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Effect of Nutrition Education on Diet Quality, Sustainable Nutrition and Eating Behaviors among University Students

İrem Zeynep Yolcuoğlu and Gül Kızıltan

Department of Nutrition and Dietetics, Baskent University - Baglica Campus, Ankara, Turkey

ABSTRACT

Objective Nutrition information is provided by proper nutrition education and nutrition education programs have a direct impact on nutrition knowledge and behavior. This study aims to determine the effect of nutrition education on diet quality, sustainable nutrition and eating behavior.

Design Cross-sectional survey.

Participants: The study was carried out on a total of 204 individuals, 21 males and 183 females, who were studying in the 3rd and 4th grades of Başkent University Faculty of Health Sciences.

Main outcome measures Mean Adequacy Ratio (MAR) score calculated with the Nutrient Adequacy Ratio (NAR) was used to evaluate the diet quality. 'Sustainable and Healthy Eating Behaviors Scale' was applied to measure sustainable and healthy eating behaviors.

Analysis A questionnaire including personal information and anthropometric measurements of the individuals and a 24-hour dietary recall was taken. Food consumption records were evaluated using the Nutrition Information System. In order to evaluate the quality of the diet, the Mean Adequacy Ratio (MAR) score calculated with the Nutrient Adequacy Ratio (NAR) was used. 'Sustainable and Healthy Eating Behaviors Scale' was applied to measure sustainable and healthy eating behaviors. SPSS 20.0 package program was applied to evaluate the data.

Results In the study, 47.5% of the individuals were educated in Nutrition and Dietetics program and 52.5% were in other programs. The diet quality of 44.8% of the individuals studying in the Nutrition and Dietetics program and 56.4% of the individuals studying in the other programs were determined as 'good' according to the MAR levels classification. No significant difference was found in terms of MAR levels of individuals according to the departments they read ($p > 0.05$). The average score of the 'Healthy and Balanced Nutrition' factor in the scale of sustainable and healthy eating behaviors was higher in individuals who were studying in the Nutrition and Dietetics program. The average scores of 'Seasonal Food' and 'Low Fat' factor were found to be significantly higher in girls studying in the Nutrition and Dietetics program ($p < 0.05$).

Conclusion It was determined that nutrition education is effective on sustainable and healthy eating behaviors. Considering the importance of nutrition education on the health of individuals and sustainable environment, it is of great importance in terms of public health to increase the awareness of the society on this issue.

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Nutrition education; diet quality; sustainable nutrition; eating behavior

Introduction

Nutrition is a conscious behavior to take the nutrients required by the body in sufficient amounts and at appropriate times, to protect and improve health and to increase the quality of life. Adequate and balanced nutrition is one of the protective factors which plays a role in reducing nutrition-related health issues e.g., reducing the risk of diseases, prevention of protein energy malnutrition and/or vitamin-mineral deficiencies etc (1).

Healthy eating habits require individuals to have sufficient nutritional knowledge to maintain a healthy life with right food choices. Nutrition information is provided by proper nutrition education, and nutrition education programs have a direct impact on nutritional knowledge and behavior. Education is a set of dynamic systems developed to inform

individuals, to create an attitude within the subject of education and to reach the desired behavior as a result. The main purpose of nutrition education is to give information that nutrition is related to health and which foods should be consumed accordingly (2).

University life is an important period of transition from childhood to adulthood and life-affecting changes (2). University students are in a critical period where their forward-looking nutritional habits are settled. As the university education of young people starts begins to change their diets because of moving away from family, because of becoming more open to external influences and starting to make their own free choices more prominently (3–5).

University education, together with vocational education, causes changes in people's health behavior, personal development and personality development. These changes with

regard to attitudes and behaviors play even more important role in the field of health. Unhealthy eating habits built during university education may cause serious health problems such as obesity, hyperlipidemia, diabetes and osteoporosis in later life (2).

It is known that diversifying diet, such as adequate consumption of different foods or food groups, improves health. It is reported that high diet quality is effective in improving health and also determining the body weight.

