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Orignal article

Nutrition literacy, dietary habits and food label use among Turkish adolescents

Gülay Yilmazel[1], *Serpil Bozdoğan*[2]

[1]Hitit University Faculty of Medicine, Department of Public Health, Çorum/TURKEY; [2]Hitit University Health Sciences Institution, Çorum/TURKEY

Summary. *Objective:* The aim of this study is to determine the nutrition literacy, dietary habits and food label use among Turkish adolescents. *Material and Methods:* This cross-sectional study was conducted in Çorum city between March and May 2019 with adolescents (n = 307). The data were collected with a questionnaire consisting of 51 items. In the first phase of the questionnaire, adolescents' socio-demographic characteristics, dietary habits, health behaviors (physical activity, smoking) and food label use were questioned. In the second phase adolescent nutrition literacy scale was used to measure nutrition literacy. Data were analyzed by using SPSS 17.0 program. In analysis percentage, average, independent t test and One-Way Anova (Post-hoc Tukey) test. P <0.05 value was considered statistically significant. *Results:* In this study, adolescents received 70,31±8,66 score out of the total score of 110. It was determined that nutrition literacy was influenced by socio-demographic characteristics and health behaviors of adolescents. This effect was found to be significant in terms of age, gender, education level of the mother, regular sports and BMI (p<0.05). Only one third of students consumed daily water adequately (≥8 glass) and when the daily water consumption increased, nutrition literacy increased (p<0.05). Fast food consumption had a significant effect on nutrition literacy (p<0.05). Nutrition literacy was higher among mostly food label users (p<0.05). Nutrition literacy was found to be significantly higher among the utilizers health care workers as a nutrition source (p<0.05). *Conclusion:* In our study, nutrition literacy was moderate among adolescents. The use of the food label was not at the desired level. The dietary habits and food label use of had a significant effect on nutrition literacy. Extension of epidemiological studies, public health efforts with the school health programs in cooperation with the multi-sectorial could be an important keystone in increasing nutrition literacy in adolescence.

Key Words: Nutrition; literacy; dietary habits; food labelling**;** adolescents

Introduction

Health literacy is an empowerment approach in mobilizing health information (1). Health literacy (HL) is generally defined as the knowledge, motivation and competencies that enable a person to define, evaluate and implement health information to make health decisions(2). Inadequate health literacy is associated with poor management of chronic problems including cardiovascular diseases (3,4), asthma (5,6), diabetes (7,8) and increased morbidity and mortality (9,10).

Health literacy is an important gateway in demonstrating healthy nutrition practices. Optimum nutrition contributes to the development of general welfare and hence increase the quality of life (11). Good nutrition is also associated with better management of disease management (12). Poor health literacy is an obstacle for individuals to understand and interpret nutritional information (13). Overcoming this obstacle is possible through nutrition literacy. Nutrition literacy is the ability to provide, understand and process nutrition information to make appropriate nutrition decisions (14).

Adolescence offers opportunity window to ensure successful transition to adulthood. The nutritional status and eating behaviors acquired during this stage of life have important effects on the health and welfare of the adolescent as well as the intergenerational health outcomes (15).

Promoting healthy eating behaviors in adolescents is important for correct growth and development, prevention of disease, prevention of overweight and obesity and creation of healthy eating patterns that can be maintained in adulthood (16).

Although studies on nutrition literacy in adolescents are limited in our country, no studies have been found on the nutrition literacy, dietary habits and food label use.

The aim of this study is to determine the nutrition literacy, dietary habits and food label use among Turkish adolescents.

Materials and Methods

This cross-sectional study was conducted in Çorum city between March and May 2019. The population of the study was composed of adolescents from a high school with a health-intensive curriculum (n = 307). Study sample was consisted with 307 adolescents willing to participate in the study. All participants were reached.

The data were collected with a questionnaire consisting of 51 items. In the first phase of the questionnaire, adolescents' socio-demographic characteristics, dietary habits, health behaviors (physical activity, smoking) and food label use were questioned.

