

NUTRITION LITERACY STATUS OF ADULTS RESIDING IN SIVAS PROVINCE AND ITS RELATIONSHIP WITH QUALITY OF LIFE : A CROSS-SECTIONAL STUDY FROM TURKEY



Research Article

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Keywords

Nutrition literacy, quality of life, adults

Abstract

Introduction: This cross-sectional study was performed to investigate nutrition literacy of adults living in the city center of Sivas and the relationship between nutrition literacy and quality of life.

Material and Methods: The study sample consisted of 384 people. Of the people residing in the houses located in 63 neighborhoods in the city center, those who met the inclusion criteria were included in the study. The houses were selected using the simple random sampling method. The participation rate was 95.5%. Data were collected with the Personal Information Form, Evaluation Instrument of Nutrition Literacy on Adults (EINLA), and the World Health Organization Quality of Life Scale (WHOQOL-BREF-TR). To analyze the data, in addition to descriptive statistical methods (number, percentages, means etc.), Chi-square, Pearson correlation analysis, the test for the significance of the difference between two means, one-way analysis of variance and Kruskal Wallis test were used. The error rate was $p < 0.05$.

Results: Nutrition literacy levels of 79.8% of the participants were determined to be adequate. However, when the sub-scales were analyzed, it was determined that 33.5% of the participants' knowledge on general nutrition was inadequate, 20.2% had difficulty understanding and interpreting what they read, 12.8% were not knowledgeable enough about food groups, 88.2% lacked knowledge about the daily serving sizes and 90.3% lacked knowledge on numerical literacy or reading food labels. A significant correlation was determined between the mean nutrition literacy scores and variables such as gender, education and profession ($p < 0.05$). A positive, significant but weak correlation was found between the mean nutrition literacy scores and the mean scores for the physical, psychological and social domains of quality of life ($p < 0.05$).

Conclusion: In the city center of Sivas, nutrition literacy rate of the adult population was 79.8%. The mean scores the participants obtained specially from the daily serving sizes, food label reading and numerical literacy domains were inadequate. If they can obtain higher scores from those

domains, this will enhance their quality of life in physical, psychological and social domains.

Introduction

For a society to be healthy, individuals constituting the society should be healthy Aykut (2011) . Nutrition applications are closely associated with the growth and development of a person, protection and maintenance of the health, management of many diseases and therefore with the quality of life. Nutrition literacy is defined as the capacity of a person to obtain, understand, interpret and implement basic nutrition information so as to improve his/her health Carbone (2013) J. et al. (2009) Gibbs and Chapman-Novakofski (2012) Cimbaro (2008) . A society's low level of nutrition literacy may lead to problems in understanding, evaluating and implementing nutrition information and ultimately to an increase in nutrition-related diseases. Today, it is a well-known fact that eating habits play an important role in the development of health problems such as cardiovascular diseases, many cancers, obesity, hypertension, diabetes, allergic diseases, osteoporosis, anemia etc. Gibbs and Chapman-Novakofski (2012) Allen and Gillespie (2001) . Due to the deterioration of health caused by diseases, a person experiences lots of limitations in several dimensions of life such as hygiene, personal care, workplace, recreation, family and society, and thus his/her quality of life is impaired Allen and Gillespie (2001); Mollaoğlu (2007). Community nutrition aims to gain individuals and society healthy lifestyles such as healthy eating and physical activity habits, to protect and improve their health, to prevent unhealthy nutrition-related diseases from developing and to promote the quality of life Aykut (2011) . In order to achieve these goals, it is essential to determine the nutrition literacy status of community and the factors affecting it. This study was carried out to determine nutrition literacy of adults living

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in the city center of Sivas and the relationship between nutrition literacy and quality of life.

