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Association of nutrition literacy level with sociodemographic data: Case of Afyonkarahisar

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Abstract

This study was planned to evaluate the nutrition literacy (NL) levels of randomly selected individuals aged 18-65 years living in Afyonkarahisar, Turkey, and to associate the NL with some of their sociodemographic characteristics. The data of this cross-sectional study were collected through a face-to-face survey technique. In the survey form created for the study, questions about descriptive characteristics and the Evaluation Instrument of Nutrition Literacy on Adults (EINLA) were included. The study was carried out between 15 September and 1 November 2021 with a total of 1,601 participants. The study was conducted with a total of 1,601 participants. The participants' mean age was 29.40±10.04 years, and as per the Body Mass Index (BMI) classification, 14.7% were underweight, 50% were normal weight, 25.7% were overweight and 9.6% were obese. In this study, the total NL score of the participants was found as adequate in 61.4% of them and borderline in 38.6%. In the BMI classification of the participants, the group with the highest total NL score was found to be individuals with normal BMI (65.6%- p=0.003). As the BMI values of the participants increased, their NL portion knowledge levels decreased (p<0.01). Individuals with normal weight were determined to read food labels more (p<0.01). As the individuals' education level increases, the NL level increases. Underweight and normal weight individuals according to their BMI values were determined to have a higher level of NL competence than overweight and obese ones. Our study results indicate that most of the individuals with adequate levels of knowledge on NL have a normal BMI value and they integrate this knowledge into their daily lives. Organizing and providing various programs and training in order to improve the NL levels of societies may play a role in increasing the level of awareness and decreasing obesity.

Keywords: Adult nutrition, nutritional habits, nutrition literacy

Introduction

Nutrition constitutes one of the important parameters for individuals to maintain their lives in healthily [1]. In order for individuals to maintain a healthy life, nutrients should be consumed consciously in an adequate and balanced way [2]. Otherwise, they might be exposed to many health-threatening diseases [1-2]. This negatively affects the quality of life and life expectancy of the individual [2]. Obesity, diabetes, hypertension, and coronary diseases are the leading diseases that develop and/or impair the quality of life due to inadequate and/or unbalanced nutrition [3-4]. Obesity is defined as an abnormal increase in fat cells in the body, while at the same time it is an increase in scale weight [5]. Developing food technologies in the globalizing world and smart devices focused on increasing the comfort of the life of individuals have triggered the increase in obesity [6-7]. This has led to the need for individuals to act more consciously and carefully in food selection [8-9]. The development of healthy lifestyle behaviors and thus the prevention of various diseases

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are very important in terms of public health. At the same time, the length and costs of the treatment processes of these emerging diseases bring a great burden on the economies of countries [9]. The stages of access to correct information, evaluation, and making the right choice should be provided in order for an individual to gain healthy eating habits. The combination of desire, knowledge, skill, behavior, attitude and ability required for managing safe and healthy nutrition is defined as nutrition literacy [10-11]. NL, intended to measure the nutritional knowledge of the individual, is a concept that includes the level of awareness and comprehension ability. An individual with an adequate level of NL knowledge can analyze food selection and focus on the right choices of foods. They can also analyze portion control and label information together. By choosing the most suitable food for their health, they can apply the healthiest preparation and cooking methods [12]. Increasing the NL level of individuals or raising the awareness of societies about NL is extremely important for the prevention of many chronic diseases, especially obesity [10-12]. Although various studies have been conducted to measure the level of NL knowledge in our country, it is not at adequate levels. The aim of this study was to make contributions to the literature and draw attention to the importance of the subject by examining the relationship between NL level and some sociodemographic characteristics and BMI.

Material and Methods

This single-center cross-sectional study was conducted in Afyonkarahisar, Turkey, between September 15 and November 1, 2021. Afyonkarahisar is a city with a population of approximately 1 million located in the Inner Aegean region of Turkey geographically [8]. Individuals aged 18-65 formed the population of the study. The study was carried out with 1,601 volunteer individuals who agreed to participate in the survey method, were randomly selected, and did not have any obvious serious psychiatric disease and communication barriers (such as serious hearing and vision).

