







Research Article / Araştırma Makalesi

The effect of sustainable food literacy education on primary school nutrition attitudes and behaviours

Mutlu Tuçe Ülker ¹ Funda Elmacıoğlu ¹ Hafize Sema Büyükaş ¹
Aysu Özdemir ¹ Halime Kuşcu Sezen ¹ Sümeyye Nur Gündüz ¹

¹ Department of Nutrition and Dietetics, Faculty of Health Sciences, Istinye University, İstanbul, Türkiye

Article info

Keywords:

Nutrition education, adequate-balanced nutrition, sustainable nutrition, nutrition behaviours

Received: 23.01.2024

Accepted: 26.03.2024

E-ISSN: 2979-9511

DOI: 10.58625/jfng-2472

Ülker et. al.; The effect of sustainable food literacy education on primary school nutrition attitudes and behaviours

Available online at <https://jfng.toros.edu.tr>

Corresponding Author(s):

* Mutlu Tuçe Ülker, mutlutuceulker@gmail.com

Abstract

Permanent habits are acquired during childhood. Nutritional behaviors acquired during this period persist throughout life. Nutrition education in schools can raise awareness about adequate and balanced nutrition and sustainable food sources that preserve the environment. Two primary schools with similar socioeconomic status in Istanbul were selected for the study. One received a 10-week sustainable nutrition education that included education on comprehensive nutrition; the other while the received no intervention (the control group). Evaluations before and after the intervention revealed the changes in the nutritional knowledge of the students. The overall effectiveness of the nutrition education was assessed after the intervention. 158 students participated to the study. A significant difference occurred before and after the intervention in the nutritional behaviors and attitudes of the students ($p < 0.05$). The mean Nutrition Behavior and Nutrition Attitude Scale scores of the students in the intervention group were higher after the intervention than they were before. There was no significant difference in the pretest and posttest scale scores of the control group. Nutrition education can help children make nutritional choices that support lifelong healthy habits and contribute to reduction in future government health expenditures.



INTRODUCTION AND AIM

Childhood is the period when nutritional habits are acquired and nutrition education given in this period provides improvement of the nutritional status of the society (1). Every 10th child aged 5-17 years is overweight or obese worldwide and the prevalence of childhood obesity is increasing (2). In children and adolescents, the causes of overweight include inadequate physical activity and unhealthy eating habits resulting in excess energy intake and thus in-adequate nutrition (1). The main aim of intervention programmes to prevent childhood obesity is to provide education on nutrition and physical activity (3). Through nutrition education, children gain awareness about healthy eating habits and sustainable nutrition for the environment (4).

Nutrition education in childhood and adolescence promotes healthy food choices and healthy eating patterns in children and adolescents (5). Unhealthy eating habits increase the risk of overweight and obesity in childhood and adolescence and chronic diseases and death in later life. Though presentations and videos, nutrition education interventions offer information on portion sizes and recommended daily food limits and teach people how to read food labels (6). Interventions to improve food safety and nutrition literacy positively impact food and nutrition awareness, food selection, food preparation, and fruit vegetable consumption. The result is increased self-efficacy in these areas and improved diet. The World Health Organization identifies the school environment as an ideal setting for guiding children and adolescents to better nutrition by instilling them with healthful eating habits (2). Nutrition education given to children and adolescents at school can reduce nutrition-related health problems and future health expenditures (6). Research shows a strong relationship between the nutritional self-efficacy of schoolchildren and their eating habits (7). Additionally, children's school grades and income levels have a reported positive and significant relationship with their nutritional behaviors and self-efficacy (8).

This study provided sustainable nutrition and food safety-literacy education to primary school

students to teach them healthy eating habits. The education taught them adequate and balanced nutrition and introduced them to food choices sustainable for the environment. Our results will perhaps guide additional research to raise healthier generations.

MATERIALS AND METHODS

Study Design

The study was conducted with two randomly selected, socioeconomically similar primary schools. Students in one school received 10 weeks of education on sustainable nutrition, food literacy and hygiene; students at the control school did not receive any education. The content of the nutrition trainings was prepared and checked by experts.

The Nutrition Behavior Scale and Nutrition Attitude Scale were administered to two groups before and after the intervention to determine the nutritional knowledge, attitudes and behaviours of participants (7).

Nutrition Behavior Scale

This 14-item scale for assessing children's food consumption, was adapted into Turkish in 2022. The scale asks children which of two foods they consume more frequently and assigns values of -1 for unhealthy foods and +1 for healthy foods. The total possible score ranges between -14 and +14 and a high score on the scale is an indicator of healthy eating habits (7).

