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The Relationship Between Nutritional Attitudes and Behaviors and Nutritional Self-Efficacy Levels of School-Age Children with Various Variables: A Cross-Sectional Study

Okul Çağı Çocuklarının Beslenme Tutum ve Davranışları ile Beslenme Öz Yeterlilik Düzeylerinin Çeşitli Değişkenlerle İlişkisi: Kesitsel Bir Çalışma

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ABSTRACT Objective: This study aimed to evaluate the relationship between nutritional attitudes and behaviors and nutritional self-efficacy levels of school-age children and various variables. **Material and Methods:** The study was conducted with a total of 400 volunteer students (191 girls, 209 boys) studying in the 4th grade of 4 state primary schools in İstanbul. The Sociodemographic Information Form, Child Health Perception Form, Child Dietary Self-Efficacy Scale (CDSS), Nutrition Attitude Scale (NAS) and Food Behavior Scale were used to collect the research data. The data were analyzed using the SPSS 27.0 statistical package program and $p<0.05$ values were considered significant. **Results:** In the study, 47.7% of the participants were girls and 52.3% were boys. The mean age of the students was 9.3±0.8 years, mean body mass index z score for age was 1.45±0.9 and total daily sleep time was 8.34 hours. It was determined that the mean scores of the male students on the CDSS ($p=0.003$) and NAS ($p=0.040$) were significantly higher than those of the female students. It was observed that the CDSS scores of the students with excellent health perception were the highest ($p=0.003$). A positive significant correlation was found between the CDSS and NAS scales ($p=0.002$). **Conclusion:** It was concluded that nutritional self-sufficiency and nutritional attitudes are important predictors of health perception. Accordingly, it is thought that interventions aimed at improving nutritional attitudes and behaviors in school children can help protect and improve the health of children and thus, make positive contributions to public health.

Keywords: Attitude; health behavior; child health

ÖZET Amaç: Bu çalışmada, okul çağı çocuklarının beslenme tutum ve davranışları ile beslenme öz yeterlilik düzeylerinin çeşitli değişkenlerle ilişkisinin incelenmesi amaçlanmıştır. **Gereç ve Yöntemler:** Çalışma, İstanbul'da 4 devlet ilköğretim okulunun 4. sınıflarında öğrenim görmekte olan toplam 400 gönüllü öğrenci (191 kız, 209 erkek) ile yürütülmüştür. Çalışma verilerinin toplanmasında Sosyodemografik Bilgi Formu, Çocuk Sağlık Algısı Formu, Çocuk Beslenme Öz Yeterlilik Ölçeği (ÇBÖÖ), Beslenme Tutum Ölçeği (BTÖ) ve Beslenme Davranış Ölçeği (BDÖ) kullanılmıştır. Veriler SPSS 27.0 istatistik paket programı ile analiz edilmiş ve $p<0,05$ değeri anlamlı olarak kabul edilmiştir. **Bulgular:** Çalışmaya katılan bireylerin %47,7'sini kız %52,3'ünü erkek öğrenciler oluşturmaktadır. Öğrencilerin ortalama yaşları 9,3±0,8 yıl, yaşa göre beden kütle indeksi (BKİ) z skoru ortalamaları 1,45±0,9 günlük toplam uyku süreleri ise 8,34 saat olarak bulunmuştur. Erkek öğrencilerin ÇBÖÖ ($p=0,003$) ve BTÖ ($p=0,040$) ortalama puanlarının kızlardan anlamlı olarak daha yüksek olduğu belirlenmiştir. Sağlık algısı mükemmel olan öğrencilerin ÇBÖÖ puanlarının en yüksek olduğu görülmüştür ($p=0,003$). ÇBÖÖ ve BTÖ ölçekleri arasında pozitif yönde anlamlı bir korelasyon olduğu tespit edilmiştir ($p=0,002$). **Sonuç:** Beslenme öz yeterliliği ve beslenme tutumunun sağlık algısının önemli bir yordayıcısı olduğu sonucuna varılmıştır. Bu doğrultuda, okul çocuklarında beslenme tutum ve davranışlarının iyileştirilmesine yönelik müdahalelerin çocukların sağlığını korumaya ve geliştirmeye yardım edebileceği ve böylece, toplum sağlığına olumlu katkılar sağlayabileceği düşünülmüştür.