Dietary habits and health behaviors of the adolescents were evaluated according to their statements. Dietary habits included number of daily meals, meal skipping, daily water consumption, the most consumed type of drink during the school time, the frequency of fast food consumption, the amount of salt in meals, the addition of salt to the food, and the consumption of snacks while watching television.

The decisive question for food label use was that "how often do you use the food labels when you buy any food? Responses were distributed as "mostly, sometimes, rarely, never.

Participants who use the food labels were asked "how often do you give attention the food labels?" contents which include the brand name, fee, expiry date, production date, serving amount, barcode number, nutrition content, manufacturer counrty, storage conditions, ministry license, attractiveness and readability of label.

In the second phase of the questionnaire, adolescent nutrition literacy scale was used to measure the level of nutrition literacy.

Adolescent Nutrition Literacy Scale

The scale was developed by Bari which consists of 22 items and three sub-dimensions (functional, interactive and critical nutrition literacy) (17).

Each item in the scale has a five-point in Likert type that can score between 1 and 5 (1 = I disagree, 2 = I disagree, 3 = Undecided, 4 = Agree, 5 = Totally Agree) (17). The scale was adapted to Turkish version by Turkmen et al. The minimum score was 22 and the maximum score was 110 (18).
Sub-dimensions;

Functional Nutrition Literacy
This refers to the ability to apply basic literacy skills related to nutrition (19). There are seven questions in this section and the questions in this section are coded in reverse. The minimum score for this subscale is 7 and the maximum score is 35.

Interactive Nutrition Literacy:
It includes the cognitive and interpersonal communication skills necessary to receive nutritional information and to communicate properly with nutrition counselors (19). This sub-dimension consists of 6 questions. This sub-dimension contains no reverse-coded substances. The minimum score is 6 and the maximum score is 30.

Critical Nutrition Literacy
It should cover the skills of critical assessment along with increased awareness and critical / emancipatory action to address barriers to good nutrition (20).

There are nine questions in this sub-dimension, three of which are coded (18, 19, 21). The minimum score that can be taken from the lower dimension is 9 and the maximum score is 45.

The data of the study were analyzed by using SPSS 17.0 program. In analysis percentage, average, independent t test and One-Way Anova (Post-hoc Tukey) test. P<0.05 was considered statistically significant.

The study was planned in accordance with the principles of Helsinki and was approved by Hitit University Non-Interventional Clinical Research Ethics Committee (2019/181).

Results

Of the study group 56,4% were between the 17-19 years and 64,8% were girls. The mean age was 16,55±1,23 years. Educational level was in primary and lower level among mothers (59,6%) and fathers (38,8%) of the adolescents. The rate of adolescents with moderate/bad economic status and general health perception was 65,1% and 37,1% respectively.

The average score of the adolescents in the total was 70,31±8,66. The lowest scores belonged to interactive nutrition literacy and the highest scores belonged to critical nutrition literacy sub-dimension.

Nutrition literacy according to some socio-demographic characteristics among adolescents was given in Table 1.

Nutrition literacy was significantly higher among girls, adolescents in the age group of 17-19 years, adolescents with higher educated mothers, with physically active regularly and in those with normal BMI (p<0,05). The education level of the father, perception of economic status and smoking status were not found to be effective on nutrition literacy (p>0,05).

Nutrition literacy according to the daily water consumption and nutrition habits among adolescents was given in Table 3.

In study group, 29,3% of the adolescents consumed water more than eight glass a day and nutrition literacy among these adolescents was significantly higher (p<0,05). 45.3% of the adolescents stated that they consumed carbonated beverages while they were in school, and these adolescents had significantly lower nutrition literacy (p<0,05). Only 3.4% of the adolescents stated that they did not consume fast food and these adolescents had higher nutrition literacy (p<0,05). Nutrition literacy did not differ significantly according to adolescents skipping meal, food salinity status, salt addition to foods and the frequency of eating salty snacks when watching television (p>0,05).

