

# Comparing peer-led and adult-led education to promote a healthy diet among Turkish school children

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## ABSTRACT

**Objective:** The aim was to compare the effect of peer-led and adult-led educational models that deliver educational programs to promote healthy dietary habits among school children.

**Methods:** Pre-test and post-test design was used for group comparisons. The participants were 51 fourth-grade students. The data were collected with a socio-demographic questionnaire, the Children's Dietary Self-Efficacy Scale (CDSS), and the Diet Behavior Scale (DBS). Descriptive, chi-square test, paired sample t-test, Mann-Whitney U test, Wilcoxon test and a Multivariate Analysis of Variance (MANOVA) test were administered for data analysis.

**Results:** No statistically significant difference was found between the groups with regard to pre-test diet scores ( $p > 0.05$ ). After education, diet self-efficacy and diet behavior scores significantly improved in the adult-led group ( $p < 0.05$ ). No significant difference was observed between the groups with regard to post-test diet scores ( $p > 0.05$ ).

**Conclusion:** Use of an integrated educational approach that contains both adult-led and peer-led education can be more effective in the improvement of student's dietary scores.

**Keywords:** Adult-led education, diet behavior, diet education, peer-led education, school children

## INTRODUCTION

Childhood obesity has become a rapidly growing epidemic (1, 2). In several studies conducted in Turkey, the overweight rate among school-aged children ranges from 12% to 22.1% (3-6). Overweight children are at an increased risk of being overweight, developing diabetes, certain cancers, and cardiovascular diseases during adulthood (7). The Healthy Nutrition and Active Living Program launched by the Ministry of Health considers that school-aged children and young people are the most important target groups between 2013 and 2017, due to the increasing rates of obesity in Turkey in recent years. In this context, children's knowledge, attitudes, and behaviors toward nutrition are expected to be affected by training program that aim to promote healthy dietary habits in schoolchildren (8). Therefore, for the improvement of public health, it is essential that schoolchildren are taught healthy dietary habits that encourage them to consume less fat and salt, but more fruit and vegetables (9).

To prevent diseases, it is essential to focus on children. Life-long health habits and beliefs develop early in life. Prevention efforts targeting children strengthen health protection and disease-preventive behaviors (1). Schools play a critical role in the development of children's lifelong health behaviors since they provide an environment where most children in a community can be directly contacted, and where their effects on children's social, psychological, physical, and intellectual development last for many years (2).

Nurses play a key role in conducting healthy nutritional programs in schools (10). Nurses can prevent childhood obesity by training children on healthy food choices (how to reduce calories and fat, sugar, and salt consumption, and how to increase fruit and vegetable consumption) at home, in school, and at other places (11). In Turkey, about 6 million students attended elementary school in the 2012–2013 school year (12). A very large number of these students attend government schools, yet in many of these schools, there are no nurses. Despite the efforts to prevent obesity in Turkey, attempts to promote health education via students' healthy dietary habits are insufficient, due to the lack of nurses in schools. Therefore, effective approaches to ensure healthy dietary habits in schools should be put into action urgently.

Peer-led training is defined as the education of young people by young people. After being trained by adults, peers can share health-related knowledge with each other by using social factors (13). Peer-led training has been found to increase knowledge, attitudes, and beliefs, and to promote health behaviors more than adult-led training (13, 14). Peer-led training has been used in the school environment for the following purposes: prevention of obesity (15), prevention of substance abuse (16), prevention of smoking (17), nutrition promotion (14, 18), and prevention of injuries (19). In schools lacking nurses, promoting students' healthy dietary habits through peer-led training should be considered as a method that will

contribute to the promotion of public health. The purpose of this study was to evaluate the effects of diet education programs on Turkish primary schoolchildren's diet self-efficacy and diet behaviors, and to compare the effects of peer-led and adult-led diet education programs in this context.

## METHODS

### Design and Sample

In this study, a pre-test and post-test design was used. The participants in the study were fourth-grade children from an urban primary school within a large city in western Turkey during the fall of the 2013–2014 school year. Children who were randomly assigned to the adult-led group received a healthy diet curriculum delivered by researchers. Children randomly assigned to the peer-led group received a healthy diet curriculum delivered by their peers who were trained by researchers.

This study was reviewed and approved by the Dokuz Eylül University Ethical Committee. The verbal consent of both children and teachers was received. The children were informed about the aim and method of the study, and they were guaranteed that their identities and answers would be kept confidential.

