

Do food labels affect Turkish consumers' nutritional choices and expectations?

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Summary. *Objective:* Food labels are tools that contribute to nutritional education significantly by providing accurate and clear information for societies. The aim of this study was to determine factors having an influence on individuals about reading of food labels, problems they encounter, and nutritional values they want to see on food labels. *Subjects and Methods:* This cross-sectional study was carried out with 800 individuals aged 20 to 64 years old. A questionnaire form created by the authors was used for data collection. Independent Samples t-test and Chi-square (X^2) significance test were used for statistical analyses. The findings were evaluated at 95% confidence interval and $p < .05$ taken to indicate significance level. *Results:* According to results of the study all the participants read food labels. 66.5% of the participants in both genders read food labels because they thought this habit “contributes to healthy eating”, and 55.1% of them thought “information on food labels does not adequately meet their incompetency expectations”. The first two reasons for this incompetency were difficulty in finding production and expiry dates (26.3%) and tiny font size (18.3%). There were significant correlations between some food label symbols (“Gluten free”, “Recyclable”), food label statements (“fiber” and “light”), and gender ($p < .05$). Expecting to see some food information on labels such as carbohydrates (sugar content), total fat, light, top vitamins, amount of fiber, calcium, sodium, potassium and iron content differed by gender ($p < .05$). *Conclusion:* In order to benefit from food labels, rearrangement in all aspects to ensure healthy food choices, and clearer labels may be effective.

Key words: food labelling, consumer choice, gender, symbols, expectations

Introduction

A label is a material that provides information about the content of a product and enhances the comprehension of this information by consumers (1). The purpose of labeling is to provide accurate information related to health, safety, and economic concerns, to protect consumers and producers from persuasive packaging and advertisements, and to promote equitable competition and product marketing. However, reading the information partaking on the food label while purchasing packaged food is an considerable parameter in terms of providing food safety (2). Food labels are the most basic and healthiest source providing

information to the customers. It is important to ensure that the information on food labels should be accurate, clear and comprehensive to the consumers (3). Food labels contain the portion size, energy, and nutritional values of the given food (4,5). Consumers should be able to choose healthy food by reading nutrition facts on food labels during food purchase (6). Thus, the incidence of chronic diseases can be reduced, and management of the body weight can be controlled. In addition, some food labels include information about healthy eating (4,5). According to the literature there are correlations between reading food labels and high diet quality, low energy intake, increased consumption of fruit and vegetables, enhanced health outcomes and

other favorable activities (7-10). This study aims to determine factors affecting the food-label reading habits of consumers, problems they encounter while reading food labels and nutritional values they want to see on food labels.

Materials and Methods

Study Design

This cross-sectional study, was carried out with 800 individuals, 323 males (M:40.3%) and 477 females (F:59.7%), aged between 20 and 64 living in Ankara province which is the capital city of Turkey between December 2014 and May 2015. A questionnaire created by the authors was used to evaluate the sociodemographic and food label reading attributes. Pilot study of this questionnaire conducted with 50 volunteers to evaluate the validity of the items. Some items were reorganized based on the responses taken from the participants.

The first part of the questionnaire involved items examining general information about the participant (gender, age, marital status, education, employment, total number of family members, and diagnosis of a chronic disease), while the second part questioned the problems encountered during reading food labels, whether the symbols, phrases, and sample food labels were known, and other things that consumers wanted to see on food labels (Figure 1).

Research Ethics

This study was approved by the Ethical Committee of the Ankara University (179/1344/2014). The participants were informed about the purpose and the content of the study, and they were asked to sign a consent form.

Statistical Analysis

SPSS statistical software package was used in data analysis. The quantitative data were presented as mean and standard deviation values in the tables, while qualitative data were presented as numbers and percentages (%). The number “n” was considered for each choice while calculating percentages for items with multiple choices. For statistical analysis, Chi-square (X^2) significance test was used for non-parametric variables and Independent Samples t-test was used for parametric two independent groups. All data was split by gender. The findings were evaluated at 95% confidence interval and $p < .05$ determined as significance level.

Results

According to the results of the study, 40.3% (n:323) of the participants were male, 59.7% (n:477) were female, and 32.4% were married. Mean age of the participant was 30.1 ± 11.0 years. Approximately half of them (44.7%) were aged between 20 and 24. High school and college graduation rate was 47.1% and 45.5%, respectively. There was significant difference found between age groups, education levels and marital status according to gender ($p < .05$). The number of people in the family was ≤ 4 with 65.1%. 18.4% of the participants had at least a chronic disease. Prevalance of the most common diseases were 23.1% for hypertension, 21.8% for cardiovascular diseases and 15.4% for diabetes.