The study was conducted in the city of Sivas between February 2013 and March 2014. There are 63 neighborhoods in the city center of Sivas. After the screening of the documents in the Community Health Center, of the people living in Sivas city, those who were in the 18-64 age group were identified. There were 209 756 people in the 18-64 age group and they comprised the study population. In this study, the sample size was calculated as 384 using the following values: $\alpha = 0.05$, $p = 0.5$, $q = 0.5$ and $d = 0.05$. When deciding how many people to include in the study from each of the 63 neighborhoods in City of Sivas, we utilized Çınar's (1994) and Selvi's (2008) studies using the proportional selection method Çınar Z (1994); Selvi (2008). The participants were selected using the simple random sampling method. From each of the designated house, one person was assigned to the study. The participants were selected from those who were in the 18-64 age group, at least primary school graduates, and residing in the city of Sivas. They were also required to volunteer. When the designated houses were visited, 11 people were not at home and 6 refused to participate in the study. Thus, they were excluded from the study and the study was completed with 367 people. The participation rate was 95.5%. After the participants were informed about the study and their informed consents were obtained, the questionnaire was filled in through the face-to-face method. The participants were asked to carefully read the questions and then answer them. To analyze the data, in addition to descriptive statistical methods (number, percentages, means etc.), Chi-square, Pearson correlation analysis, the test for the significance of the difference between two means, one-way analysis of variance and Kruskal Wallis test were used.

Data Collection Tools

Data were collected with the Personal Information Form, Evaluation Instrument of Nutrition Literacy on Adults (EINLA), and the World Health Organization Quality of Life Scale (WHOQOL-BREF-TR).

Personal Information Form: The form developed by the researchers consists of 16 questions on socio-demographic characteristics, general nutrition and health status.

Evaluation Instrument of Nutrition Literacy on Adults (EINLA): The instrument was developed by Cesur, Koçoğlu and Sümer to determine the nutrition literacy status of adults 171 (2015).

As a result of factor analysis conducted to determine construct validity of the assessment tool, the tool was considered to be a 5-factor tool. The first section has questions on general nutrition knowledge, the second section on understanding and interpreting what is read, the third section on food groups, the fourth section on serving sizes, and the fifth section on ability to read food labels and to perform basic arithmetic operations. While one point is given to each correctly answered question, zero points are given to questions answered incorrectly or not answered. Upon the completion of the validity and reliability study, 3 items were removed from the original 38-item tool. Therefore, the final version of the tool included 35 items. Total scores between 0 and 11 points were rated as inadequate, between

12 and 23 points as borderline, and between 24 and 35 points as adequate nutrition literacy levels. Cronbach's alpha reliability coefficient for the assessment tool was 0.75. The mean item difficulty and discriminant indices were 0.552 and 0.730 respectively. The correlation coefficient was calculated as 0.85 using the test-retest method.

World Health Organization Quality of Life Scale (WHOQOL-BREF-TR):

The WHOQOL-BREF is the short form of the WHOQOL-100 developed by the World Health Organization. The scale aiming to determine the positive and negative aspects of quality of life can be administered to healthy or unhealthy non-elderly adults. The validity and reliability study of the Turkish version of the WHOQOL-BREF was conducted by Eser et al. (1999). The twenty-six-item Turkish version of the scale consists of 27 questions, and the 27th question is unique to Turkish population. The scale is composed of physical, mental, social and environmental domains. Two items are used to rate quality of life and general health. Since each domain refers to quality of life independently of other domains, the scores for each domain range from 4 to 20 points. The scale which questions the last two weeks is a 5-point Likert-type scale. As the scores obtained from the scale increase so does the quality of life 171 (1999).

Ethical aspects of the Study

In order to perform the study, written permission was obtained from the Clinical Research Ethics Committee of Cumhuriyet University (Ethics Committee Decision, dated and numbered 2013-03 / 01). To conduct the study in the city of Sivas, legal permission was obtained from the office of the governor. Then, the participants were informed about the study and their informed consents were obtained.

Results

The participants' mean age was 36.5 ± 12.4 years. Of them, 52.9% were male, 29.7% were primary school graduates, 13.4% were junior high school, 25.8% were senior high school, 31.1 were % university, 62.7% were married, 28.3% were housewives, 19.7% were self-employed, 12.0 % were worker, 11.7 % were government official, 28.3% were others (student, retiree), 81.7% had a nuclear family, and 62.9% had a monthly income ranging between \$400 and \$1250.

As seen in Table 1, most of the females are primary school graduates, while most of the males were college graduates, and the difference is statistically significant ($p < 0.05$). According to the gender-based occupational status of the participants, most of the women were housewives and unemployed, whereas most of the men were self-employed ($p < 0.05$).

