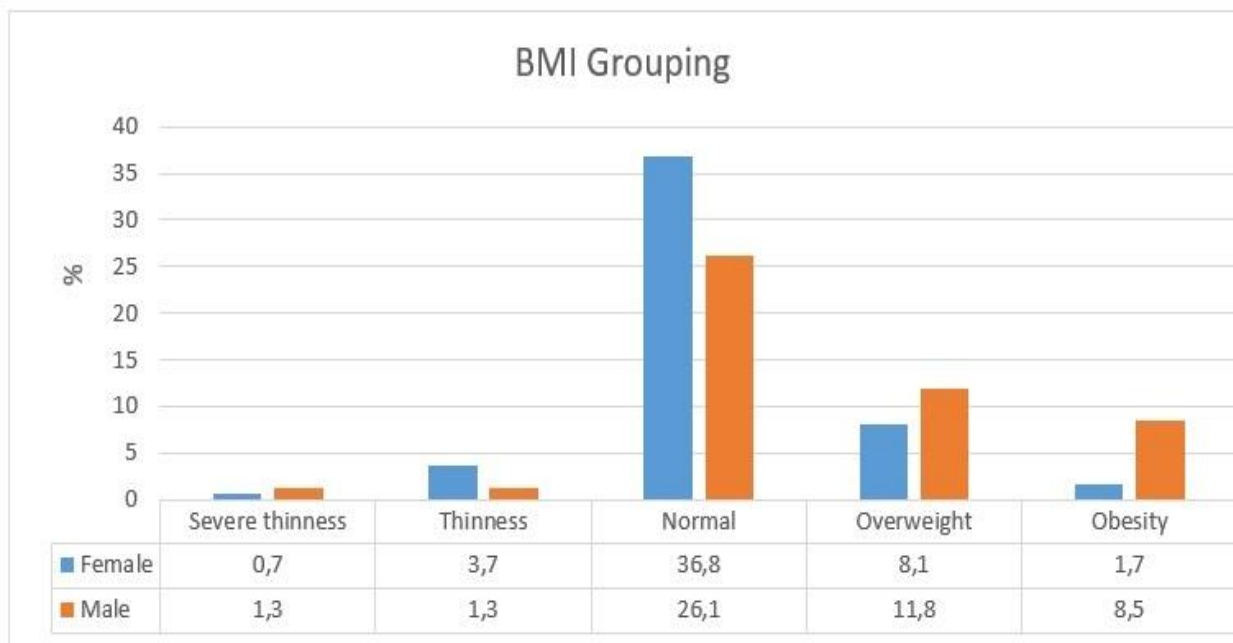
**RESULTS**

The mean age of the students in the study group was  $9.88 \pm 0.44$  years (min 9 - max 11) and 51.0% (205) of the students were female. The family monthly income was middle in 73.6% of students, in 85.1% of students the family type was nuclear family, in 36.3% of students the mother's education status was primary school, and in 43.8% of students the father's education status was middle&high school. While 61.9% of their mothers were working, 4.2% of their fathers were unemployed.

Of the participants 19.9% were overweight and 10.2% were obese. Furthermore, 46 (11.4%) of the students had a physician-diagnosed chronic disease.

Distribution of students according to BMI grouping was demonstrated in (Figure 1).

The distribution of student answers to FBS questions was demonstrated in (Table 1).