The manuscript “A Proposed Framework for Identifying Nutrients and Food Components of Public Health Relevance in the Dietary Guidelines for Americans” was published by Bailey et al. (6), was intended to streamline and add transparency to the works of Dietary Guidelines Advisory Committees to identify NFCs that need to be encouraged or discouraged in order to help reduce risk of chronic disease and promote health and energy balance in the population. In Turkey there is a similar guideline “Turkey Dietary Guidelines-2016” which is the publication of the Republic of Ministry of Health that contains the same subtitles such as the nutrients and food groups, foods and nutrients required to be consumed more, the foods and nutrients required to be consumed less, nutrition in special cases etc. to provide information on adequate and balanced nutrition to Turkish population and also show how the practical ways to achieve nutritional goals and helps development of healthy lifestyles for the population (7).

Diet quality is the calculation of dietary nutrients in order to prevent health problems caused by malnutrition and insufficiency of nutrient intake. While the diversity of diet quality is achieved by the diversity in the consumption of food groups, proportionality is achieved by avoiding the consumption of some foods and food groups above the recommended intake. While dietary quality is generally considered in terms of adequacy, diversity and proportionality in developed countries, nutrient deficiencies is the main concern in developing countries, causing the adequacy dimension to take more place in the investigations (8).

Today, unlike dietary guides, nutritionists draw attention to the need to focus on the effects of nutrition on human health as well as on the environment and food (9). The type and amount of food consumed affect the environment, and it is reported that adherence to healthy diets will contribute to the improvement in public health by building more environmentally friendly eating habits. In this context, the concept of sustainable nutrition is suggested to define a diet that avoids the consumption of natural resources and complies with the nutritional principles that will sustain long-term health (10).

An approach that links healthy nutrition with sustainability is the Live well for Low Impact Food in Europe (LIFE) project carried out by the World Wide Fund for Nature (WWF). LIFE project consists of 6 basic principles based on increasing the consumption of vegetables and fruits, ensuring food diversity, preventing food waste, reducing meat consumption to reasonable levels, purchasing certified food, and reducing the consumption of foods with high fat, salt and sugar content and sugar-sweetened beverages (11).

The aim of this research is to determine the effect of nutrition education on diet quality, sustainable and healthy eating behaviors among university students.

Methods

This study was carried out with a total of 204 individuals, studying in the 3rd and 4th grade at the Başkent University Faculty of Health Sciences between December 2019 and February 2020. For this study, approval was obtained from Başkent University Medical and Health Sciences Research Board with the number KA19/364 and dated 26/11/2019. Informed consent was obtained from all participants.

Measures

Demographics/anthropometrics

The questionnaire including multiple choice and open-ended questions was carried out by the researcher using face-to-face interview method to collect data belonging to individuals. In the questionnaire form, the socio-demographic characteristics of the individuals (age, gender, household type and the major field of study) and anthropometric measurements (height and body weight) were self-reported. BMI was calculated by the ratio of body weight (kg) to height square (m²) and the results were evaluated according to WHO classification (12).

Diet quality

Except for 5 individuals participating in the study, food consumption records were taken by using a 24-hour dietary recall method to evaluate the dietary quality of the individuals. Food consumption records were evaluated using the Nutrition Information System (BeBis). Mean Adequacy Ratio (MAR) scores, which were calculated using Nutrient Adequacy Ratio (NAR), were used to evaluate the diet quality (13). NAR scores were calculated by comparing the individual daily consumption amounts of food items with Dietary Reference Intake (DRI) levels classified according to age and gender (14). In the study, NAR scores were calculated as percentage for a total of 10 nutrients: protein, fiber, folate, vitamin C calcium, iron, calcium, potassium, magnesium, zinc and riboflavin (Formula-1). A value of 100% for NAR means that the intake level is the same as the DRI requirement.

$$\text{Formula-1: NAR (\%)} = \frac{\text{Daily intake of a food item with diet}}{\text{Dietary Reference Intake of a food item}} \times 100$$

MAR score evaluates optimal dietary adequacy for ten nutrients (14). It is expressed as a percentage by taking the average of the calculated NAR scores (Formula-2). MAR levels between 0-50 evaluated as insufficient, 51-79 as need to be improved, and 80 and above as good.