* NCD: Non-Communicable Diseases

** The participants marked more than one option

Of the participants, 29.2% had a diagnosed disease (9.8% diabetes, 9.0% high blood pressure, 6.3% digestive system diseases), and while 28.6% were not knowledgeable about nutrition, 49.3% were partly knowledgeable, and 22.1% were adequately knowledgeable. The participants' information

Table 1. Table 1 Distribution of the participants' education status and professions by gender

	Gender		Test		
	Male n	Female %	n	%	
Education Status					
Primary school	37	19.1	72	41.6	X ² =23.2 p<0.001
Junior high school	31	16.0	18	10.4	
Senior high school	54	27.8	41	23.7	
University	72	37.1	42	24.3	
Profession					
Unemployed	1	0.5	103	59.6	X ² =161.9 p<0.001
Self-employed	58	29.9	14	8.1	
Worker	36	18.6	8	4.6	
Government official	30	15.5	13	7.5	
Others (student, retiree)	69	35.5	35	20.2	

Table 2. Distribution of the participants' nutrition-related characteristics (n=367)

Characteristics	n	%
Presence of diagnosed NCD*	Yes	107 29.2
	No	260 70.8
Diagnosed diseases**	Diabetes	36 9.8
	Hypertension	33 9.0
	Digestive system disorders	23 6.3
	Musculoskeletal problems	20 5.4
	Psychological problems	10 2.7
	Vitamin and mineral deficiencies	9 2.5
	musculoskeletal disorders	7 1.9
	Endocrine (Hormonal) diseases	1 0.3
Considering his/her nutrition as sufficient	Sufficient	81 22.1
	Not sufficient	105 28.6
	Moderately sufficient	181 49.3
Sources of nutrition information **	Health professionals	161 43.9
	TV, radio, newspaper, magazine	145 24.5
	Family, friends	90 39.5
	Internet	63 17.2
	Books on nutrition	51 13.9
	Others	4 1.1
Information sources considered reliable **	Health professionals	256 69.8
	Nutritionist or dietician	166 45.2
	Health institutions	57 15.5
	TV	48 13.1
	Internet	44 12.0
	Family	38 10.4
	Friends	18 4.9
	Course books	21 5.7
	Radio	14 3.8
	Newspapers, magazines	10 2.7
BMI	Underweight (<20)	35 9.5
	Normal (20.0-24.9)	134 36.5
	Overweight (25.0-29.9)	145 39.5
	Obese (≥30.0)	53 14.5

resources were health professionals (43.9%), TV / radio / newspaper / magazine (39.5%) and family and friends (24.5%). As to the source of nutrition-, diet- and food-related information, 69.8% of the participants relied on health professionals, 45.2% on dietitians or nutritionists and 15.5% on health institutions.

More women (32.9%) had a diagnosed disease than did men (25.8%), but the difference was not statistically significant ($p > 0.05$). There is a significant difference between those with a diagnosed disease and those without a diagnosed disease in terms of BMI ($p < 0.05$). BMI was significantly higher in those with a disease.

As is seen in Table 3, the mean scores the participants obtained from the scale and subscales are as follows: Nutrition literacy: 26.2 ± 3.8 , physical domain: 15.1 ± 2.47 , psychological domain: 14.6 ± 2.3 , social domain: 14.9 ± 3.0 , environmental domain: 14.5 ± 2.5 and national environmental domain: 14.2 ± 2.2 .

Analysis of the mean total scores the participants obtained from all the sections of the scale shown in Table 4 revealed that 79.8% of the participants' level was adequate. As to subsections, 33.5% of the participants' knowledge on general nutrition, 20.7% of the participants' reading comprehension and interpretation level, 12.8% of the participants' knowledge on food groups, 88.3% of the participants' knowledge on daily serving sizes, and 90.5% of the participants' knowledge on reading food labels and numerical literacy were either inadequate or on borderline.

* $p < 0.05$ important, ** significant difference

In Table 5, the mean scores the participants obtained from the EINLA in terms of their socio-demographic characteristics are given. While the mean scores of the women and college graduates were statistically significantly high, the workers' mean scores were low ($p < 0.05$).

No statistically significant relationship was determined between the individuals' monthly income levels and their nutrition literacy scores ($p > 0.05$).

There is a positive significant relationship between the nutrition literacy scores and the scores obtained from physical, psychological and social domains ($p < 0.05$). However, the relationship between the nutrition literacy scores and the scores obtained from the environmental and national environmental domains were not significant ($p < 0.05$).