Using G Power 3 and based on a large effect size (0.4), a power of 0.80 and a significance level of 0.05, the sample size was calculated as 25 per group. However, all students in a class were included in the group since it was a class health education. In the primary school where the study was conducted, via a simple random method, 1 fourth grade was selected as the peer-led diet education group (29 students in the class) and 1 fourth grade was selected as the adult-led diet education group (29 students in the class). However, 3 students in the peer-led diet education group and 4 students in the adult-led diet education group did not participate due to illness. Twenty-six students participated in the peer-led education, and 25 students participated in the adult-led education. In the end, 51 students participated in the study.

### Procedure

First, before education about diet was delivered to the adult-led group of students, a pre-test was administered. After the researchers provided the necessary information to the students about the study's aim and details, pre-test data were obtained from the socio-demographic questionnaire, and Children's Dietary Self-Efficacy Scale (CDSS) and the Diet Behavior Scale (DBS) were collected in the classroom; data collection took only 20 minutes. After the pre-test, the adult-led diet education was completed. The post-test was administered to the adult-led group 2 weeks after their initial instructions. After the adult-led group's post-test was completed, pre-test data from the peer-led group were obtained with the same instruments, and then peer-led diet education was completed. The post-test was administered to the peer-led group after 2 weeks of teaching. The students filled in the CDSS and DBS to take the post-test. The tests were performed under the supervision of the researchers, and students were encouraged to complete the questionnaire unaided and in private.

### Description of Intervention

The education program for adult-led group consisted of three 1-hour diet lessons (with 1 lesson hour in a school day) that were delivered using traditional educational methods. Researchers who are specialists in the field of public health nursing gave information regarding a healthy diet. Within the context of this information, researchers taught students about a healthy diet, food groups, principles of a healthy diet, the properties of foods, and healthy food choices. A brochure summarizing the contents of the teaching was handed out to students.

The students in the adult-led group gave peer-led diet education for 3 class hours (with 1 lesson hour in a school day) to the students in the peer-led group. During this teaching time, each peer educator was paired with a student in the peer-led group and used flashcards prepared in advance by the researchers. The flashcards summarized the principles of a healthy diet and healthy food choices. The teaching methods included questions and answers, discussion and expression. Throughout the peer-led education, the researchers did not interfere in the teaching process.

### Measurements

The study questionnaire consisted of a socio-demographic questionnaire, a CDSS, and a DBS. The socio-demographic questionnaire included four items questioning the children's age, gender, and their parents' educational status.

The CDSS developed by Edmundson et al. (20) Parcel et al. (21) was used in this study to measure the self-efficacy of the children's diet. This encourages children to prefer less fatty and less salty foods to fattier and saltier food options; the scale was translated into Turkish by Haney and Erdogan (4). It consisted of a total of 15 questions using a 3-point scale. The scale items included various foods and food groups with fat and salt content. The possible score range was from –15 to +15, and a higher total score suggested higher self-efficacy. The reliability of this instrument was expressed by Cronbach's alpha ( $\alpha=0.77$ ).

The DBS developed by Edmundson et al. (20) Parcel et al. (21) was used in this study to measure the children's usual food consumption; the scale was translated into Turkish by Haney and Erdogan (4). It consists of 14 pictorial items using a forced-choice format where a higher fat or higher sodium food was always paired with a lower-fat or lower-sodium food. The students marked the food they ate most often. The possible score range was from –14 to +14, and higher scores indicated healthy dietary habits. The reliability of this instrument in the study was expressed by KR-20, and it was 0.72.

### Statistical Analysis

Descriptive statistics were used for the analysis of the data, while a chi-square test was used to evaluate the homogeneity of the groups. To compare the pre-test and post-test scores of the all students, a paired sample t-test was performed. To compare the pre-test and post-test scores of the intervention and control groups, a Mann–Whitney U test was used. Pre- and post-training scores of both groups were compared with a Wilcoxon test.

**Table 1.** Distribution of the students' socio-demographic characteristics in the groups

Socio-demographic characteristics	Adult-led group (n=25)		Peer-led group (n=26)		$\chi^2$	$\rho$
	n	%	n	%		
<b>Age</b>						
9	4	16.0	6	23.1	0.406	0.816
10	20	80.0	19	73.1		
11	1	4.0	1	3.8		
<b>Gender</b>						
Female	13	52.0	11	42.3	0.481	0.340
Male	12	48.0	15	57.7		
<b>Mother's education</b>						
Primary school	13	52.0	12	46.2	2.507	0.775
High school and above	12	48.0	14	53.8		
<b>Father's education</b>						
Primary school	14	56.0	14	53.8	7.480	0.187
High school and above	11	44.0	12	46.2		
Chi-square test						

A Multivariate Analysis of Variance (MANOVA) was used on the pre-test/post-test scores relative to CDSS and DBS to assess differences among the groups. The study data were analyzed using Statistical Package for the Social Sciences Version 15 (SPSS Inc.; version 15.0, Chicago, IL, USA), and the statistical significance was defined as  $p < 0.05$ .