Of the adolescents 34,1% stated that they mostly used the food label when buying food and nutrition literacy was significantly higher in these adolescents (p<0,05). Approximately, one-fourth of those often paid attention to the production date, nutrition content, manifacturer county, storage conditions, ministry license, attractiveness

Table 1. Nutrition literacy according to some socio-demographic characteristics among adolescents

Characteristics (n=307)	No. (%)	X±SD	p
Age groups			
14-16 years	134 (43,6)	68,45±8,52	**0,001***
17-19 years	173 (56,4)	71,76±8,53	
Gender			
Male	109 (35,5)	67,56±8,99	**0,000***
Female	198 (64,5)	71,83±8,12	
Education level of mothers			
≤Primary	183 (59,6)	70,05±8,31[a]	**0,012****
Secondary	76 (24,8)	68,91±9,01[a]	
≥High school	48 (15,6)	73,52±8,85[b]	
Education level of mothers (n=305)*			
≤Primary	119 (39,0)	70,04±8,10	0,296**
Secondary	70 (23,0)	69,31±8,01	
≥High school	116 (38,0)	71,27±9,59	
Perception of economic status			
Good	107 (34,9)	71,48±8,59	0,085*
Moderate/bad	200 (65,1)	69,69±8,66	
Regular physical activity			
Yes	73 (23,8)	73,01± 9,87	**0,006***
No	234 (76,2)	69,47±8,10	
Smoking status			
Never smoked/Quit	225 (73,3)	70,42±8.44	0,726*
Current smoker	82 (26,7)	70,02±9,30	
BMI			
Weak	57 (18,6)	68,53±9,42[b]	**0,044**
Normal	217 (70,7)	71,11±8,69[a]	
Overweight /obese	33 (10,7)	68,18±6,20[b]	
Total	**307 (100.0)**	**70,31±8,66**	

a, b: The difference between groups is significant); *Independent t test; **One-Way Anova (Post-hoc Tukey)

Table 2. Nutrition literacy according to the daily water consumption and dietary habits among adolescents

Features (n=307)	No. (%)	X±SD	p
Daily water consumption			
≤3 glass	119 (38,8)	68,97±8,25[a]	**0,041****
5-7 glass	98 (31,9)	70,35±8,59 [a,b]	
≥8 glass	90 (29,3)	72,03±9,05[b]	
Consumption of carbonated beverages at school			
Yes	139 (45,3)	69,22±8,14	**0,045***
No	168 (54,7)	71,21±9.00	
Skipping meal			
<3 meal	175 (57,0)	70.16±9,02	0.771*
3 meal	132 (43,0)	70.51±8,20	
Freuency of fast-food consumption			
Every day	88 (28,6)	69,73±8,13	**0,032****
Twice a week	118 (38,4)	71,96±8,30	
Once a month	91 (29,6)	68,56±9,12	
Never	10 (3,4)	72,00±10,71	
Consumption of foods with salt			
Very salty	60 (19,5)	71,55±9.98	0.218*
Low salty/salt-free	247 (80,5)	70.01±8.31	
Adding salt to food			
Yes	245 (79,8)	70,25±8,50	0,798*
No	62 (20,2)	70,56±9,37	
Eating salted snacks in while watching television			
Mostly	180 (58,6)	70,35±8,23	0,929*
Sometimes	127 (41,4)	70,26±9,28	

a, b: The difference between groups is significant; *Independent t test; **One-Way Anova (Post-hoc Tukey)

and readability of the label and these students had significantly higher nutrition literacy (p<0,05).

The rate of those who had access to nutrition information via health workers was 15% and nutrition literacy was significantly higher in this group (p<0,05).

Discussion

The burden of nutrition-related non-communicable diseases is growing in low- and middle-income countries (21). This epidemiological transition is associated with the simultaneous nutrition transition. Due to rapid urbanization and technological factors, there is a dramatic transformation in food consumption pat-

Table 3. Nutrition literacy according to food label use and food label contents among adolescents