$$\text{Formula-2: MAR (\%)} = \frac{\sum \text{NAR (\%)}}{\text{Number of nutrients}}$$

'Sustainable and healthy eating behaviors' scale

In the study, the Turkish version of the 'Sustainable and Healthy Eating Behaviors' scale, which was developed according to the definition of FAO, Live Well approach and principles of sustainable and healthy eating habits, was used for the concept of sustainable diet, validity and reliability analysis of the students of the Department of Nutrition and Dietetics of Gazi University was used (15, 16).

This scale consists of 8 factors and 34 items in total. These 8 factors are Healthy and Balanced Nutrition, Quality Signs (Local and Organic), Reducing Meat Consumption, Local Food, Low Fat, Avoiding Food Waste, Animal Health and Seasonal Foods. The 34 items in the scale were evaluated with the Likert-type scale, and participants were expected to mark each item as never, very rarely, rarely, sometimes, often, very often or always. Evaluation was established as Never = 1 and Always = 7 points.

Statistical analysis

Survey method was used as a data collection tool. The data obtained in the study were analyzed using the SPSS (Statistical Package for Social Sciences) 20.0 program. Study data in conformity with the normal distribution of variables. While evaluating, descriptive statistics such as mean (\bar{X}), standard deviation (\pm SD), number (n) and percentage (%) values were calculated. A Chi-Square Test was used in two independent group comparison analysis when normal distribution condition is not met for numerical variables. In comparing the means of two independent groups; Student's t test was used when the data is normally distributed and Mann-Whitney U test was used when it is not normally distributed. Statistical significance level was accepted as p value less than 0.05.

Results

This study was carried out with 204 individuals aged between 19-40 years with a mean of 21.6 ± 2.05 years. Twenty-one (10.3%) of the individuals were male and 183 (89.7%) were female. 75% of the individuals live with their families, 8.8% in the dormitory, 5.9% with their friends and 10.3% live alone. Distribution of individuals according to their major field of study shows that 47.5% of the participants were studying in Nutrition and Dietetics, 29.9% in Physiotherapy and Rehabilitation, 16.2% in Nursing and

Table 1. Distribution of Demographic Characteristics and Eating-Out Habits of Individuals.

Demographic characteristics	N	%
Gender		
Female	183	89.7
Male	21	10.3
Household type		
Family	153	75.0
Dormitory	18	8.8
Friend	12	5.9
Alone	21	10.3
Major field of study		
Nutrition and dietetics	97	47.5
Physical therapy and rehabilitation	61	29.9
Nursing	33	16.2
Healthcare management	13	6.4
Eating-out frequency	58	28.5
1 time a day		
3-4 times a week	69	33.9
1-2 times a week	62	30.4
2 times a month	10	4.9
1 time a month	3	1.4
Never	23	0.9

6.4% in Health Management. The 28.5% of the individuals were eating-out every day and 0.9% of them have no eating-out habits (Table 1).

The mean and standard deviation values for anthropometric measurements by major field of study were shown in Table 2. The mean height of individuals studying in the nutrition and dietetics department were determined as; 176 ± 3.39 and 164.8 ± 5.55 cm, body weight as 78.2 ± 5.9 and 55.3 ± 6.89 kg, and BMI as 25.2 ± 1.38 and 20.3 ± 2.26 kg/m², respectively for male and female. The mean height of individuals studying in other departments, was determined as 181.7 ± 6.59 and 164.9 ± 6.74 cm, mean body weight as 77.9 ± 9.26 and 58.2 ± 8.64 kg, and mean BMI as 23.6 ± 3.05 kg/m² and 21.4 ± 3.45 kg/m², respectively for male and female. The difference in BMI values was statistically significant between female groups ($p < 0.05$).

According to BMI classification, underweight and obesity were more frequent among individuals studying in other programs (Table 2).