Discussion

In our study, the mean score for the nutrition literacy was 26.2 ± 3.8 , and 79.8% of the participants' nutrition literacy levels were adequate. In their study conducted with the elderly Japanese, Aihara and Minai (2011) determined that while 30.7% of the participants' nutrition literacy levels were adequate, 66.3% participants had borderline nutrition literacy levels Aihara and Minai (2011). In their study conducted in the Lower Mississippi Delta region, Zoellner et al. (2009) investigated nutrition literacy levels of the participants by using the New Vital Sign (NVS) measurement tool and found that the levels were insufficient in 24% of them, on borderline in 28%, and adequate in 48% Uğurlu (2011) These differences in nutrition literacy levels may have stemmed from the different features

of communities where the studies were conducted. For example, among the possible reasons for the high rates of inadequate or borderline nutrition literacy levels in the Lower Mississippi Delta region are that the Delta Region is mainly rural, there are a lot of African-Americans, income inequality is high and overall education levels are low 171 (2012b). In Aihara and Mina's study (2011) conducted with elderly individuals, 31% of the respondents' education levels were below the 9th grade Aihara and Minai (2011). In Uğurlu's study investigating health literacy levels of individuals who presented to hospitals in Ankara (2011), it was determined that the respondents' health literacy activity (reading the recipe, reading and understanding the information given in the patient information leaflet getting help to take medicine at home) scores were generally high, similar to our findings 171 (2006). In our study, that the participants' nutrition literacy levels were adequate may have been due to the fact that they lived in a city center, that they were at least primary school graduates and that they were 18-64 years of age. In our country, there is a need for further studies investigating general nutrition literacy status, factors affecting nutrition literacy and the differences between urban and rural areas. Even if people's nutrition literacy levels are adequate, they should be supported in order that they can better use the skills they already have. In their study (2012), Uçar et al. stated that even though individuals with high levels of knowledge had adequate nutrition information, they were not able to make use of it properly Çekal (2008). No significant relationship was determined between BMI and mean nutrition scores in Rothman's study (2006), and between BMI and nutrition literacy in Zoellner et al.'s (2009) and Aihara and Mina's (2012) studies J. et al. (2009); Aihara and Minai (2011); 171 (2006). There was no significant correlation between BMI and nutrition literacy scores in our study, which was in line with the findings of aforementioned studies. In our study, although the participants' overall nutrition literacy scores were adequate, only 36.5% of them were normal weight according to BMI. These results suggest that the participants did not use their nutrition literacy skills decently. This result may also have stemmed from the fact that the scores the majority of individuals obtained from the serving sizes, reading food labels and numerical literacy subscales of nutrition literacy were inadequate or on borderline.

Review of the literature in terms of sociodemographic characteristics affecting nutrition literacy revealed a significant relationship between nutrition literacy and education and income levels J. et al. (2009); Aihara and Minai (2011); Uğurlu (2011). Çekal's (2008) study on the relationship between education and nutrition literacy levels demonstrated that the percentage of secondary school graduates with adequate or high levels of nutrition knowledge was significantly higher than that of elementary school graduates with the same levels of nutrition knowledge (82.0% and 70.9% respectively) Çekal (2008). In Zoellner et al.'s study (2009), it was determined there was a significant relationship between the education level and nutrition literacy in studies, and that as the individuals' educational level increased so did the scores they obtained from the nutrition literacy scale J. et al. (2009). In Uğurlu's study (2011) on health literacy, it was determined that the patients with low levels of education

Table 3. Mean scores the participants obtained from the nutrition literacy and quality of life domains

	Ort. \pm SD	Min.	Max.
Nutrition Literacy	26.2 \pm 3.8	9.0	33.0
Physical Domain	15.1 \pm 2.5	6.0	20.0
Psychological Domain	14.6 \pm 2.3	7.0	20.0
Social Domain	14.9 \pm 3.0	4.0	20.0
Environmental Domain	14.5 \pm 2.5	7.0	20.0
National Environmental Domain	14.2 \pm 2.2	8.0	20.0

Table 4. Distribution of the scores the participants obtained from the EINLA (n=367)

Sections	Inadequate		Borderline		Adequate	
	n	%	n	%	n	%
All the sections	1	0.3	73	19.9	293	79.8
Subsections						
First section (general nutrition knowledge)	4	1.1	119	32.4	244	66.5
Second section (understanding and interpreting what is read)	4	1.1	72	19.6	291	79.3
Third section (food groups)	4	1.1	43	11.7	320	87.2
Fourth section (amount of servings)	180	49.0	144	39.3	43	11.7
Fifth section (food labels and numerical literacy)	184	50.2	148	40.3	35	9.5