All of the participants stated that they read food labels. Table 1 presents the factors that affect the participants for reading food label information. Accordingly, in both genders, the most given response (66.5%) was reading food labels because of “its contribution to healthy eating” (M:71.2%; F:63.2%), and the second popular response (11.1%) was “comparing

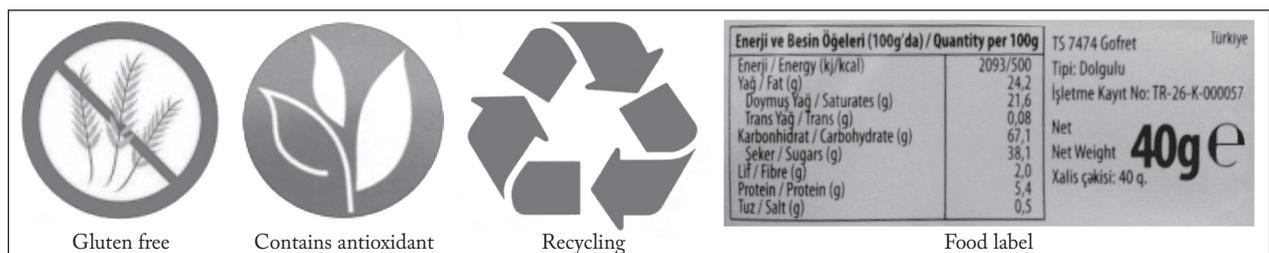


Figure 1: Symbols, selected sample food label

Table 1. The distribution of the most effective factors for reading food labels by gender, n (%)

Effective factors on reading food labels	Male	Female	Total	<i>p</i>
Going on a diet	15 (4.6)	29 (6.0)	44 (5.5)	0.002
Maintaining body weight	12 (3.7)	45 (9.4)	57 (7.1)	
Having a chronic disease	8 (2.5)	10 (2.0)	18 (2.3)	
Contribution to healthy eating	230 (71.2)	301 (63.2)	531 (66.5)	
Comparing two different products	39 (12.2)	50 (10.6)	89 (11.1)	
Contribution to nutritional awareness	19 (5.8)	42 (8.8)	61 (7.5)	

Table 2. Distribution of problems related to food label information by gender, n (%)

Problems related to food label information *	Male (n:168)	Female (n:273)	Total
Difficulty in finding production and expiry dates	51 (30.3)	65 (23.8)	116 (26.3)
Inconsistency about net amount and food label information	25 (14.8)	43 (15.7)	68 (15.4)
No price	15 (8.9)	19 (7.0)	34 (7.7)
Faint label print	20 (11.9)	29 (10.6)	49 (11.1)
Incomprehensive label language	21 (12.5)	41 (15.9)	62 (14.0)
Too small font size	26 (15.4)	55 (20.1)	81 (18.3)
Label information isn't highlighted	11 (6.5)	19 (7.0)	30 (6.8)
Label information is not written on the front side	10 (5.9)	14 (5.1)	24 (5.4)

*Participants choice more than one reason.

similar products of two different brands" (M:12.2%; F:10.6%). However, the third effective factor was "maintaining body weight" in women (9.4%), whereas it was "contribution to nutritional awareness" in men (5.8%) (Table 1).

The participants (n 441) thought that the information on food labels did not adequately meet their expectations (55.1%) (M:52.0%; F:57.2%). Among the reasons for that were difficulty in finding the production and expiry dates (26.3%), too small font size (18.3%), inconsistency between net amount and food label information (15.4 %), and incomprehensive label language (14.0%) (Table 2).

Meaning of some of the symbols, icons and statements on the food label were asked to the participants (Table 3). According to Table 3, the rate of 5 correct answers in women and 2 in men was over 50.0%. On the other hand, frequency of incorrect responses was found to be high in two genders (M:85.8%; F:74.6%) when they were asked about the caloric density of a selected food label. While antioxidant symbol awareness was determined to be insignificant by gender ($p>0.05$), the difference between correct responses

about other symbols, statements, and selected sample food label was found significant by gender ($p<0.05$). The mean score of the questions asked in this section was 3.64 ± 1.69 (M: 3.19 ± 1.66 points and F: 3.94 ± 1.65 points), and the scores classified by gender were statistically significant ($p<0.05$).