Nutrition Attitude Scale

This scale of 16 items was adapted to the Turkish population. The scale consists of four sub-dimensions: Exercise (4 items), Nutrition (4 items), Smoking (4 items), Stress control (4 items). Each scale item score ranges from 1 to 4 points (1-strongly disagree, 4-strongly agree) and the total score ranges from 4 to 16 points. High scale scores correspond to increasingly positive attitude (7).

Data Analysis

All statistical analyses were calculated with IBM SPSS version 25.0. The tables, present continuous variables as Mean \pm SD and categorical variables

as number (n) and percentage (%). Intergroup comparisons were achieved using the Mann Whitney U test and Wilcoxon Singed Rank test for continuous variables. The Chi square test was used to compare categorical variables; $p < 0.05$ was considered statistically significant (8).

A voluntary consent form was obtained from the participants and their families. The research was conducted in accordance with the Declaration of Helsinki, ethics committee approval was obtained from Istinye University Social Human Ethics Committee on 16/02/2023 with meeting number 2023/02 and decision number 22 and informed consent was obtained from each participant.

RESULTS AND DISCUSSION

Sociodemographic Characteristics Of Participating Primary School Students

The students participating in the study were between the ages of 10 and 18. The study included 158 students, including experimental (75) and control (83) students. 48,1% of the students were female and 51,9% were male (see Table 1).

Pre-and post-test mean scale scores

The students' Nutrition Behavior Scale pretest and posttest scores showed a statistically

significant difference ($Z = -3,155$ $p = 0.002$); the post-test total scores were higher than the pretest total scores (see Table 2).

Intervention Group Pretest And Posttest Mean Scale Scores

Comparison of the pretest and post-test Nutrition Behavior Scale total scores of the students in the intervention group, identified a statistically significant difference ($Z = -3,384$ $p = 0.001$). The posttest total scores were higher than the pretest scores of these students (see Table 3).

Comparison of the pretest-posttest scale total scores of the students in the intervention group, identified a statistically significant difference between the pretest and post-test total scores of the Nutrition Attitude Scale ($Z = -2,076$ $p = 0.038$). The post-test total scores were higher than the pretest scores of these students (see table 3).

Control Group Pretest And Posttest Mean Scale Scores

The study evaluated sustainable nutrition education's effect on student attitudes and behaviors in two socioeconomically similar primary schools. Students' attitudes and behaviors toward and food safety improved after education intervention.

Table 1. Sociodemographic Characteristics Of Participating Primary School Students

| | All participants | | Intervention group | | Control group | |
|--------|------------------|------|--------------------|------|---------------|------|
| | n | % | n | % | n | % |
| Female | 76 | 48,1 | 33 | 44,0 | 43 | 51,8 |
| Male | 82 | 51,9 | 42 | 56,0 | 40 | 48,2 |
| Total | 158 | 100 | 75 | 100 | 83 | 100 |

Table 2. Primary School Students Pre-And Post Test Mean Scale Scores (n:158)

| Variable | Pre Intervention | Before Intervention | Z | p | Cohen's d |
|--------------------------|------------------|---------------------|--------|--------|-----------|
| | Mean±SD | Mean±SD | | | |
| Nutrition Behavior Scale | 1,66±5,09 | 2,70±5,25 | -3,155 | 0.002* | 0.64 |
| Nutrition Attitude Scale | 13,67±2,81 | 13,67±2,24 | -0,982 | 0.236 | 0.10 |

Wilcoxon Singed Rank Test. $p < 0.005$

Sustainable nutrition education among children is protective against non-communicable diseases and prevents malnutrition by fostering healthy eating habits and food choices (10). Nutrition education interventions aim at behavior change and assess motivators and barriers to the process. A systematic review of the effectiveness of nutrition intervention programs in children aged 3-12 years worldwide, reported that nutrition intervention programs were effective in improving knowledge and behaviors about healthy habits resulted in reduced body mass index; they concluded that school centers and families should be included in nutrition education interventions (11).

A study examining the relationship between nutrition behaviors and nutrition self-efficacy of secondary school students, found a positive and significant relationship between the mean scores of the Nutrition Self-Efficacy Scale and Nutrition Behavior Scale of the students (8). Japan encourages healthy eating habits in children through its 2005 law on nutrition education. A study of primary and secondary school students, to assess the outcomes of nutrition education, attitudes and behaviors, revealed those who received nutrition education in schools tended to have a more positive attitude towards nutrition education (12). In our study, students

who received sustainable nutrition education had a more positive attitude towards nutrition education than those who did not. This is due to the fact that students have knowledge about nutrition due to nutrition education planned in accordance with their levels.