**Figure 1.** Distribution (%) of students according to BMI grouping and gender

**Table 1.** Distribution of student answers to FBS questions

FBS <sup>†</sup> questions <sup>‡</sup>		Correct Answer (%)	Wrong Answer (%)
1	Cookie	83.3	16.7
2	Hot Dog	88.6	11.4
3	Buttered Popcorn	63.2	36.8
4	<b>Bran muffin</b>	42.5	57.5
5	Chocolate cake	79.4	20.6
6	<b>Ice cream</b>	71.9	28.1
7	Sweet roll	67.4	32.6
8	<b>Turkey</b>	66.2	33.8
9	Whole milk	77.4	22.6
10	<b>Saltless</b>	57.2	42.8
11	Ice cream	60.9	39.1
12	<b>Whole wheat or brown bread</b>	65.9	34.1
13	<b>Herbal oil</b>	56.7	43.3
14	Regular hamburger	53.0	47.0

<sup>†</sup>Food Behavior Scale, <sup>‡</sup>Each food in FBS questions was presented in illustrated form. Every question was formed like 'Which of these two foods do you prefer more frequently'. The foods specified in bold in the table are the right options.

FBS scores of the students were indicated by calculating the percentage of healthy food preferences of each child. The total nutrition behavior scores of students were between 0% and 100%. While female students in FBS chose healthy food with a mean  $\pm$  SD 69%  $\pm$  22 percentages, male students chose healthy food with a mean  $\pm$  SD 64%  $\pm$  23 percentages. The score of students from CDSS was stated by calculating the percentage of healthy food preferences of each child. The total

dietary self-efficacy scores of students were between 0% and 100% healthy food choices. While female students in CDSS chose healthy food with a mean  $\pm$  SD 65%  $\pm$  24 percentages, male students chose healthy food with a mean  $\pm$  SD 55%  $\pm$  25 percentages ( $p < 0.001$ ). The distribution of average total scores of students in the study group taken from FBS and CDSS according to socio-demographic and medical characteristics was demonstrated in (Table 2).

**Table 2.** Distribution of average total scores of students in the study group taken from FBS and CDSS according to socio-demographic and medical characteristics

Characteristics	FBS <sup>†</sup> Total Score (%) Mean $\pm$ SD	P	CDSS <sup>‡</sup> Total Score (%) Mean $\pm$ SD	P
Gender				
Female	69 $\pm$ 22	0.055*	65 $\pm$ 24	<0.001*
Male	64 $\pm$ 23		55 $\pm$ 25	
Family type				
Nuclear family	67 $\pm$ 23	0.809**	61 $\pm$ 25	0.156**
Extended family	65 $\pm$ 23		53 $\pm$ 28	
Single-parent family	68 $\pm$ 21		64 $\pm$ 30	
Family income status				
Low	62 $\pm$ 29	0.629**	47 $\pm$ 32	0.230**
Middle	67 $\pm$ 22		60 $\pm$ 25	
High	65 $\pm$ 24		62 $\pm$ 26	
Mother education status				
Primary school	62 $\pm$ 26 <sup>a</sup>	0.012**	56 $\pm$ 26 <sup>a</sup>	<0.001**
Middle&High school	67 $\pm$ 21 <sup>a</sup>		58 $\pm$ 25 <sup>a</sup>	
University	72 $\pm$ 20 <sup>b</sup>		67 $\pm$ 24 <sup>b</sup>	
Father education status				
Primary school	61 $\pm$ 27 <sup>a</sup>	0.027**	56 $\pm$ 28 <sup>a</sup>	0.002**
Middle&high school	66 $\pm$ 22 <sup>a</sup>		58 $\pm$ 24 <sup>a</sup>	
University	71 $\pm$ 20 <sup>b</sup>		65 $\pm$ 25 <sup>b</sup>	
Mother employment status				
Employed	71 $\pm$ 22	0.006*	66 $\pm$ 26	<0.001*
Unemployed	64 $\pm$ 23		57 $\pm$ 25	
Father employment status				
Employed	67 $\pm$ 23	0.224*	60 $\pm$ 26	0.618*
Unemployed	59 $\pm$ 27		56 $\pm$ 17	
BMI <sup>§</sup> grouping				
Severe thinness	71 $\pm$ 26	0.497**	43 $\pm$ 22	0.232**
Thinness	66 $\pm$ 23		64 $\pm$ 26	
Normal	65 $\pm$ 23		60 $\pm$ 25	
Overweight	70 $\pm$ 22		62 $\pm$ 23	
Obesity	69 $\pm$ 24		60 $\pm$ 31	
Chronic disease				
Yes	65 $\pm$ 21	0.408*	51 $\pm$ 26	0.029*
No	67 $\pm$ 23		61 $\pm$ 25	

<sup>†</sup>Food Behavior Scale, <sup>‡</sup>Children Dietary Self-efficacy Scale, <sup>§</sup>Body mass index.