Anahtar Kelimeler: Tutum; sağlık davranışı; çocuk sağlığı

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The school-age period covers the period between the ages of 6 and 12 when the child consciously participates in community life. Adequate and balanced nutrition is important in school-age children as it is important in every period of life.[1,2] In this period, it is one of the important goals to ensure the continuity of healthy growth and development of the child as well as to gain healthy eating habits to be maintained throughout life.[1,3] Inadequate energy and nutrient intake of school-age children negatively affects their growth and development and school success.[4] Maintaining an inadequate and unbalanced diet during this period may increase susceptibility to noncommunicable chronic diseases such as obesity, diabetes, cancer and cardiovascular diseases which are common in adulthood. Therefore, it is important to provide school-age children with adequate and balanced nutrition habits.[1,2,5,6]

According to the findings of the Turkish Childhood Obesity Surveillance COSI-TUR 2016, it was found that the frequency of consumption of sugary bars, chocolate, biscuits, cakes and cookies in school-age children was high, while the frequency of consumption of fresh fruits, vegetables, milk-yogurt-cheese and meat-chicken-fish-eggs was lower than the recommended amounts in the Turkish Dietary Guidelines [Türkiye Beslenme Rehberi (TÜBER)].[7] It has been reported that children in this age group adopt a diet limited in fruits and vegetables, rich in added sugar and saturated fat, high in energy content and skip breakfast.[8-10]

Self-efficacy is defined as an individual's belief and abilities to perform in a situation and his/her self-confidence.[11] Healthy eating self-efficacy represents the school-age child's behavior of choosing healthier foods. It is observed that children with high self-efficacy levels prefer healthier foods with less sugar and lower fat.[12,13] Nutritional attitudes, behaviors and self-efficacy levels of school-age children can significantly affect their perception of health. While nutritional attitudes and behaviors contribute to children's adoption of healthy living habits, self-efficacy level may affect motivation to maintain these habits. Understanding these relationships plays an important role in designing health education and intervention programs. Promoting healthy eating habits and self-efficacy levels can improve children's perception of health and increase their overall health.[13]

While the influence of the family is more dominant in the nutrition of children in the early stages of life, the influence of the environment of friends and school environment becomes more prominent with school age.[14,15] The habits acquired during this period when important changes in nutritional attitudes and behaviors are experienced are important determinants of future health. This period is also a critical period for children's physical and mental development. Nutrition attitudes, behaviors and self-efficacy levels may affect children's general health perceptions and health behaviors. Determining the interrelationships between these variables has an important place in terms of both individual and social health. Therefore, this study aimed to examine the effects of nutrition self-efficacy and nutrition attitude on health perception and various variables in school-age children.

MATERIAL AND METHODS

The study was conducted on 4th grade primary school students studying in public schools in the 2019-2020 academic year in İstanbul. A total of 970 students between the ages of 8-12 studying in the 4th grade of 4 randomly selected primary schools constituted the study universe. The number of participants to be sampled in the study was determined as 400 with a power of 0.95 and a significance level of 0.05, and the study was completed with the participation of 400 volunteer students. Research data were collected by asking survey questions about children and parents through face-to-face interviews. A survey form to determine demographic characteristics (age, gender, education status of mother and father and healthy nutrition information), the Child Health Perception Form (CPQ), the Children Dietary Self-Efficacy Scale (CDSS), the Nutrition Attitude Scale (NAS) and the Food Behavior Scale (FBS) were used to collect the data. The scales were created as part of the "Child and Adolescent Trial for Cardiovascular Health (CATCH)", a US research initiative that attempts to lower the risk of cardiovascular disease and enhance the heart health of children and adolescents. CATCH is a school-based intervention project involving over 6,000 children and adolescents from 96 schools in 4