Table 5. Mean scores the participants obtained from the EINLA in terms of their socio-demographic characteristics

Characteristics	n	\pm SD	p
Gender			
Male	194	25.8 \pm 4.1	t= 2.163
Female	173	26.7 \pm 3.2	p= 0.031*
Education			
Primary schoola	109	25.7 \pm 2.9	
Junior high schoolb	49	25.5 \pm 3.8	F= 3.732
Senior high schoolc	95	25.9 \pm 4.3	p= 0.004*
University d	114	27.2 \pm 3.7	(a-d)**
Profession			
Workera	104	24.3 \pm 4.7	
Housewifeb	72	26.2 \pm 3.1	F= 3.912
Self-employedc	44	26.3 \pm 3.4	p= 0.004*
Government officiald	43	27.3 \pm 3.7	(a-b,c,d,e)**
Otherse	104	26.5 \pm 3.8	
Presence of diagnosed NCD			
Yes	107	26.3 \pm 3.1	t=0.322
No	260	26.2 \pm 4.0	p=0.748
BMI			
Underweight (<20.0)	35	27.2 \pm 3.9	
Normal (20.0-24.9)	134	26.2 \pm 3.6	F=1.475*
Overweight (25.0-29.9)	145	26.2 \pm 3.6	p=0.221
Obese (\geq 30.0)	153	25.5 \pm 4.2	

Table 6. Relationship between the individuals' quality of life and their nutrition literacy scores

	Physical Domain	Psychological Domain	Social Domain	Environmental Domain	National Environmental Domain
Nutrition Literacy Scores					
r		.250	.136	.162	0.043 0.051
p		0.000	0.009	0.002	0.408 0.327

received more help to read and understand the written materials such as forms, tests and booklets given by physicians and other healthcare professionals than did the patients with higher levels of education [Uğurlu \(2011\)](#). In our study, in line with the literature, the nutrition literacy scores of the university graduates were significantly higher than were those of the others, and the gap was especially wider between primary school graduates and university graduates. In addition, in our study, the scores government officials obtained from nutrition literacy assessment tool were significantly higher than were the scores of other occupational groups, which is probably due the fact that the government officials' education levels were higher. The occupational group with the lowest nutrition literacy scores was workers, which may be due to the fact that their jobs required higher use of physical force, that the majority of them were male and that they were subjected to difficult working conditions. It has been reported that there may be association between low economic level and limited nutrition literacy, that people with low level of education may have difficulty understanding information they read, and that they are inadequate in numerical literacy, for instance, they cannot calculate how many grams of fiber they should take [Uğurlu \(2011\)](#); [171 \(2011\)](#). A significant relationship was determined between nutrition literacy and income levels in [Zoellner et al.'s \(2009\)](#), and [Aihara and Mina's \(2012\)](#) studies. [Rothman et al. \(2006\)](#) found a significant relationship between income levels, and nutrition literacy and numerical literacy [171 \(2006\)](#). However, in our study, different from the literature, although the mean scores of those with a monthly income less than \$310 were lower than those of the other income groups, the relationship was not statistically significant ($p>0.05$). If individuals' nutrition literacy levels are to be improved, they should be able to access reliable information and services, to utilize the information and services accurately and effectively and thus to make correct decisions about nutrition [Aihara and Minai \(2011\)](#). In our country over the last ten years, there has been a significant increase in accessing and utilizing health promotion services, and the number of visits to physicians per capita increased from 3.2 in 2002 to 8.2 in 2011. In particular, individuals living in city centers can utilize health care institutions more and therefore can obtain more information from health professionals [171 \(2011\)](#). Therefore, in today's conditions, individuals, whatever income groups they are in, can obtain nutrition-related information from many sources, mainly health institutions and health care providers. For this reason, no statistically significant relationship may have been determined between income levels and nutrition literacy scores. However, in a study conducted to investigate the relationship between health literacy and dietary behaviors

in a sample of people with low-income level (2012), it was reported that they might not consume fruit and vegetables and foods with less fat and fewer calories since their prices are high [171 \(2012c\)](#). Therefore, even though people have adequate nutrition literacy levels, they should be informed about how frequently and how much food they should consume to meet their daily needs considering their income levels so that they can use their nutrition literacy skills efficiently.