**RESULTS**

Table 1 shows the socio-demographic characteristics of the students who participated in the study. The chi-square analysis conducted to ensure homogeneity between the groups revealed that the socio-demographic characteristics of the students in the peer-led and adult-led groups were similar.

The mean pre-test and post-test dietary self-efficacy scores and diet behavior scores of all students are shown in Table 2. No significant difference was found between the pre-test and post-test dietary self-efficacy scores of the students ( $p = 0.166$ ). It was determined that there was a statistically significant difference between the mean pre-test and post-test diet behavior scores ( $p = 0.016$ ).

A comparison of the dietary self-efficacy scores and diet behavior scores of the students according to their groups is presented in Table 3. No significant difference was found between the groups according to the pre-test diet scores ( $p = 0.117$ ,  $p = 0.465$ ). After education, the mean post-test diet scores between the groups were not statistically significant either ( $p = 0.473$ ,  $p = 0.909$ ). This finding indicated no intergroup difference before and after education. According to the intragroup comparisons, there was a significant difference between pre-test and post-test diet scores of the adult-led group ( $p = 0.044$  and  $0.014$ , respectively). No significant difference was found between the pre-test and post-test diet scores of the peer-led group ( $p = 0.914$ ,  $p = 0.333$ , respectively).

**Table 2.** Dietary scores of students (n=51)

	Median	Mean±SD	$\rho$
<b>CDSS</b>			
Pre-test	6.00	5.84±5.36	0.166
Post-test	8.00	7.01±5.83	
<b>DBS</b>			
Pre-test	6.00	4.27±6.09	0.016*
Post-test	8.00	6.03±6.16	

\*a paired sample t-test:  $p < 0.05$

CDSS: Dietary Self-Efficacy Scale; DBS: Diet Behavior Scale ; SD: standard deviation

Table 4 shows results of the MANOVA test used to determine if students' pre-test and post-test scores on dietary self-efficacy and dietary behavior were significantly different between the peer-led and adult-led groups. The results indicated no significant differences between the groups in dietary self-efficacy (Wilks' lambda  $\lambda = 0.900$ ;  $F = 2.676$ ;  $p > 0.05$ ) and dietary behavior (Wilks' lambda  $\lambda = 0.943$ ;  $F = 1.438$ ;  $p > 0.05$ ) at both pre-test and post-test.

**DISCUSSION**

The study's findings revealed there was no difference between the peer-led diet education group and the adult-led diet education group in terms of pre-education self-efficacy and behavior scores. For both groups, the students' diet self-efficacy scores ranged between -6 and +15 (the total possible score that could be obtained from the scale is between -15 and +15). This confirmed students should be encouraged so they could maintain healthy dietary habits. Similarly, the students' dietary behavior scores ranging between -10 and +14 (the total possible score

that could be obtained from the scale is between -14 and +14) indicated the students were at a greater risk from unhealthy dietary habits and had a tendency to consume foods rich in fat and salt.

After the education, there was a partial improvement in the adult-led group's scores, but the MANOVA test results evidenced this development as not expressive between the groups. This result showed adult-led diet education could increase the children's healthy diet self-efficacy and help them to develop favorable behavioral changes in a short time. As stated in previous studies, adult-led, school-based diet education had a positive impact on children's diet self-efficacy and behaviors (22, 23).

Planned and continuous health education, organized in accordance with the needs of society, plays an active role in people's health-related knowledge and behaviors. Elementary school age is an ideal time to provide planned and continuous health education. This is because at this age, children are eager to learn new things, their learning ability is great, and they believe what they learn at school is true (24). It is easier to train school-age children and encourage them to acquire healthy lifestyle habits, before they gain unhealthy habits. Planned and continuous health education programs, prepared in accordance with the age and needs of children, become etched in their memory. These programs also enable them to acquire positive lifelong habits. Children not only acquire these habits, but also transfer them to their families, peers, or other people around them (25).