states. Researchers have developed a series of measurement tools Health Behavior Questionnaire (HBQ) to evaluate the interventions and their outcomes.[16] The child dietary self-efficacy scale and the NAS are just 2 of the tools in this series. In addition, students' BMI values were evaluated in accordance with the BMI percentiles determined by the World Health Organization (WHO) according to age. The data obtained from the students' body weight and height measurements were entered into the WHO AntroPlus program and the body mass index for age (BMI for age z Score-BAZ) z score values were calculated. BMI values were evaluated by taking the WHO z-score classification as reference.[17] All participants were informed before the study and the study was completed by having the parents who accepted their child's participation in the study sign a written consent form. The ethical approval of the study was obtained from the Üsküdar University Non- Interventional Ethics Committee with the approval numbered 61351342/2020-137 dated March 27, 2020. The study was carried out in accordance with the ethical standards of the Declaration of Helsinki.

CHILD HEALTH PERCEPTION FORM (CPQ)

It was adapted by Öztürk and Erdoğan to assess the health outcome component of the health behavior interaction model (HBIM). Children's health perception was measured with the cognitive assessment component of HBIM. In the study, children were asked to choose the appropriate answer (poor, moderate, good, excellent) to the question "I believe my health is…" regarding their general health. The answers are valued between 1-4 points, with higher scores indicating better health perception.[18]

THE CHILDREN'S DIETARY SELF-EFFICACY SCALE

This scale measures the self-efficacy (self-confidence) that enables children to eat (low salt and low fat) to protect and improve heart health. The scale items include a variety of foods and food groups that contain fat and salt. The foods in the scale were selected from foods often consumed by children in this age group. The scale assesses the self-confidence that enables children to choose less salty and low fat foods despite the avability of fatty and salty food options. Öztürk and Erdoğan conducted a Turkish validity and reliability study on the 15-item scale, which has a single factor structure in the triple likert system. The scale items range in value from -1 to +1. The overall score range from -15 and +15, and a high overall score on the scale implies a high self-efficacy level.[18]

NUTRITION ATTITUDE SCALE

The "nutrition subscale of the child heart health development attitude scale" was used to measure the affective response of HBIM. The scale was tested for Turkish validity and reliability by Haney and Bahar in 2014. Children's attitudes and feelings about nutrition were measured with the NAS. The NAS measures the child's attitude towards activities that promote healthy food consumption, reduce fat intake, and a diet that improves heart health. Scale items are scored between 1-4. The total score ranging from 4-16, and a high total score from the scale shows a positive attitude.[19]

FOOD BEHAVIOR SCALE

This scale, developed as part of CATCH-HBQ, is used to evaluate children's food consumption. The scale was tested for Turkish validity and reliability by Öztürk and Erdoğan in 2010. To determine children's food consumption, the scale includes 14 illustrated items with low-fat/salty and high-fat/salty food options. Children are asked which food they consume more often with 2 comparable food options. Scale items take a value of -1 "for unhealthy food" and +1 "for healthy food", and the total score ranging from -14 and +14. High scores on the scale reflect healthy eating habits.[18]

STATISTICAL ANALYSIS

The data analyzed from the study were analyzed with the SPSS 27 statistical (SPSS Inc., Chicago, IL, USA) program. The descriptive data was presented as number, percentage, arithmetic mean, and standard deviation. The Kolmogorov-Smirnov test was used to determine if variables fit a normal distribution. To compare categorical data, the Pearson chi-square test was utilized; quantitative data between 2 groups was compared using the t-test; and 3 or more groups were compared using the one-way analysis of variance test. A p value of less than 0.05 was considered statistically significant in the analyses.