A study of the effect of school nutrition education and physical activity intervention on car-diovascular risks for obese children, gave students nutrition education and physical activity intervention for 8 months; improvement in children’s cardiovascular health obtained (13). Our study included obese and non-obese students, and the nutrition education positively affected their nutrition attitudes and behaviors. It is believed that this condition forms the basis for healthy eating habits that students acquire throughout their lives and protect them against nutrition-related diseases like obesity in their later life.

Malnutrition among school children leads to non-communicable diseases and poor cognitive performance. Nutrition education interventions in schools can prevent malnutrition. Our study evaluated the effectiveness of nutrition interventions. We provided nutrition education to students with a three-month follow-up; healthy menus were provided in school

Table 3. Intervention Group Pre-And Post-Test Mean Scale Scores

| Variable | Pre Intervention | Before Intervention | Z | p | Cohen’s d |
|--------------------------|------------------|---------------------|--------|---------------|-----------|
| | Mean±SD | Mean±SD | | | |
| Nutrition Behavior Scale | 2,52±4,92 | 4,41±4,86 | -3,384 | 0.001* | 0.84 |
| Nutrition Attitude Scale | 13,05±2,22 | 13,37±2,64 | -2,076 | 0.038* | 0.49 |

Wilcoxon Singed Rank Test. p<0.005

Table 4. Control Group Pre-And Post-Test Mean Scale Scores

| Variable | Pre Intervention | Before Intervention | Z | p | Cohen’s d |
|--------------------------|------------------|---------------------|--------|-------|-----------|
| | Mean±SD | Mean±SD | | | |
| Nutrition Behavior Scale | 0,89±5,15 | 1,15±5,15 | -0,864 | 0.388 | 0.19 |
| Nutrition Attitude Scale | 14,22±3,16 | 13,93±1,80 | -0,814 | 0.416 | 0.17 |

Wilcoxon Singed Rank Test. p<0.005

canteens. Knowledge, attitudes and practices on nutritional behaviors, body composition, cognitive performance and health-related quality of life were evaluated before and after the education intervention; we concluded that nutrition education had positive effects on these issues (14). Our study, aimed to prevent malnutrition by providing students with adequate and balanced nutrition habits through nutrition education.

CONCLUSIONS

Our study contributes to the development of nutrition policies targeting primary school students. To expand sustainable nutrition education in primary schools for promoting healthy eating habits, we recommend further research on the long-term effects of nutrition education in public and private schools. The sustainable nutrition education given in the study was limited to 10 weeks as a consequence of the intensive curriculum of the students; in addition, physical activity and anthropometric measurement status of the students could not be evaluated. Since the same scales were used before and after the intervention, familiarity with the questions may be expected to lead to improvement between the groups.

Author Contributions

MTU: Conceptualization (lead); data curation (lead); formal analysis (lead); investigation (lead); methodology (lead); project administration (equal); resources (lead); software (lead); supervision (lead); validation (lead); visualization (lead); writing – original draft (lead); writing – review and editing (lead). FE: Conceptualization (equal); data curation (lead); methodology (lead); project administration (lead); software (equal); writing – original draft (supporting); writing – review and editing (supporting). HSB: Conceptualization (lead); investigation (lead); methodology (lead); project administration (lead); resources (supporting); software (supporting); writing – original draft (lead); writing – review and editing. AÖ: Conceptualization (lead); investigation (lead); methodology (lead); project administration (lead); resources (supporting);

software (supporting); writing – original draft (lead); writing – review and editing. HK: Conceptualization (lead); methodology (lead); project administration (lead); software (lead); visualization (lead); writing – original draft (lead); writing – review and editing (lead). SNG: Conceptualization (lead); investigation (lead); methodology (lead); project administration (lead); resources (supporting); software (supporting); writing – original draft (lead); writing – review and editing.

Ethics Approval Statement

The research was conducted in accordance with the Declaration of Helsinki, ethics committee approval was obtained from Istinye University Social Human Ethics Committee on 16/02/2023 with meeting number 2023/02 and decision number 22, and informed consent was obtained from each participant.

Acknowledgments

We would like to thank the principal of Zeytinburnu Şehit Ömer Cankatar Primary School and Bayrampaşa Hacı İlbey Primary School.

Financial support

The research was supported by TÜBİTAK 2209-A project, Project no: 1919B012216658.

Conflicts of interest

The authors declare no conflicts of interest. TÜBİTAK played a role in the collection and analysis of the study data by providing funding.