In our study, the mean scores the women obtained from the EINLA were significantly higher than were those of the men. In [Özçelik, Özfer and Uçar's study \(2008\)](#) investigating the adults' knowledge level about fat, fiber and cholesterol by gender, while the women answered all but one of the questions correctly, the men answered more questions incorrectly [Özfer \(2008\) 171 \(2000b\)](#). In another study on nutrition knowledge and food intake, women's nutrition knowledge levels were higher than were those of the men [WHO \(2010\)](#). While no significant relationship was determined between gender and nutrition literacy in [Zoellner et al.'s study \(2009\)](#), in [Aihara and Mina's study \(2011\)](#), borderline nutrition literacy levels were determined to be higher in men than in women [J. et al. \(2009\)](#); [Aihara and Minai \(2011\)](#). Since women carry out such tasks as food purchasing, food selection and cooking, child care and feeding the child more often than men do, they can be more knowledgeable about nutrition-related issues than men are.

In 2008, 10% of the males and 14% of the females were found to be obese all over the world. In all the WHO regions in the world, women are more obese than men. Overweight and obesity leads to adverse metabolic effects on blood pressure, cholesterol, triglyceride and insulin resistance, and causes an increase in the incidence of chronic diseases [171 \(2005\)](#). In some regional studies on the prevalence of chronic diseases, women's fasting blood glucose, triglyceride, total cholesterol, HDL, LDL, mean body mass index, systolic and diastolic blood pressure values were determined to be higher than were those of men [171 \(2005, 2000a\)](#). In our study, the proportion of the women with a diagnosed disease was higher than that of the men too, but the difference between them was not statistically significant. In our study, it is a remarkable finding that the percentage of the women with a diagnosed disease was higher than that of the men, although their mean EINLA scores were significantly higher, which may be due to the fact that women's eating habits are affected by such conditions as sadness, stress, fatigue, etc.

In studies conducted in Turkey, the prevalence of NCD has been found to be higher in those living in city centers. In [Özdemir et al.'s study \(2005\)](#) on the prevalence of chronic diseases among elderly people living in Sivas, 78.0% of

the participants were identified to have at least one chronic disease, and of the participants, 60.9% were hypertensive (36.8% on the borderline, 24.1% moderate or severe), 19.7% had diabetes, 22.7% had a suspected coronary disease, 7.9% were anemic, and 24.8% were obese. Only 14.4% of these people had been diagnosed previously; the remaining were not aware of their diseases [171 \(2005\)](#). In our study, 29.2% of the participants stated that they had a diagnosed disease. Of them, 9.8% had diabetes, 9.0% had high blood pressure and 6.3% had a digestive system disease. These rates indicate only those with a definite diagnosis of disease. If those who were not aware of their disease in the sample are taken into account, the rates can be expected to be a lot higher. If exposure to risk factors for NCDs in later years continues, these rates will inevitably increase. NCDs are dramatically increasing in low- and middle-income countries. This increase is mainly due to the increase in obesity caused by deteriorated eating habits and decreased physical activities. In the world, each year, more than 2.8 million people lose their lives due to being overweight or obese [WHO \(2009\)](#). In our study, there was a significant difference between the BMI values of the participants with or without a diagnosed disease. The BMI of those with a disease were significantly higher than those of the patients without a disease. These results are consistent with those in the literature. Indeed, it has been indicated that overweight and obesity induce adverse metabolic effects on blood pressure, cholesterol, triglyceride and insulin resistance, and that risk of coronary heart disease, ischemic stroke, and type 2 diabetes rises as the BMI increases [WHO \(2010, 2009\)](#).

In studies on nutrition literacy, nutrition literacy skills have been determined to be associated with nutrition skills such as awareness of basic nutrition information, serving size, interpretation of food labels, access to reliable information sources and scientific information [Carbone \(2013\)](#); [Gibbs and Chapman-Novakofski \(2012\)](#); [171 \(2015\)](#). Individuals' acquisition of basic knowledge about nutrition plays an important role in the promotion of nutritional literacy. [Özçelik and Sürücüoğlu \(2002\)](#) conducted a study on "nutrition knowledge of two generations of women" with mothers aged 50 and over living in the city of Ankara and their married daughters living in separate houses, and determined that 64.8% of the mothers and 92.1% of their daughters had a good level of nutrition knowledge [171 \(2002\)](#). In her study conducted with middle-aged and elderly people in Sivas (2008), [Çekal](#) determined that the participants' nutrition knowledge levels were sufficient [Çekal \(2008\)](#). The analysis of the scores obtained from the subscales of the assessment tool revealed that 66.5% of the participants' nutrition literacy was adequate in the general nutrition knowledge subscale, 79.3% of the participants' nutrition literacy was adequate in understanding and interpreting of what is read subscale and 87.2% of the participants' nutrition literacy was adequate in the food groups subscale. In line with these findings, it can be said that the majority of the participants sufficiently understood information they read about nutrition, and were knowledgeable about general nutrition and food groups.