Table 3 shows the distribution of Mean Adequacy Ratio (MAR) values by major field of study of individuals. MAR of 20.8% of the individuals studying the Nutrition and Dietetics and 19.4% of the individuals studying other major fields of study were evaluated as 'inadequate'; 34.4% of individuals studying in the Nutrition and Dietetics, 24.2% of those studying in other major fields of study were evaluated

Table 2. The Mean and Standard Deviation Values for Anthropometric Measurements by Major Field of Study.

	Nutrition and Dietetics Program (n:97)		Other Programs (n:107)		p ¹	p ²
	Male (n:5)	Female (n:92)	Male (n: 16)	Female (n:91)		
	$\bar{X} \pm$ SD	$\bar{X} \pm$ SD	$\bar{X} \pm$ SD	$\bar{X} \pm$ SD		
Height (cm)	176 ± 3.39	164.8 ± 5.55	181.7 ± 6.59	164.9 ± 6.74	0.260	0.023*
Body weight (kg)	78.2 ± 5.9	55.3 ± 6.89	77.9 ± 9.26	58.2 ± 8.64	0.069	0.461
BMI (kg/m ²)	25.2 ± 1.38	20.2 ± 2.79	23.6 ± 3.05	21.5 ± 3.46	0.161	0.040*
BMI classification	n(%)	n(%)	n(%)	n(%)		p³
<18.5, underweight	-	18(19.6)	2(12.5)	17(18.7)		0.078
18.5-24.9, normal	3(60.0)	72(78.3)	7(43.8)	67(73.6)		
\geq 25.0, obese	2(40.0)	2(2.2)	7(43.8)	7(7.7)		

* $p < 0.05$. p¹: The difference between male individuals in 2 groups. p²: The difference between female individuals in 2 groups. p³: Chi-square.

Table 3. Distribution of Mean Adequacy Ratio (MAR) Values of Individuals According to the Programs They Have Education.

MAR Levels	Nutrition and Dietetic Program (n:96)		Other Programs (n:103)		Total (n:199)		p-value
	n	%	n	%	n	%	
Inadequate (0–50)	20	20.8	20	19.4	40	20.1	0.263
Need to be Improved (51–79)	33	34.4	25	24.2	58	29.2	
Well (80 and above)	43	44.8	58	56.4	106	50.7	

as ‘need to be improved’ and 44.8% of individuals studying Nutrition and Dietetics and 56.4% of individuals studying other major fields of study as ‘good’. According to the distribution of MAR levels, the difference between individuals studying Nutrition and Dietetics and other major fields of study was not statistically significant ($p > 0.05$).

Factor average scores of individuals studying in the Nutrition and Dietetics program were determined as, 5.06 ± 1.48 and 4.83 ± 0.76 for healthy and balanced diet, 4.32 ± 2.16 and 3.73 ± 1.11 for quality marks (local and organic), 3.4 ± 2.08 and 2.84 ± 1.11 for reduction of meat consumption, 4.26 ± 2.03 and 2.63 ± 1.14 for local food, 4.93 ± 1.96 and 4.17 ± 0.94 for low fat, 5.13 ± 1.21 and 4.57 ± 1.01 for avoiding food waste, 4.66 ± 1.54 and 3.46 ± 1.4 for animal health and 5.13 ± 1.19 and 4.62 ± 0.98 for seasonal foods were, respectively for male and female.

Factor average scores of individuals studying in other major fields of study than Nutrition and Dietetics were determined as, 4.23 ± 1.16 and 4.29 ± 0.92 for healthy and balanced diet, 4.08 ± 1.56 and 3.84 ± 1.09 for quality marks (local and organic), 2.42 ± 0.97 and 3.03 ± 1.28 for reduction of meat consumption, 2.39 ± 1.03 and 3.05 ± 1.24 for local food, 3.41 ± 1.49 and 3.98 ± 1.38 for low fat, was 4.87 ± 1.23 and 4.47 ± 1.12 for avoiding food waste, 3.79 ± 1.13 and 3.37 ± 1.23 for animal health and 3.75 ± 1.16 and 4.09 ± 1.19 for seasonal foods, respectively for male and female.