Frequency of food label use (n=307)	n (%)	X±SD	p*
Mostly	106 (34,5)	72,81±9,41[b]	**0,001**
Sometimes	103 (33,5)	69,34±7,67[a]	
Rarely/never	98 (32,0)	68,63±8,27[a]	
Attention to label contents (n=287)*			
Brand name			
Mostly	222 (77,4)	71,08±8,94	0,222
Sometimes	43 (15,0)	70,12±6,50	
Rarely/never	22 (7,6)	67,86±8,69	
Fee			
Mostly	249 (86,8)	70,79±8,42	0,558
Sometimes	25 (8,7)	69,12±10,02	
Rarely/never	13 (4,5)	71,77±9,85	
Expiration date			
Mostly	142 (49,5)	69,57±8,41	0,070
Sometimes	87 (30,3)	69,51±7,54	
Rarely/never	58 (20,2)	68,37±8,44	
Production date			
Mostly	74 (25,8)	72,84±10,00[b]	**0,040**
Sometimes	77 (26,8)	70,31±8,20 [a,b]	
Rarely/never	136 (47,4)	69,74±7,86[a]	
Serving amount			
Mostly	73 (25,4)	71,49±9,39	0,092
Sometimes	70 (24,4)	72,09±8,60	
Rarely/never	144 (50,2)	69,60±8,12	
Barcode number			
Mostly	12 (4,2)	71,33±12,08	0,958
Sometimes	15 (5,2)	70,93±6,98	
Rarely/never	260 (90,6)	70,65±8,55	
Nutrition content			
Mostly	49 (17,1)	73,78±9,43[b]	**0,000**
Sometimes	66 (23,0)	72,68±6,37[b]	
Rarely/never	172(59,9)	69,05±8,76[a]	
Manufacturer country			
Mostly	47 (16,4)	73,21±8,55[b]	**0,021**
Sometimes	55 (19,2)	71,91±8,40[a,b]	
Rarely/never	185 (64,4)	69,69±8,56[a]	
Storage conditions			
Mostly	52 (18,1)	73,85±9,49[b]	**0,006**
Sometimes	71 (24,7)	71,05±7,98[a,b]	
Rarely/never	164 (57,1)	69,53±8,37[a]	

Table 3. Nutrition literacy according to food label use and food label contents among adolescents

Frequency of food label use (n=307)	n (%)	X±SD	p*
Ministry licence			
Mostly	26 (9,1)	73,81±7,74[b]	**0,035**
Sometimes	30 (10,5)	72,90±8,84[b]	
Rarely/never	231 (80,4)	70,05±8,59[a]	
Attractiveness of the label			
Mostly	72 (25,1)	72,94±8,27[b]	**0,021**
Sometimes	85 (29,6)	70,69±8,41[a,b]	
Rarely/never	130 (45,3)	69,44±8,74[a]	
Readability of the label			
Mostly	73 (25,4)	73,21±8,90[b]	**0,007**
Sometimes	76 (26,5)	70,77±7,26[a,b]	
Rarely/never	138 (48,1)	69,31±8,90[a]	

a, b: The difference between groups is significant. *One-Way Anova (Post-hoc Tukey)

terns around the world. Global nutrition shows a large change in the trend of processed foods, with high proportion of refined carbohydrates and sugar away from cereals, whole grains and vegetables (22).

This study emphasizes the effect of nutrition literacy on the use of food labels and dietary habits in adolescents. No previous study has investigated this three concept in our country.

In this study, adolescents received 70,31±8,66 points out of the total score of 110, and the level of nutrition literacy was found to be moderate (Table 1). The result of our study was found to be higher than the nutrition literacy level of Iranian adolescents (23). The adolescents were found to have the lowest level of interactive nutrition literacy and the highest level of critical nutrition literacy. This is explained by the fact that adolescents may have moderate cognitive ability and interpersonal skills needed to manage nutrition problems jointly with professionals (1, 24).

It was determined that nutrition literacy was influenced by socio-demographic characteristics and health behaviors of adolescents. This effect was found to be significant in terms of age, gender, education level of the mother, regular activity and BMI (Table 1). The impact of socio-demographic characteristics on nutrition literacy can be explained by health literacy. As a matter of fact, age, gender, education status and social status are important factors in health literacy level of individuals (25, 26).