\*Mann-Whitney U, \*\*Kruskal Wallis, a,b: The difference between groups that do not have the same letter in each column is significant ( $P < 0.05$ ).

Medium level positive relation ( $r = 0.426$ ,  $p < 0.001$ ) was detected between scores taken from FBS and CDSS in Spearman Correlation Analysis. In the multiple linear regression performed to determine the relationship between FBS and CDSS after controlling the effect of related factors, it was determined that nutrition behavior indicated a

positive relation ( $\beta$  (95% CI): 0.398 (0.301-0.495)) with CDSS score.

The results of multiple linear regression analysis of variables that could have effects on FBS scores of the study group were demonstrated in (Table 3).

**Table 3.** The results of multiple linear regression analysis of variables that could have effects on FBS<sup>†</sup> scores of the study group

Variables	Unstandardized beta $\beta \pm SE$ (95% CI <sup>§</sup> )	Standardized beta $\beta$
Gender	-0.239 $\pm$ 0.594 (-1.407 - 0.929)	-0.019
Mother education status	0.352 $\pm$ 0.484 (-0.599 - 1.303)	0.045
Father education status	0.507 $\pm$ 0.512 (-0.500 - 1.504)	0.058
Mother employment status	-0.452 $\pm$ 0.650 (-1.731 - 0.826)	-0.034
CDSS <sup>‡</sup> total score	0.398 $\pm$ 0.049* (0.301 - 0.495)	0.384*
Adjusted $R^2 = 0.182$ , $F = 17.577$ *		

\* $P < 0.001$ , <sup>†</sup>Food Behavior Scale, <sup>‡</sup>Children Dietary Self-efficacy Scale, <sup>§</sup>CI: Confidence Interval

## DISCUSSION

The health of children is mostly determined by their eating habits. Children with insufficient and unbalanced eating habits become resistless to diseases, they get ill frequently, they have more severe illness, in addition their perception, attention, and cognitive abilities are influenced negatively. It is crucial to prepare the ground for future generations to become healthier and stronger in order to realize the development of cognitive abilities of children. It is extremely important to gain healthy eating behavior from childhood and to maintain these habits in later ages in order to have a healthy body (25,26). Gaining eating habits is a multifactor process which starts in the family and continues in school (27).

It is demonstrated that eating habits are systematically related to various factors (such as fear of being overweight, ideal body shape and weight, low-size prestige, self-respect, and social approval). Girls taking care of their body image, eating less sugary, sweetened, and fast-food in order to lose weight, consuming fruit and vegetables more frequently rather than energy-intensive foods and choosing healthy foods are explained with their attention to nutrition more than boys (28,29). In the study, any difference could be found between girls and boys in their FBS scores. Similar results have been reported in the studies of Passos et al. and Svenson et al. (30,31). In some studies, nutritional behavior scores were reported to be higher in girls (32,33).

One of the important factors dominating a healthy lifestyle is education status and influences not only the person but also his/her environment. Education status of the parents could affect children's behavior to choose healthy food. It is asserted that parents having a higher level of education are more closely interested in a child's nutrition, have healthy food purchasing habits, care more about food variety such as fruit, vegetable,

meat, and milk, etc. in the house. These factors could provide that the child's to have better-eating decisions and gain healthy eating behaviors (9,34,35). In the study, FBS scores of children whose parents' education level was university was higher than those whose parents' had lower education level. Although there are researches declaring similar results in the literature, it was reported that there were no relationship between parents' education status and children's nutrition behavior in the study conducted by Svensson et al. (31,34,36,37).