Table 4. Mean Value of Individuals’ Sustainable and Healthy Eating Scale Attitudes by Major Field of Study.

	Nutrition and Dietetic Program (n:96)		Other Programs (n:103)		p ¹	p ²
	Male	Female	Male	Female		
	$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$		
Healthy and balanced nutrition	5.06 ± 1.48	4.83 ± 0.76	4.23 ± 1.16	4.29 ± 0.92	0.808	0.088
Quality marks (local and organic)	4.32 ± 2.16	3.73 ± 1.11	4.08 ± 1.56	3.84 ± 1.09	0.718	0.941
Reducing meat consumption	3.4 ± 2.08	2.84 ± 1.11	2.42 ± 0.97	3.03 ± 1.28	0.120	0.098
Local food	4.26 ± 2.03	2.63 ± 1.14	2.39 ± 1.03	3.05 ± 1.24	0.063	0.349
Low fat	4.93 ± 1.96	4.17 ± 0.94	3.41 ± 1.49	3.98 ± 1.38	0.293	0.001*
Avoiding food waste	5.13 ± 1.21	4.57 ± 1.01	4.87 ± 1.23	4.47 ± 1.12	0.889	0.332
Animal health	4.66 ± 1.54	3.46 ± 1.4	3.79 ± 1.13	3.37 ± 1.23	0.842	0.223
Seasonal foods	5.13 ± 1.19	4.62 ± 0.98	3.75 ± 1.16	4.09 ± 1.29	0.828	0.013*

* $p < 0.05$. p¹: Difference between male individuals between the 2 groups; p²: Difference between female individuals between the 2 groups.

Table 5. The average scale of sustainable and healthy eating behaviors of individuals according to household type.

Scale	Family $\bar{X} \pm SD$	Dormitory $\bar{X} \pm SD$	Friends $\bar{X} \pm SD$	Alone $\bar{X} \pm SD$	p-value
Healthy and balanced nutrition	4.5 ± 0.94	4.6 ± 1.05	4.2 ± 0.74	5.0 ± 0.61	0.075
Quality marks (local and organic)	3.7 ± 1.16	3.7 ± 1.24	3.7 ± 1.00	4.1 ± 1.26	0.551
Reducing meat consumption	2.8 ± 1.19	2.5 ± 1.02	3.5 ± 1.29	2.8 ± 1.39	0.196
Local food	2.8 ± 1.19	2.8 ± 1.49	2.4 ± 1.16	3.0 ± 1.38	0.595
Low fat	4.0 ± 1.22	3.8 ± 1.34	3.8 ± 0.90	4.4 ± 1.40	0.445
Avoiding food waste	4.5 ± 1.11	4.4 ± 1.10	4.5 ± 0.91	4.5 ± 1.02	0.955
Animal health	3.4 ± 1.29	3.3 ± 1.42	3.2 ± 1.36	3.7 ± 1.52	0.758
Seasonal foods	4.4 ± 1.11	3.6 ± 1.31	4.0 ± 1.77	4.3 ± 1.06	0.048*

* $p < 0.05$.

According to the major field of study, the factor average scores of low fat and seasonal foods showed differences between sexes and this difference was statistically significant ($p < 0.05$) (Table 4).

Table 5 presents the mean scale of sustainable and healthy eating behaviors of individuals according to their household types.

The mean score for healthy and balanced nutrition factor was 4.5 ± 0.94 and the mean score for the factor of avoiding food waste was 4.5 ± 1.11 for those living with their family. The mean scores for healthy and balanced nutrition factors were as follows; 4.6 ± 1.05 for those living in a dormitory, 5.0 ± 0.61 for those living alone. The mean score for the factor of avoiding food waste was 4.5 ± 0.91 for those living with friends.

The consumption of seasonal foods belonging to the sustainable and healthy eating behaviors scale differs according to the showed differences between household types, and this difference was statistically significant ($p < 0.05$). No statistically significant difference was found between household types for healthy and balanced nutrition, quality marks (local and organic), reduction of meat consumption, local food, low fat, avoiding food waste and animal health attitudes, which belong to the scale of sustainable and healthy eating behaviors ($p > 0.05$).