RESULTS

Demographic characteristics of the students according to gender are given in Table 1. 47.7% of the students in the study were female and 52.3% were male. It was determined that 31.4% of the female students and 32.5% of the male students had a high school education level of their mothers (p>0.05). It was determined that 34.6% of the female students and 33.5% of the male students had a high school education level of their fathers (p>0.05). It was observed that 61.8% of the female students and 66.5% of the male students answered their families when asked where they obtained their healthy nutrition information (p>0.05). In addition, it was observed that 47.6% of female students and 41.1% of male students had poor health perception (p>0.05). The mean age of the students was 9.3±0.8 years, their mean BMI z score for age was 1.45±0.9 and their total daily sleep time was 8.34 hours.

The mean scores of the students in the CPQ, CDSS, NAS and FBS according to gender are given in Table 2. The mean CDSS and NAS scores were considerably higher in male students than in female students (p=0.003, p=0.040, respectively).

The relationship between health perception and the scales used in the study is evaluated in Table 3. It was observed that students with excellent health perception had the highest CDSS scores (p=0.003).

The relationship levels between the scales are shown in Table 4. A significant positive correlation was found between the CDSS and NAS scales (p=0.002).

DISCUSSION

More than half of the participants in the study were boys. It was found that the mean scores of boys were significantly higher than the mean scores of girls in terms of the CDSS and NAS. It was found that the

TABLE 1: Demographic characteristics of students by gender

Variables	Girls (n=191) n (%)	Boy (n=209) n (%)	Total (n=400) n (%)	χ^2	p value
Mother's education status					
Primary school	25 (13.1)	32 (15.3)	57 (14.2)		
Secondary school	44 (23.0)	47 (22.5)	91 (22.8)		
High school	60 (31.4)	68 (32.5)	128 (32.0)	0.871	0.929*
University	50 (26.2)	52 (24.9)	102 (25.5)		
Postgraduate	12 (6.3)	10 (4.8)	22 (5.5)		
Father's education status					
Primary school	14 (7.3)	18 (8.6)	32 (8.0)		
Secondary school	37 (19.4)	32 (15.3)	69 (17.3)		
High school	66 (34.6)	70 (33.5)	136 (34.0)	6.082	0.298*
University	55 (28.8)	76 (36.4)	131 (32.8)		
Postgraduate	19 (9.9)	13 (6.2)	32 (8.0)		
Source of healthy nutrition information					
Family	118 (61.8)	139 (66.5)	257 (64.3)		
School	41 (21.5)	36 (17.2)	77 (19.3)	2.326	0.508*
Books	23 (12.0)	28 (13.4)	51 (12.8)		
TV and internet	9 (4.7)	6 (2.9)	15 (3.8)		
Health perception					
Excellent	1 (0.5)	4 (1.9)	5 (1.3)		
Good	28 (14.7)	33 (15.8)	61 (15.3)	2.980	0.395*
Moderate	71 (37.2)	86 (41.1)	157 (39.3)		
Poor	91 (47.6)	86 (41.1)	177 (44.3)		
Age (years) (X±SD)	9.3± 0.7	9.3 ± 0.8	9.3 ± 0.8	0.688†	

*Pearson's chi-square test; †Student's t-test; SD: Standard deviation

TABLE 2: Mean scores of students on the child dietary self-efficacy scale, NAS and FBS according to gender

Variables	Girls (n=191) (X±SS)	Boy (n=209) (X±SS)	Total (n=400) (X±SS)	t value	p value
CPQ	3.3±0.7	3.2±0.8	3.3±0.8	1.371	0.171
CDSS	4.9±4	6.1±3.9	5.5±4.0	-3.004	**0.003**†
NAS	12.7±1.8	13.1±1.8	12.9±1.8	-2.058	**0.040**†
FBS	1.7±4	1.6±4.1	1.7±4.1	0.351	0.726

†Student's t-test. SS: Standard deviation; CPQ: Child Health Perception Form; CDSS: Child Dietary Self-Efficacy Scale; NAS: Nutrition Attitude Scale; FBS: Food Behavior Scale