The individuals who agreed to participate were asked about their height, weight, age and marital status, and these data were noted. Also, their educational status, place of residence, and whether they actively use social media were questioned. Body Mass Index (BMI) (kg/m2) has been calculated according to the recorded height (m) and body weight (kg) value [BMI formula: body weight (kg)/height (m2)]. BMI values were evaluated according to the criteria set by the World Health Organization for adults. BMI ≤ 18.5 was considered as underweight, 18.5-25.0 normal, 25.0-30.0 overweight, and 30≥obese. Evaluation Instrument of Nutrition Literacy on Adults Scale was applied to the participants.

Evaluation Instrument of Nutrition Literacy on Adults (EINLA) It is a scale developed by Cesur et al. in 2015 to assess nutrition literacy. The Cronbach's Alpha reliability score of the EINLA was found to be 0.73 and the correlation coefficient was 0.85. The scale consists of 35 questions and five subsections. In addition, the total score of the scale is calculated [13]. Subsections of the scale:

1.General nutritional knowledge (GNK) 10 items,

2.Reading comprehension (RC) 6 items,

3.Knowledge of food groups (KFG) 10 items,

4.Portion knowledge (PK) 3 items,

5.Reading food label (RFL) has 6 items.

The scoring was performed by coding the correct questions as "one point" and the questions answered incorrectly or skipped as "zero points". The total scale score from the NL is classified as an inadequate level if it is between 0-11 points, borderline if it is between 12-23 points, and adequate if it is between 24-35 points [13].

Data Analysis and Statistical Method, continuous quantitative variables are given as "n" and "percentage". Continuous variables consisting of independent measurements and showing normal distribution were analyzed with the **Independent Samples T-Test**, while the **Mann-Whitney Rank Sum Test** was used for the data that did not show normal distribution. The Chi-square test was used in descriptive statistics. The probability value of $p<0.05$ was considered significant. SPSS 21 package program was used in all data analyses.

Ethics Committee; Ethics Committee approval for the study (2021/445) was obtained on 03.09.2021 from the Clinical Research Ethics Committee of Afyonkarahisar Health Sciences University.

Results

The study was conducted with a total of 1,601 participants, 32.4% male, and 67.6% female. The mean age of the participants was 29.40±10.04 (18-65) years. As per the Body Mass Index (BMI) classification, 14.7% were underweight (18.96±1.74-22), 50% were normal weight (22.48±1.40), 25.7% were overweight (27.06±1.34) and 9.6% were obese (33.29±3.57). The majority of the participants in the study were single (66.5%), with an undergraduate education level (69%), not working at any job (52.5%), using social media actively (95.1%), and living in the city center (67%) (Table 1).

In this study, a significant difference was found in terms of gender and this difference was in favor of women ($p<0.001$). In regards to the marital status of the participants, while there was a significant difference in favor of married participants in general nutritional knowledge and the total score ($p<0.001$), a significant difference was found in favor of single individuals in the subsections of portion knowledge ($p=0.001$) and reading food labels ($p<0.001$). In regards to the place of residence, there was a significant difference in favor of participants living in the districts in general nutrition knowledge ($p<0.01$), reading comprehension ($p=0.01$), and the total score ($p=0.01$), while a significant difference was found in favor of those living in the

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city center in the subsection of reading food label (p=0.021).

As the education level of the participants increased, a statistically significant increase was observed in the level of general nutrition knowledge and reading comprehension (p<0.001). In terms of the profession, the participants who were not working were found to have statistically significant higher scores in all areas of nutrition literacy, except for reading food labels. The portion knowledge level was found to decrease as BMI increased, and this was statistically significant. The reading food label values of the group with normal BMI values were found to be significantly different.