Discussion

Nutrition education aims to improve the nutritional status in issues by developing adequate and balanced food consumption habits such as preventing foods from becoming unhealthy by eliminating improper nutrition practices, and using food resources more effectively and economically (17). In this respect, this study investigated the effect of nutrition

education on attitudes of sustainable and healthy eating behaviors, including individuals studying Nutrition and Dietetics in the 3rd and 4th grades who received nutrition education as well as individuals studying in other major fields of study at the faculty of health sciences and did not receive nutrition education.

Özenoğlu et al. (18) determined, in their study with 421 students studying at the Faculty of Health Sciences, that the gender and the major field of study were effective factors on the BMI. In this study, the average BMI values were higher in males and lower in females studying in the Nutrition and Dietetics department than the individuals studying in other major fields of study.

In another study, the general nutritional habits and nutritional knowledge levels of young people before and after nutrition education were investigated. Examining the BMI classifications of male and female student after the nutrition education, a decrease in the BMI of female students was observed due to the decrease in daily energy intake and highly meal skipping, yet it was not statistically significant ($p > 0.05$). In the same study, a decrease in the ratio of overweight male students was observed and this decrease was statistically significant ($p < 0.05$) (19). In this study, according to BMI classification, the individuals studying in Nutrition and Dietetics program were less likely to be underweight and obese in both gender.

Several studies have been stated that the development of individuals in the cultural, economic and educational fields is not in direct proportion to the diet quality. The reason for this is that the frequency of out-of-home food consumption of people with a high level of education is higher and this results in an increase in the ready to eat and unhealthy food consumption, and thus higher fat, sugar and sodium intake (20–23). In this study it was found that almost one of every three individual had an eating-out habit.

In this study, MAR levels were used to evaluate the diet quality of individuals. Comparison of MAR levels between students studying Nutrition and Dietetics and those studying major fields of study showed no statistically significant difference ($p > 0.05$). In another study, similar results were shown that no statistically significant difference was found in the MAR scores between people with different education levels (8).

Sustainable and healthy eating is a multifaceted concept. It includes avoiding food waste, consuming or paying attention to shop locally and seasonally and consuming local and seasonal foods. Along with these factors, animal welfare, healthy and balanced diet, consumption of low-fat foods and reduction of meat consumption are also healthy-eating related matters within the scope of sustainable and healthy nutrition. Regional and organic certificates and the use of quality labels are also claimed to be important in evaluating sustainable and healthy eating behaviors (16). In this study, sustainable and healthy eating attitudes of individuals were evaluated.

‘Sustainable and Healthy Nutrition Scale’; the statements of avoidance of sugar-sweetened beverages, limiting salt consumption, preference of the foods which are additive-free, natural, nutrient-dense high in vitamins and minerals in “The Healthy and Balanced Nutrition” factors were higher in individuals studying Nutrition and Dietetics than others.

Ünal (24), also determined in his study that 76.6% of dietitians stated that it is necessary to avoid sugar, fat and salt consumption for sustainable nutrition. Also in the same study it is stated that this situation is important in terms of sustainability by effectively reducing the burden of chronic diseases such as obesity, which may arise in relation to nutrition, and the economic burden due to diseases. In this study, the fact that the factor having a higher average score for the individuals studying in the Nutrition and Dietetics program is a healthy and balanced diet shows that the nutrition education has an effect on the nutrition attitudes of the individuals. In a study, it was determined that knowledge is important in the perception of environmental awareness and inclusion in the applicability of sustainable nutrition. The majority of the participants in the study stated that there is a need for more information about sustainable nutrition (25).

In another study conducted with nutrition and dietetics students in Australia, it was determined that nutrition and dietetics students recognized the importance of sustainability and incorporated knowledge into their advocacy and interest behaviors (26).

In this study, the mean score of the ‘Avoiding Food Waste’ factor was higher for both females and males studying Nutrition and Dietetics compared to others. The factor with the highest score among all participants was found to be “Avoiding Food Waste” in male studying in the Nutrition and Dietetics program.