In Turkey, people's knowledge on the nutritional values of foods, what foods are healthy, how frequently and in what amounts they should consume foods, food labels,

the relationship between diseases and their diet was either inadequate or incorrect [Baysal \(2009\)](#); [Aygen \(2012\)](#). In our study, the majority of the participants' knowledge levels regarding the daily serving size and reading food labels and numerical literacy subscales of the EINLA were either inadequate or on borderline (% 49.0 inadequate, 39.2 borderline % for the daily serving size subscale) (50.1% inadequate, 40.3% borderline for the reading food labels and numerical literacy subscale). In their study on food labels (2006), [Rothman et al.](#) reported that the majority of the patients (89.0%) used food labels. Questions on food labels were correctly answered by 69.0% of the patients. Incorrect answers resulted from wrong serving sizes, confusion due to excessive information on food labels and miscalculations [171 \(2006\)](#). In [Aygen's](#) study (2012), while 53.0% of participants read the information on food labels always or often, 40.0% read them sometimes, and approximately 10.0% read them rarely. Twenty percent of the participants stated that they "rarely" or "never" read the information on food labels, which is of great importance in the fight against obesity and obesity-related diseases, one of the biggest problems of our era. In the same study, in terms of food labels, the participants were dissatisfied about the following: "labels lack warning information", "nutritional values are not provided by serving size", "production and expiration dates cannot be seen easily", "there is too much information", "information is not clear", "it is difficult to understand information on weight / quantity" [171 \(2010b\)](#). In [Grunert et al.'s](#) study (2010), it was indicated that acquiring healthy eating habits was related with knowledge on nutrition, which can be obtained by understanding the pertinent information given on food labels [171 \(2010b\)](#). In [Besler et al.'s](#) study (2012), the participants stated that they understood the terms such as fat, calories, sugar, vitamins and salts, but did not understand the relationship between "calories and energy" "sodium and salt", and "sugar and carbohydrates" [171 \(2012a\)](#). In line with all this data, it can be proposed that food labels should include all the information required, be easy to understand, and be presented in a standard format, and that individuals' lack of knowledge on basic nutrition should be dealt with so that they should make healthy food choices. In addition, their nutrition literacy skills related to serving sizes, food label reading, performing basic arithmetic operations should be improved as well. Another important point in terms of nutrition literacy is easy access to reliable information resources and nutrition-related information [Aihara and Minai \(2011\)](#). Today, in Turkey, as throughout the world, various media such as newspapers, magazines, radio, TV and the Internet provide people with information on many topics including health and nutrition [Uğurlu \(2011\)](#); [Aktaş \(2011\)](#); [171 \(2009a\)](#). [Aktaş and Cebirbay's](#) (2011) study revealed that the participants' first choice of information resource was television (29.1%), second choice was newspapers and magazines (25.7%), third choice was radio (23.0%) and fourth choice was the Internet (22.1%). According to their statements, of the participants, 52.5% kept up with nutrition information in the media daily or weekly, 58.8% implemented the information they obtained on "food safety", 64.9% thought that the information was "comprehensible"

and 63.3% considered the information as "scientific" [Aktaş \(2011\)](#).