Table 1. EINLA and evaluation of sociodemographic data I

			Socio-demographic data I							
			Gender		Marital status			Location of residence		
			Female n=1083	Male n=518	Married n=537	Single n=1023	Divorced n=41	City n=1072	District n=460	Village n=69
VBODA	General nutritional knowledge	Inadequate	53 (4.9)	32 (6.0)	16 (3.0)	65 6.4)	3 (7.3)	55 (5.1)	20 (4.3)	9 (13.0)
		Borderline	385 (35.5)	258 (49.8)	163 (30.3)	462 (45.2)	18 (43.9)	444 (41.4)	163 (35.4)	36 (52.2)
		Adequate	645 (59.6)	228 (44.2)	359 (66.7)	495 (48.4)	20 (48.8)	573 (53.5)	277 (60.2)	24 (34.8)
			p<0.001		p<0.001			p<0.01		
	Reading Comprehension	Inadequate	25 (2.3)	26 (5.0)	18 (3.3)	30 (2.9)	3 (7.3)	31 (2.9)	15 (3.3)	5 (7.2)
		Borderline	335 (30.9)	207 (40.0)	132 (24.5)	395 (38.6)	15 (36.6)	374 (34.9)	134 (29.1)	34 (49.3)
		Adequate	723 (66.8)	285 (55.0)	388 (72.1)	597 (58.4)	23 (56.1)	667 (62.2)	311(67.6)	30 (43.5)
			p<0.001		p<0.001			p=0.01		
	Knowledge of Food Groups	Inadequate	20 (1.8)	8 (1.5)	13 (2.4)	13 (1.3)	2 (4.9)	23 (2.1)	4 (0.8)	1 (1.4)
		Borderline	312 (28.8)	174 (33.6)	145 (27.0)	327 (32.0)	14 (34.1)	314 (29.3)	153 (33.3)	19 (27.5)
		Adequate	751 (69.3)	335 (64.9)	380 (70.6)	682 (66.7)	25 (61.0)	735 (88.6)	303 (65.9)	49 (71.1)
			p=0.145		p=0.146			p=0.254		
	Portion Knowledge	Inadequate	666 (61.5)	363 (70.1)	348 (64.7)	652 (63.8)	29 (70.7)	703 (65.6)	280 (60.9)	46 (66.7)
		Borderline	342 (31.6)	138 (26.6)	174 (32.3)	297 (29.1)	9 (22.0)	307 (28.6)	155 (33.7)	18 (26.1)
		Adequate	75 (6.9)	17 (3.3)	16 (3.0)	73 (7.1)	3 (7.3)	62 (5.8)	25 (5.4)	5 (7.2)
			p=0.001		p=0.001			p=0.327		
	Reading Food Label	Inadequate	243 (22.4)	156 (30.1)	163 (30.3)	223 (21.8)	13 (31.7)	249 (23.2)	122 (26.5)	28 (40.6)
		Borderline	537 (49.6)	240 (46.3)	264 (49.1)	493 (48.2)	20 (48.8)	529 (49.3)	220 (47.8)	28 (40.6)
		Adequate	303 (28.0)	122 (23.6)	111 (20.6)	306 (29.9)	8 (19.5)	294 (27.4)	118 (25.7)	13 (18.8)
			p=0.003		p<0.001			p=0.021		
	NL Total Scores	Inadequate	-	-	-	-	-	-	-	-
		Borderline	363 (33.5)	255 (49.2)	169 (31.4)	428 (41.9)	21 (51.2)	421 (39.3)	157 (34.1)	40 (58.0)
		Adequate	720 (66.5)	263 (50.8)	369 (68.6)	594 (58.1)	20 (48.8)	651 (60.7)	303 (65.9)	29 (42.0)
			p<0.001		p<0.001			p=0.01		

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Table 2. EINLA and evaluation of sociodemographic data II