TABLE 3: Comparison of mean scores of BMI, child dietary self-efficacy scale, NAS and FBS according to students' health perception

Scales	Health perception	X±SS	p value
CDSS	Poor	5.5±4.3[a]	**0.003***
	Moderate	6.1±3.5[a]	
	Good	4.0±3.6[b]	
	Excellent	7.0±4.4[ab]	
NAS	Poor	13.0±1.9	0.371
	Moderate	13.0±1.8	
	Good	12.7±1.8	
	Excellent	11.8±2.5	
FBS	Poor	1.6±4.2	0.343
	Moderate	1.9±4.1	
	Good	1.0±3.8	
	Excellent	3.6±3.0	
BMI z-score for age	Poor	1.49±0.9	0.118
	Moderate	1.48±0.9	
	Good	1.2±1.0	
	Excellent	1.9±0.7	

*One-way analysis of variance test, a,b,c: Different letters in the same column indicate statistically significant differences between samples (p<0.05). CDSS: Child Dietary Self-Efficacy Scale; NAS: Nutrition Attitude Scale; FBS: Food Behavior Scale; BMI: Body mass index

TABLE 4: Relationships between scale scores

Scales		CDSS	NAS	FBS
Health perception	r value	0.066	0.65	0.010
	p value	0.190	0.192	0.843
CDSS	r value	1	0.158	0.040
	p value		**0.002**	0.426
NAS	r value		1	-0.800
	p value			0.112
FBS	r value			1
	p value			

CDSS: Child Dietary Self-Efficacy Scale; NAS: Nutrition Attitude Scale; FBS: Food Behavior Scale

students with excellent health perception had the highest mean scores on the CDSS and there was a significant positive correlation between the CDSS and NAS scales.

School age is a period in which children acquire nutritional habits that will last a lifetime. In this period, adequate and balanced nutrition is important for maintaining growth and development and ensuring school success.[20] Trainings and interventions to promote healthy eating behaviors in children are very valuable in terms of public health. In this direction, it is of primary importance to identify the factors affecting food preferences in order to determine the interventions that will enable children to acquire healthy eating habits.[21,22]

In this study conducted with 4th grade primary school students. In this study, the mean CDSS score of the children was determined as 5.5±4.0. In several studies conducted with similar age groups, the mean CDSS score was reported as 2,27±6,16 and 3,4±6,03 points.[23,24] NAS and CDSS scores of boys (13.1±1.8 and 6.1±3.9, respectively) were significantly higher than those of girls (12.7±1.8 and 4.9±4.0, respectively) (p<0.05). Accordingly, the nutritional attitudes and nutritional self-efficacy of males were more positive compared to females (Table 2). No significant difference was found between genders in terms of mean scores of the NAS (girls; 1.7±4.0-boys; 1.6±4.1) (p>0.05). In a study evaluating the nutritional attitudes and behaviors of 6- to 8-year-old children, the mean FBS score was 13.83±2.03 and the mean NAS score was 2.57±4.53. Although the scores of girls in the nutritional attitude and nutritional behavior scale (13.86±2.04 and 3.01±4.39, respec-

tively) were higher than those of boys (13.81±2.04 and 2.18±4.64, respectively), statistical significance was not found (p>0.05).[14] In a study evaluating the effect of a healthy eating program applied to 4th grade primary school students on the nutritional attitudes and behaviors of the students, the FBS score of the children was found to be 12.4±3.3 and the NAS score was found to be 1.0±4.8 and no difference was found according to gender (p>0.05).[25] A study of children aged 10 to 15 years indicated that females had a higher mean CDSS score (4.83±4.64) than boys (3.72±4.79), although there was no significant gender difference (p>0.05).[26] When the results of these studies conducted in school-age children are examined, it is seen that the findings related to FBS, NAS and CDSS scores may vary depending on the characteristics of the included sample and environmental factors, but the mean scores obtained are similar to the results of our study.