In Uğurlu's study (2011) on health literacy, the patients obtained information on diet, exercise and prevention of diseases from healthcare professionals (93.1%), radio / television (75.2%), and family members and friends (70.5%) [Uğurlu \(2011\)](#). In Zoellner et al.'s (2009) study, the participants stated that they trusted the information obtained from physicians and other medical staff, television, and family and friends [J. et al. \(2009\)](#). In our study, the participants' information resources were healthcare professionals (43.9%), TV / radio / newspaper / magazine (39.5%), family and friends (24.5%), and the Internet (17.2%), and they stated that the resources they trusted most were healthcare professionals, nutritionist or dietician, health care institutions, TV and the Internet, which was consistent with the literature. The most important issue to be considered in educating community on nutrition is that the message to be given should not mislead people. Energy and nutrient requirements of each person and group (children, adults, patients, workers etc.) are different. Therefore, using media in community-based nutrition education other than providing general nutritional advice (the benefits of fruits and vegetables, excessive eating drawbacks etc.) will bring more harm than good. If the content of general information given through the mass media is not controlled scientifically, this may cause people to obtain misinformation, which, in turn, may pose a threat to their lives [Merdol \(2012\)](#). That the participants in our study mainly relied on information about nutrition and diet given by health professionals and dietitians is a gratifying finding in terms of the promotion of nutrition literacy. On the other hand, it is thought-provoking that health professionals and dietitians/nutritionists were not considered as reliable information resources by some of the participants (30% and 55% respectively). In Alici and Pinar's study (2007), education provided by nurses to obese individuals was indicated to be effective in the development of metabolic and psychological parameters and quality of life of these obese people [M \(2007\)](#). In line with these findings, it can be said that health personnel and dietitians can play an effective role in the promotion of nutritional literacy and thus win the public's trust by actively taking part in programs aiming to gain people nutrition literacy skills. There is a constant interaction between the biological and psychosocial needs of the human since he is a biopsychosocial being. Individuals with healthy diet are physically healthy and thus feel psychologically and socially healthy. Having a diet rich in healthy and quality food gives people not only physical but also emotional and psychological pleasure. Nutrition which is a basic human need may undergo changes not only due to adverse conditions such as insufficient physical activity and changes in eating behaviors but also due to emotions such as joy, sadness, stress, and thus can affect the frequency of feeding, serving size, and the content of the food [171 \(2004\)](#). All these negative factors cause individuals to develop nutrition-related disorders and decrease their quality of life [171 \(2004, 2010a, 2012d\)](#). In our study, a weak positive correlation was determined between the nutrition literacy score and the scores obtained from the physical, psychological and social domains of the quality of life. Several studies have revealed

that chronic diseases cause adverse effects which make an individual lose his/her health, independence, control power over life, privacy, social status and roles, self-confidence, and power to plan future [Mollaoğlu \(2007\); 171 \(2012d\)](#). Tokuda et al. (2009) carried out a study to determine whether there was a relationship between health literacy and physical and psychological well-being, and found that low levels of literacy were correlated with poor physical and psychological health [171 \(2009b\)](#). In her study (2013), Günsoy determined that the participants' eating habits and anthropometric measurements affected their quality of life, and that the scores they obtained from the physical functionality, general health, social functionality and mental health domains of quality of life decreased as their BMI increased [Günsoy \(2013\)](#). In line with all these data, it is expected that as an individual's nutrition literacy skills improve so do the physical, mental and social aspects of his/her quality of life.

Conclusions

In our study, no significant correlation was determined between the scores obtained from the nutrition literacy and the scores obtained from the environmental and national environmental domains of quality of life. This may be due to following factors: 70.8% of the participants did not have a diagnosed disease; those with a diagnosed disease did not suffer severe complications or were not dependent on others (i.e. inability to perform activities of daily living, weakness, hospitalization, being connected to a medical device); the participants did not have difficulty accessing health care institutions since they lived in the city center. In order for a person to be healthy, he/she should make healthier diet choices and put this into practice [Carbone \(2013\); Gibbs and Chapman-Novakofski \(2012\); 171 \(2015\)](#). Findings in our study showed that having basic information about nutrition is not enough for people to have a healthy diet. The participants appeared to be inadequate in performing basic arithmetic operations needed to determine serving sizes, food label reading, and daily nutrient and energy intakes. In case these deficiencies are not eliminated, increases in the number of overweight and obese people and in the prevalence non-communicable diseases in society will be inevitable. That the physical, mental and social aspects of quality of life improve in people with high nutrition literacy indicates the importance of nutrition literacy in public health. Thus, people with adequate nutrition literacy can themselves determine their problems related to nutrition and correct their erroneous applications by accessing accurate information about nutrition. If they are not satisfied with these, then they present to health care institutions where they can receive necessary services. Therefore, by actively participating in nutrition and health-related activities, people may become healthier and more productive, and utilize health services more consciously, which in turn, reduces health care costs.

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