			Socio-demographic data II							
			Education Status					Profession		
			Primary school n=55	Secondary school n=78	High school n=363	Graduate n=1105	Not working n=840	Government employee n=384	Labourer n=333	Retired n=44
VBODA	General nutritional knowledge	Inadequate	4 (7.3)	9 (11.5)	32 (8.8)	38 (3.4)	30 (3.6)	20 (5.2)	33 (9.9)	1(2.3)
		Borderline	26 (47.3)	36 (46.2)	164 (45.3)	416 (37.7)	295 (35.1)	190 (49.5)	134 (40.2)	24 (54.5)
		Adequate	25 (45.5)	33 (42.3)	167 (45.9)	651 (58.9)	515 (61.3)	174 (45.3)	166 (49.8)	19 (43.2)
				p<0.001				**p<0.01**		
	Reading Comprehension	Inadequate	8 (14.5)	7 (9.0)	17 (4.7)	19 (1.7)	19 (2.3)	7 (1.8)	22 (6.6)	3 (6.8)
		Borderline	21 (38.2)	30 (38.5)	158 (43.6)	331 (30.0)	213 (25.4)	181 (47.1)	130 (39.0)	18 (40.9)
		Adequate	26 (47.3)	41 (52.6)	187 (51.7)	754 (68.3)	608 (72.4)	196 (51.0)	181 (54.4)	23 (52.3)
				p<0.001				**p<0.01**		
	Knowledge of Food Groups	Inadequate	0 (0.0)	3 (3.8)	10 (2.8)	15 (1.4)	15 (1.8)	4 (1.0)	7 (2.1)	2 (4.5)
		Borderline	22 (40.0)	32 (41.0)	129 (35.6)	302 (27.4)	275 (32.7)	97 (25.3)	101 (30.3)	13 (29.5)
		Adequate	33 (60.0)	43 (55.1)	223 (61.6)	787 (71.3)	550 (65.5)	283 (73.7)	225 (67.6)	29 (65.9)
				p=0.01				**p=0.094**		
	Portion Knowledge	Inadequate	35 (63.6)	48 (61.5)	235 (64.9)	709 (64.2)	517 (61.5)	261 (68.0)	217 (65.2)	34 (77.3)
		Borderline	16 (29.1)	27 (34.6)	112 (30.9)	325 (29.4)	261 (31.1)	110 (28.6)	101 (30.3)	8 (18.2)
		Adequate	4 (7.3)	3 (3.8)	15 (4.1)	70 (6.3)	62 (7.4)	13 (3.4)	15 (4.5)	2 (4.5)
				p=0.838				**p=0.027**		
	Reading Food Label	Inadequate	29 (52.7)	36 (46.2)	119 (32.9)	215 (19.5)	212 (25.2)	69 (18.0)	98 (29.4)	20 (45.5)
		Borderline	23 (41.8)	39 (50.0)	176 (48.6)	537 (48.6)	395 (47.0)	200 (52.1)	160 (48.0)	22 (50.0)
		Adequate	3 (5.5)	3 (3.8)	67 (18.5)	352 (31.9)	233 (27.7)	115 (29.9)	75 (22.5)	2 (4.5)
				p<0.01				**p<0.01**		
	NL Total Scores	Inadequate	-	-	-	-	-	-	-	-
		Borderline	33 (60.0)	48 (61.5)	174 (48.1)	361 (32.7)	258 (30.7)	180 (46.9)	154 (59.1)	26 (59.1)
		Adequate	22 (40.0)	30 (38.5)	188 (51.9)	743 (67.3)	582 (69.3)	204 (53.1)	179 (53.8)	18 (40.9)
				p<0.001				**p<0.01**		

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Table 3. Relationship between BMI and EINLA

			BMI		
		Underweight n=229	Normal weight n=809	Overweight n=414	Obese n=149
FINAL	General nutritional knowledge	Inadequate	8 (3.5)	46 (5.7)	17 (4.1)	13 (8.7)
		Borderline	87 (38.0)	339 (41.9)	164 (39.6)	53 (35.6)
		Adequate	134 (58.5)	424 (52.4)	233 (56.3)	83 (55.7)
			p=0.153			
	Reading Comprehension	Inadequate	5 (2.2)	27 (3.3)	14 (3.4)	5 (3.4)
		Borderline	66 (28.8)	284 (35.1)	137 (33.1)	55 (36.9)
		Adequate	158 (69.0)	498 (61.6)	263 (63.5)	89 (59.7)
			p=0.511			
	Knowledge of Food Groups	Inadequate	3 (1.3)	12 (1.5)	6 (1.4)	7 (4.7)
		Borderline	69 (30.1)	245 (30.3)	130 (31.4)	42 (28.2)
		Adequate	157 (68.6)	552 (68.2)	278 (67.1)	100 (67.1)
			p=0.194			
	Portion Knowledge	Inadequate	138 (60.3)	501 (61.9)	286 (69.1)	104 (69.8)
		Borderline	71 (31.0)	252 (31.1)	119 (28.7)	38 (25.5)
		Adequate	20 (8.7)	56 (6.9)	9 (2.2)	7 (4.7)
			p<0.01			
	Reading Food Label	Inadequate	81 (35.4)	119 (14.7)	134 (32.4)	65 (43.6)
		Borderline	125 (54.6)	359 (44.4)	216 (52.2)	77 (51.7)
		Adequate	23 (10.0)	331 (40.9)	64 (15.5)	7 (4.7)
			p<0.01			
	NL Total Scores	Inadequate	-	-	-	-
		Borderline	89 (38.9)	278 (34.4)	179 (43.2)	72 (48.3)
		Adequate	140 (61.1)	531 (65.6)	235 (56.8)	77 (51.7)
			p=0.003			