REFERENCES

1. Dike, I. C., Ebizie, E. N., Chukwuone, C. A., Ejiofor, N. J., Anowai, C. C., Ogbonnaya, E. K., Ugwu, E. I., Nkechinyere, U. S., Chigbu, E. F., Ezeaku, M. N., Nnadi, G. C., Ihuoma, E. C., Gera, N. P., Chikwendu, J. N., & Vasireddy, D. (2021). Effect of community-based nutritional counseling intervention on children's eating habits. *Medicine (United States)*, 100(30), E26563. <https://doi.org/10.1097/MD.00000000000026563>.
2. World Health Organization. (2017). Adolescent obesity and related behaviours: trends and inequalities in the WHO region 2002-2014. *World Health Organization, Regional Office for Europe*, 87. http://www.euro.who.int/__data/assets/pdf_file/0019/339211/WHO_ObesityReport_2017_v3.pdf.
3. Yılmaz, M., Ağartioğlu Kundakçı, G., Uyanık, G., Ongan, D., Yildirim Sari, H., Akay, N., Algül, E., & Yildirim, A. (2022). İlkokul öğrencilerinin obezite, fiziksel aktivite ve özetkililik-yeterlilik düzeylerinin incelenmesi. *Ahi Evran Med. J.*, 6(2), 174–183. <https://doi.org/10.46332/aemj.841750>.
4. Yardımcı, H., & Özçelik, A. (2015). Üniversite öğrencilerinin öğün düzenleri ve beslenme eğitiminin beslenme bilgisine etkisi. *Bes Diy Der*, 43(1), 19–26.
5. Yolcuoğlu, İ. Z., & Kızıltan, G. (2021). Beslenme eğitiminin diyet kalitesi, sürdürülebilir beslenme ve yeme davranışlarına etkisi. *Başkent Üniv Sağlık Bilimleri Fakültesi Derg.*, 6(1), 77–90. <http://hdl.handle.net/11727/6581>.
6. Xu, H., Li, Y., Du, S., Zhang, Q., Liu, A., Sun, J., & Ma, G. (2020). Cost–utility and cost–benefit analyses of school-based obesity prevention program. *BMC Public Health*, 20(1), 1–7. <https://doi.org/10.1186/s12889-020-09718-x>.
7. Haney, M. Ö., & Rdoğan, S. E. (2013). Sağlık Davranışı Etkileşim Modeli : Çocukların Beslenme Alışkanlıklarını Belirlenmek İçin Bir Rehber. 6(4), 218–223. <https://dergipark.org.tr/tr/download/article-file/753451>
8. Çeltekin Orhan, Ö., Karayagız Muslu, G., Manav, G., & Kara, R. (2022). An investigation of the relationship between nutritional behaviours and nutritional self-efficacy in children. *Child: Care, Health and Development*, 48(5), 744–750. <https://doi.org/10.1111/cch.12982>.
9. Lenhard, W., & Lenhard, A. (2016). Computation of effect sizes. Retrieved from: https://www.psychometrica.de/effect_size.html.
10. Verjans-Janssen, S. R. B., Van De Kolk, I., Van Kann, D. H. H., Kremers, S. P. J., & Gerards, S. M. P. L. (2018). Effectiveness of school-based physical activity and nutrition interventions with direct parental involvement on children's BMI and energy balance-related behaviors - A systematic review. *PLoS ONE*, 13(9), 1–24. <https://doi.org/10.1371/journal.pone.0204560>.
11. Collado-Soler, R., Alférez-Pastor, M., Torres, F. L., Trigueros, R., Aguilar-Parra, J. M., & Navarro, N. (2023). A systematic review of healthy nutrition intervention programs in kindergarten and primary education. *Nutrients*, 15(3), 1–19. <https://doi.org/10.3390/nu15030541>.
12. Kuwahara, M., & Eum, W. (2022). Effects of childhood nutrition education from school and family on eating habits of japanese adults. *Nutrients*, 14(12). <https://doi.org/10.3390/nu14122517>.
13. Yu, H. J., Li, F., Hu, Y. F., Li, C. F., Yuan, S., Song, Y., Zheng, M., Gong, J., & He, Q. Q. (2020). Improving the metabolic and mental health of children with obesity: A school-based nutrition education and physical activity intervention in Wuhan, China. *Nutrients*, 12(1), 1–11. <https://doi.org/10.3390/nu12010194>.
14. Teo, C. H., Chin, Y. S., Lim, P. Y., Masrom, S. A. H., & Shariff, Z. M. (2019). School-based intervention that integrates nutrition education and supportive healthy school food environment among Malaysian primary school children: a study protocol. *BMC Public Health*, 19(1), 1427. <https://doi.org/10.1186/s12889-019-7708-y>.