Differences in nutrition literacy between age groups in adolescents can be addressed in terms of increased health literacy levels with growing. There is evidence that health literacy decreases with advancing age. On the other hand, it is stated that adolescents and young adults have a higher level of health literacy than the elderly (27, 28). This decrease is associated with decreased cognitive function and the emergence of probable health problems in older age groups (26,29,30=).

Although there are no clear mechanisms for how gender differences affect nutrition literacy (31), in this study higher level of nutrition literacy among females can be explain with traditional gender-specific social roles in our country.

There was no study examining the effect of parental education especially mothers education on nutrition literacy among adolescents, However, the basis of healthy eating habits is formed in childhood, especially in adolescents. Mothers play the most effective role in this regard (32). This result suggests that highly educated mothers may have more health literate and nutritional awareness.

In our country, the main challenge faced by national researchers is the lack of physical activity in all age groups and sedentary lifestyle is serious level. In children and adolescents, time spending on the screen is an important factor that limits physical activity. According to Turkey Nutrition and Health Survey 2010, individuals in the 12-18 age group averege time spending on television and computer was 3,9 hours on weekdays and 4,1 hours at the end of the week. 33,34 In line with the results of the studies conducted in our country, the majority of adolescents (76,3%) did not perform regular physical activity in this study. It is recommended that adolescents carry out moderate and severe physical activity for at least 60 minutes daily to prevent health problems due to immobility (35) and not being exposed to the screen for more than 2 hours per day (36). The level of physical activity may affect the level of individual nutrition literacy. In a study, it was observed that the adolescents who were physically active moderately had more positive nutrition behaviors and thus a positive development in the eating hab-

its along with the increase in physical activity (19).

In our study, daily water consumption was eight glass and over in only one third of the adolescents. As the daily consumption of water increased, the level of nutrition literacy increased (p<0,05). (Table 2). Important amount of daily liquid need (8-10 glass) should be met only from drinking water (34) Daily drinking water consumption of adolescents was insufficient. This result is likely to be related the high rate of (45,3%) consuming carbonated beverages during the period of schooling.

A minority of adolescents (3,4%) didn't consumed fast food and the frequency of fast food consumption had a significant effect on nutrition literacy (p<0,05) (Table 2). High-risk behaviors, such as unhealthy nutrition and physical inactivity, are increasing in the countries where nutrition transition takes place, leading to an increased prevalence of overweight and obesity in adolescence (37).

Nutrition information has a direct effect on food preference. The use of a food label is an important way of providing this information (38). In our country, it was found that half of the young individuals (14-24 years) (39) and nearly half of the individuals in the general population (40) weren't use food labels. On the other hand, only a small number of Europian (16,8%) living six European countries (United Kingdom, Sweden, France, Germany, Poland and Hungary) were food label users (41). In this study, it was an unexpected finding that food label use at a higher rate than the studies conducted in our country and European countries. However, the frequency of attention to the content of the food label was very low. Nutrition literacy increased when the frequency of attention on contents of the food label increased (p<0,05) (Table 3). The use of a food label can serve as a mediator between nutrition behavior and nutrition literacy. Within the scope of school health services, awareness should be created with educational programs for the use of food label in selecting healthy food for adolescents.

Nutrition literacy was found to be significantly higher among the beneficiaries of health care personnel, although the percentage of those who utilized from media access was higher (p <0,05). Such a result may be related to the education programmes of adolescents which consists practices in hospital clinics during their education. Differently from this study, a study conducted in adults in the Lower Missisipi Delta revealed that the frequency of use of media sources affect nutrition literacy (42).

Conclusions

In this study, the level of nutrition literacy was moderate among adolescents. The use of the food label was not at the desired level. The nutrition habits and food label use of adolescents had a significant effect on nutrition literacy. Extension of epidemiological studies, public health efforts with the school health programs in cooperation with the multi-sectorial could be an important keystone in increasing nutrition literacy in adolescence.

Conflicts of Interest: The authors declare no conflict of interest.

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Correspondence:
Gülay Yilmazel
Hitit University Faculty of Medicine, Department of Public Health, Çorum/TURKEY
Phone:90 364 223 07 30
Email:dryilmazelgul@gmail.com