Similarly, Zakowska-Biemans et al. (16) determined the highest mean score for the ‘Avoiding Food Waste’ factor in their study.

Food Sustainability Index scores for 67 countries, including Turkey, have been published in 2018 by Barilla Food and Nutrition Center. In the Food Sustainability Index, the evaluation was carried out as the rate of food loss over the total of the products produced in the country. Sustainability has been evaluated in this index under 3 main headings as Food Loss and Waste, Sustainable Agriculture and Nutritional Challenges. A higher score means that a country is on the right path toward a sustainable food and nutrition system. According to rankings Turkey is in the “Low Category” with the overall score of 60.1 (27). On the other hand, according to Sustainable Development Report 2021 (28) Turkey ranks 70 th out of 165 countries with 70.4 SDG (Sustainable Development Goals) index score which requires success in realizing six major transformations: quality education, access to good quality and affordable health care, renewable energy and a circular economy, sustainable land and marine management, sustainable urban infrastructure and universal access to digital services.

Erdogan et al. (15) stated that in Turkey last consumer-level attention toward food waste is low and developments of policies against food waste is needed. In this study, 3 statements which are the daily fruit and vegetable consumption, the seasonal consumption of fruits and vegetables, and the seasonal shopping from the market were questioned, under the title of ‘Seasonal Food’ factor. The mean score of the individuals studying in Nutrition and Dietetics program was higher than the individuals studying other major fields and this difference was statistically significant ($p < 0.05$). This

result reflect that the individuals studying in Nutrition and Dietetics have the knowledge about the factor and the items related to the factor and adapted these factors to their daily lives in line, owing to their education.

Individuals' attitudes toward sustainable and healthy eating behaviors were evaluated according to their household type (who they live with) in this study. Healthy and balanced nutrition factor; Quality marks (local and organic) queried by 5 items: choosing foods which have geographical indication and traditional product certificate, checking the certificate and quality marks on the label when purchasing food, purchasing organic and local foods, choosing foods produced with environmentally friendly methods factor; local food factor; mean scores of low fat factor were higher in individuals living alone. It suggests that living alone and healthy eating and food choices in this direction are more applicable with awareness.

It has been stated by the Food and Agriculture Organization (FAO) that ever year approximately one third of the food produced for human consumption is wasted. It is important to reduce food waste to increase food safety and reduce the environmental footprint of food systems (29). Mean scores for the factor of avoiding food waste were 4.5 ± 1.11 for those living with their families, 4.4 ± 1.10 for those living with their families, 4.5 ± 0.91 for those living with friends and 4.5 ± 1.02 for those living alone. The average score for this factor was determined to be the highest among those living with their family. It has been determined that individuals living with their families have a higher tendency to avoid food waste. It is important to increase the knowledge of consumers about how to prepare and store food and vegetables (30), and this can be explained by the high food-waste avoidance tendency of individuals living with their families.

The mean scores for the seasonal foods factor were 4.4 ± 1.11 for those living with their family, 3.6 ± 1.31 for those living in a dormitory, 4 ± 1.77 for those living with friends, and 4.3 ± 1.06 for those living alone. The highest mean score was found respectively, in those living alone and those living with their families. It is observed that those who live alone or with their families tend to shop seasonal foods at the local food markets, consume fruits and vegetables in season, and pay attention to the fruit and vegetable portions they consume per day. The seasonal food factor average scores showed differences between the household types of individuals, and this difference was statistically significant ($p < 0.05$).

Implications for research and practice

Today, sustainable nutrition is becoming increasingly important. In addition to its health effects, the impacts of nutrition on the environment should not be ignored. In this regard, sustainable and healthy eating behaviors are important in order to leave a livable world to future generations.

Nutrition education is important for both healthy and balanced nutrition of individuals and its contribution toward sustainable nutritional resources for the environment. In our

study, it was determined that nutrition education has effects on healthy and balanced nutrition and sustainable nutrition, and approaches should be taken considering the necessity of giving more importance to nutrition education and adapting this education received to the lives of individuals.

Disclosure statement

No potential conflict of interest was reported by the authors.

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