Although it is probable that the working status of the mother and father may have different effects on children, studies have mostly not focused on the working status of a single parent and they did not separate the working status of parents (38). According to traditional gender role distribution, men are perceived as ones supporting families, on the other hand, even women work full time, they are accepted as caregivers (39). In this regard, parents working especially mothers working leads mothers to have work and life stress. Moreover, their time spent with child shortens, care shown in the selection of the food offered to her child decreases, time spent to prepare food reduces, number and duration of breakfasts and family dinners realized together and periodically lessens. In addition, this causes child to consume more energy-intensive, poor quality sugary, sweetened and fast food instead of fruits and vegetables, working parents especially working mothers lead work and life stress. Therefore children especially with working mothers were indicated not to have healthy eating behavior (40,41). In this study, FBS scores of children with working mothers were determined to be higher. In addition, no difference was found between nutrition behavior scores of children with employed and unemployed fathers. In the study of Kopelman et al., it was reported that the nutrition behaviors of the children whose

parents were working were better (42). In the study executed by Jacka et al., any relationship was found between the working status of mother and children nutrition scores. In addition, this study stated that nutrition scores of children with working fathers were higher (43). The reasons for the different results were the socioeconomic and sociocultural characteristics of the country and region where the study was conducted, differences between the working order, the differences between the measurement tools used, and the differences between the age distributions of the study group.

Lots of predictor factors have been defined in the never-ending search for health-related behavior explanations. In social cognitive theory, the concept of self-efficacy and the role of self-efficacy in the prediction of health-related behaviors have been studied extensively (44,45). It is stated that self-efficacy includes a productive ability about judgments what one can do with the skills he/she has, but not with the skills he/she has. Self-efficacy reflects a person's faith in overcoming difficulties in performing a particular task in a particular situation. It is stated that self-efficacy influences the behavior preferences of people undertook such as gaining new behaviors (learning a new computer program etc.) and preventing current behaviors (reducing oily food choices etc.). In addition, self-efficacy influences people's efforts to adopt new behavior and persistence when faced with obstacles (46). In this study, a positive relationship was detected between the nutrition behavior of children and dietary self-efficacy. In the study conducted by Choi et al. and Won et al. similar results were reported (47,48). In addition, in researches, it was declared that increasing self-efficacy provides eating habits to change and boost the possibility of shaping in a healthy way (19,20,48). In this study, multivariate model in the primary school age group was found to be remarkable in terms of indicating the positive impact of dietary self-efficacy by removing the

effect of socio-demographic factors on nutrition behavior.

**Limitations:** The study was a cross-sectional study that was conducted in six primary schools in the city center of Eskisehir and that could not be generalized to all primary school students in Turkey. While some students' body weight and height were taken based on their own statements, others' body weight and height were obtained from school records. Inclusive students with communication difficulties were not included in the study. Because these inclusive students may not understand the questions correctly and can not answer properly.

### CONCLUSION

In this study, dietary self-efficacy was determined as a factor influencing nutrition behavior. SCLT is appeared to be a useful model for investigating effective structures in healthy nutrition behavior. It is crucial to address individual, environmental and behavioral factors in childhood in order to increase faith in healthy nutrition behavior. More comprehensive further researches (based on the fact that more comprehensive identification of outstanding factors for healthy lifestyles may be useful in shaping lifelong healthy eating habits) are needed in order to determine whether improvement of self-efficacy of children will transform into healthy eating behavioral changes. Individual, environmental and behavioral constraints affecting nutrition behavior and dietary self-efficacy are needed to be understood more clearly. In this regard, it was concluded that monitoring the close relationships of nutrition behavior and dietary self-efficacy could be useful beginning from early ages.

**Informed Consent:** All participants included were informed about the study.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

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