Discussion

Nutrition literacy is a relatively new concept all over the world. It is one of the important tools in the evaluation of nutritional habits and has gained more importance during the pandemic that has affected the whole world. Studies are showing that adequate and balanced nutrition of individuals in the pandemic increases the rate of coping with the disease and survival. This study was planned to analyze the factors affecting nutrition literacy, which is one of the methods of measuring whether individuals have adequate and balanced nutrition knowledge. In this study, the relationship between nutrition literacy and body mass index was examined. When the NL total score of 1,601 participants (32.4% male, 67.6% female) was evaluated, none of the individuals had inadequate NL levels. While 61.4% of the participants had adequate NL total scores, 38.6% had total scores at borderline. In similar studies to our study, 83.7% of the 750 participants in the study of Özenoğlu et al. had adequate levels of NL and 16.3% had NL levels at borderline [14], Cesur et al. found that 79.8% of 384 participants had adequate levels of NL and 19.9% were at the borderline [15], in the thesis study conducted by Er-Döngel with 430 participants, 59.8% of the participants had adequate levels [16], 94.4% of the 195 participants were found to have adequate levels of NL by Ünal [17], in Uzun's thesis study with 967 participants, 73.5% of them were at adequate levels [18], in their study with 320 academic participants, Demir et al. found that 50% of them were at an adequate level, 32.8% were at borderline, 17.2% were at inadequate level [19] and Ozdenk reported that 32.1% of the 225 licensed athletes had adequate levels of NL. It was thought that the differences in the results might be due to

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the differences in the geographical differences where the studies were conducted, the used scales, and the population structure.

The majority of the individuals participating in our study were female (67.6%). When studies on NL were evaluated in terms of gender, many studies reported the female population with higher NL scores compared to males [15, 21-26]. The results of our study were found to be in line with the literature. The competency rate of female participants was found to be higher than male participants in the total score and all sub-sections of the NL scale we have used. There was a significant difference in all the areas except for the sub-section of knowledge of food groups of the scale. Females were observed to be more interested in nutrition.

The marital status of participants in our study was 33.6% married, 63.8% single, and 2.6% divorced. The competency rate of married participants was found to be significantly higher in the total score of the scale and general nutritional knowledge, reading comprehension, and reading food label subsections. This was thought to be because the majority of the participants were female and they spend more time in the kitchen. Besides, responsibilities related to the kitchen are often on females as a traditional structure of our country. This situation is thought to foster the NL levels of females.

In regards to the education level, NL levels of the participants were found to increase as their education levels increased. This was applicable for all sub-sections of the NL scale, and a significant difference was found in all sub-sections except portion knowledge. As the level of education increases, the NL of individuals increases. Many studies conducted on this subject support our results [21, 27-29]. In a study conducted with 1,281 participants in Greece, a positive relationship was found between education levels and nutrition literacy, and the level of nutrition literacy of individuals with low socio-economic status was reported to be inadequate [21]. Another study reported that the nutrition literacy of students whose fathers were university graduates was higher than those whose fathers were primary school graduates [29]. It can be said that as the level of education increases, analytical thinking becomes stronger, the sense of perception improves, and questioning increases.

When the BMI values of the individuals in our study were compared with the nutrition literacy, the group with the highest competency of nutrition literacy total score was found to be normal weight, followed by underweight, overweight, and obese individuals, respectively. According to our results, it can be said that individuals with normal weight are more careful about their nutrition and make an effort not to gain weight or have a healthy life. Similar results can be seen in different studies on this subject [15-16, 18, 30-31]. While individuals with inadequate nutrition literacy were reported to be more prone to obesity in one of the studies [18], another study found higher nutrition literacy scores in underweight individuals although there was no significant relationship [25]. When the sub-sections of the nutrition literacy scale were examined in our study, the underweight individuals were found to have more portion knowledge, while individuals with normal weight were significantly more careful in reading food labels. There is a significant relationship between BMI and nutrition literacy. As BMI increases, nutrition literacy decreases.

In conclusion, individuals who are female, married, with high education levels and normal BMI were found to have higher nutrition literacy. Raising awareness of society about nutrition literacy can play an important role in bringing BMI values closer to normal, that is, in reducing obesity.

Conflict of interests
The authors declare that there is no conflict of interest in the study.

Financial Disclosure
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Ethical approval
Ethics committee approval was obtained from the Ethics Committee of Afyonkarahisar Health Sciences University, Turkey (03/09/2021 numbered 445).

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