In this study, when the mean scores of FBS, NAS and CDSS were compared according to health perception, it was observed that health perception was affected by nutritional self-efficacy levels and those with "excellent" health perception had the highest CDSS scores (p<0.05) (Table 3). Higher self-efficacy scores have been associated with increased health perception and behavior change.[27] This may affect children's healthy eating behaviors in terms of knowledge or attitudes. As a result, their self-efficacy may be explained by the fact that their self-efficacy is also low. It is thought that children will be able to choose healthier foods with increased self-efficacy. In a study that evaluated the effect of nutritional self-efficacy and nutritional attitudes on health perception, it was observed that there was a significant relationship between health perception levels and nutritional self-efficacy levels of male individuals, and the mean CDSS scores of individuals with "excellent" health perception were higher (p<0.05).[28] In a study conducted with children aged between 11-13 years, a significant relationship was found between nutrition self-efficacy and health perception.[29] In our study, a positive and significant correlation was found between CDSS and NAS mean scores, and it was observed that as self-efficacy increased, positive eating behaviors increased (p<0.05; r=0.158) (Table 4). In brief, as the children's nutritional self-efficacy increased, their nutritional attitudes improved. Similarly, a study found a significant relationship between CDSS score and NAS score (p=0.000; r=0.427).[28] In a study examining the relationship between children's NAS and FBS scores, it was found that there was a weak positive relationship between the scales (r=0.212, p<0.001).[14] In this study, no significant relationship was found between the 2 scales (p>0.05). In a study conduct by Çeltek Orhan et al. examining the relationship between feeding behaviors and nutrition self-efficacy in children, a positive and significant relationship was found between CDSS and FBS mean scores (p<0.000; r=0.415).[30] In this study, no significant relationship was found between the 2 scales (p>0.05).

CONCLUSION

In this study, it was observed that the health perception of the children participating in the study affected their nutritional self-efficacy level and nutritional attitudes and behaviors; as the level of nutritional self-efficacy increased, the nutritional attitudes of the children improved. The findings of this study emphasize the importance of behavior and attitude in bridging the gap between knowledge and behavior. It is thought that a positive educational environment and raising awareness of the family about nutrition and being a role model can develop more positive attitudes and behaviors towards healthy nutrition among children.

At the same time, providing education and counseling services on nutrition and proper eating habits to improve the nutritional attitudes and behaviors of school-age children, monitoring the growth and development of children, monitoring BMI in schools so that deviations from normal in anthropometric measurements can be detected early and measures can be taken, are among the important steps to be taken to ensure that families and children are healthy. In this context, there is a need to plan future trainings on the relationship between nutrition and health and to investigate more effective ways to enable children to effectively transform knowledge into practical actions and transfer it to their daily lives. Awareness trainings should be organized for all primary school students and their parents on the basic issues of health

and nutrition in order to implement healthy eating habits and healthy lifestyles. It is thought that the practices to be implemented at this point will have positive effects on the state budget by reducing the burden of obesity and related diseases in the country and preventing the formation of chronic diseases. In conclusion, policies aimed at preventing the development of nutrition-related chronic diseases from childhood onwards should focus not only on promoting positive attitudes but also on the implementation of effective nutrition and health education strategies.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Yasemin Açar, Gül Eda Kılınç, Aliye Özenoğlu;* ***Design:*** *Yasemin Açar, Gül Eda Kılınç, Aliye Özenoğlu;* ***Control/Supervision:*** *Aliye Özenoğlu;* ***Data Collection and/or Processing:*** *Yasemin Açar, Gül Eda Kılınç;* ***Analysis and/or Interpretation:*** *Aliye Özenoğlu;* ***Literature Review:*** *Yasemin Açar, Gül Eda Kılınç;* ***Writing the Article:*** *Yasemin Açar, Gül Eda Kılınç;* ***Critical Review:*** *Yasemin Açar, Gül Eda Kılınç, Aliye Özenoğlu.*

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