The findings of this study revealed there were no improvements in diet self-efficacy and the behaviors of the peer-led diet edu-

cation group. Peer-led education is an effective method in providing health education for children and encouraging them to change their health behaviors (26). This is because peers can share their health-related knowledge informally using social factors (13). Previous studies indicate peer leaders, students, and teachers consider peer-led interventions as feasible and highly acceptable, and they can be used to promote children's health-related knowledge, attitudes, and behaviors (15, 27). In addition, in their critical review study, Mellanby et al. (13) reported peer-led interventions were more effective than adult-led interventions, but they also added this was not thoroughly proven due to the analytical and methodological problems related to the studies. Another study supporting these results stated teachers provided more information than peer educators in school-based sex education program (28).

In our study, there were no significant improvements in the diet scores of the peer-led group, which is in line with the findings of another study conducted in Turkey (29). In that study, which investigated the effectiveness of peer-led nutritional education among preschool children, the researcher stated dietary attitudes improved more in the adult-led education group than in the peer-led education group. This result was explained by the fact that the students were trained by the teacher, and strengthened the knowledge they acquired because they had the opportunity to practice that knowledge and transfer it to others. In our study, the adult-led group of students received more formal education from the researchers experienced in their fields. They transferred knowledge to their peers and thus had the opportunity to strengthen their knowledge. On the other hand, the education that the peer-led group students received from their peers was more informal, and they did not have any opportunity to transfer their knowledge to another group; that there was no improvement in their scores was related to this fact.

The findings of the present study indicated no difference between the peer-led and adult-led groups' dietary scores. This finding confirmed that although adult-led education seems more effective, the effects of adult-led and peer-led educational methods on the improvement of school-age children's diet self-efficacy and behaviors were not different. Thus, it was concluded that peer-led dietary education could be used as an alternative approach in future school-based health education interventions, even though it did not lead to any changes in the children's diet self-efficacy and behaviors in this study. This result supported the findings of other studies in which peer-led education was implemented to prevent school injuries and to improve students' oral health behaviors (19, 30).

**Table 3.** Comparison of the mean dietary scores between groups, and within groups

	Adult-led group (n=25) Mean±SD	Peer-led group (n=26) Mean±SD	ρ
<b>CDSS</b>			
Pre-test	4.60±5.65	7.03±4.87	0.117
Post-test	7.64±5.76	6.42±5.94	0.473
ρ	0.044*	0.914	
<b>DBS</b>			
Pre-test	3.04±7.28	5.46±4.50	0.465
Post-test	5.84±6.90	6.23±5.49	0.909
ρ	0.014*	0.333	

\* Wilcoxon test, p<0.05; Mann-Whitney U test  
CDSS: Dietary Self-Efficacy Scale; DBS: Diet Behavior Scale; SD: standard deviation

**Table 4.** Multivariate tests-MANOVA pre-test/post-test scores for the CDSS and DBS

Group	Value	F	Hypothesis df	Error df	p	η <sup>2</sup>	
CDSS	Wilks' Lambda	0.900	2.676	2.000	48.000	0.079	0.100
DBS	Wilks' Lambda	0.943	1.438	2.000	48.000	0.247	0.57

MANOVA: Multivariate Analysis of Variance; CDSS: Dietary Self-Efficacy Scale; DBS: Diet Behavior Scale

Although the study enabled us to obtain some useful data, it had some limitations. First, due to the relatively small sample size of the study, the data cannot be generalized to other schoolchildren. Second, in order not to take too much time from the students' formal education, the duration of the diet education program was kept short; therefore, it did not give any clues to long-term, peer-led dietary programs. Third, the children may not have given truthful answers, but the desired answers; thus, their answers are susceptible to response bias.

## CONCLUSION

This study indicated that differences between adult-led and peer-led dietary education programs were not significant. This result provided an important tip that the use of an integrated training approach containing both adult-led and peer-led education can be more effective. Nurses can promote health education in the community by establishing a peer education network in schools, particularly in countries such as Turkey, where the number of nurses in schools is limited and where the peer-led education method can be used as an alternative approach in preventing childhood obesity and encouraging children to acquire healthy dietary habits. Thus, this will allow nurses sufficient time to focus on other roles such as caregiving, researching, coordinating, performing early diagnoses and referrals, liaising, creating a healthy school environment and promoting health policy, in addition to their health educator role. We recommend nurses and other health professionals, working in the field of school health, investigate the effects of peer-led education interventions on children's dietary habits in future studies.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Dokuz Eylül University.

**Informed Consent:** Verbal informed consent was obtained from patients who participated in this study.

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