Table 3. Correct responses to questioned symbols, selected sample food label, and phrases, n (%)

Symbols, selected sample food label, and phrases		True	False	<i>p</i>
Gluten free	M	141 (43.7)	182 (56.3)	0.000
	F	296 (62.1)	181 (37.9)	
Contains antioxidant	M	73 (22.6)	250 (77.4)	0.989
	F	108 (22.6)	369 (77.4)	
Recycling	M	263 (81.4)	60 (18.6)	0.000
	F	420 (88.1)	57 (11.9)	
Food label	M	46 (14.2)	277 (85.8)	0.000
	F	121 (25.4)	356 (74.6)	
Fiber	M	151 (46.7)	172 (53.3)	0.000
	F	323 (67.7)	154 (32.3)	
Light	M	149 (46.1)	174 (53.9)	0.000
	F	309 (64.8)	168 (35.2)	

M:Male, F:Female

Table 4 presents the distribution of nutrients of which the participants wanted to see on food labels by gender. Willingness to read carbohydrates (sugar content), total fat, light, salt and sodium, most common vitamins, fiber, calcium, potassium and iron content differed statistically by gender ($p < .05$), however the rate of others did not yield a significance ($p > 0.05$). Moreover, though not statistically significant, the frequency of women who thought energy value, saturated fat, cholesterol, and protein content should always take part on food labels was determined to be higher than men.

Discussion

Adequate and balanced nutrition is important in increasing the life quality of individuals. As a part of that it is necessary to effectively use food label facts while choosing healthy foods. Thus, it is also possible to gain healthy eating habits. Nowadays, although consumers are aware of nutrient content of some foods, it is generally thought that the information on food labels of packaged foods is not always clear, consumers have somewhat difficulty in reading food labels, and that food labels can be confusing for consumers. For this reason, food labels should include clear and practical information about the product. Therefore, determining the factors which affect consumers' food label

reading, also the problems encountered while reading food labels and the nutrients consumers would like to see on food labels was examined in this study.

As a result of the study, it was determined that all of the participants (n:800) were reading nutritional labels. In 65 of 120 studies conducted on consumers' reading habit of food labels, it was found that consumers read the information on food labels (10). In some of that studies based on individuals' self reports, consumers read food labels in detail (11-13). In other studies, the reading rate according to age group is evaluated and found that middle aged and young adults generally read food labels (10). The larger part of the participants in the study (83.9%) was made up of adults aged between 20 and 40, and most were high school and university graduates (92.6%). It was shown in most studies on food label reading that the habit of reading food labels was high in those with high educational levels (5,14-19). The high educational level in this study (with 92.6%) may have been effective in reading food labels. The high rates of food label reading in young and middle aged participants and in those with high educational levels can be explained by the fact that these variables are efficient on health awareness.

As the consumers' own statements are valid in such studies most of the time, the responses may also meet social expectations. For this reason, consumers are interested in food label information without fully

Table 4. The distribution of nutrients that the participants willing to see on food labels by gender, n(%)

Statements	Male			Female			<i>p</i>
	Always	Sometimes	Never	Always	Sometimes	Never	
Energy	280 (86.7)	31 (9.6)	12 (3.7)	434 (91.0)	30 (6.3)	13 (2.7)	0.152
Carbohydrate (sugar content)	238 (73.7)	72 (22.3)	13 (4.0)	395 (82.8)	65 (13.6)	17 (3.6)	0.005
Total fat	227 (70.3)	77 (23.8)	19 (5.9)	373 (78.2)	82 (17.2)	22 (4.6)	0.039
Saturated fat	216 (66.9)	77 (23.8)	30 (9.3)	341 (71.5)	104 (21.8)	32 (6.7)	0.273
Light	202 (62.5)	73 (22.6)	48 (14.9)	318 (66.7)	117 (24.5)	42 (8.8)	0.029
Cholesterol	213 (65.9)	61 (18.9)	49 (15.2)	329 (69.0)	93 (19.5)	55 (11.5)	0.323
Protein	215 (66.6)	62 (19.2)	46 (14.2)	342 (71.7)	88 (18.4)	47 (9.9)	0.137
Salt and Sodium	201 (62.2)	62 (19.2)	60 (18.6)	327 (68.6)	95 (19.9)	55 (11.5)	0.020
The most common vitamins	195 (60.4)	63 (19.5)	65 (20.1)	336 (70.4)	82 (17.2)	59 (12.4)	0.004
Fiber	164 (50.8)	77 (23.8)	82 (25.4)	299 (62.7)	110 (23.1)	68 (14.3)	0.000
Calcium content	188 (58.2)	61 (18.9)	74 (22.9)	338 (70.9)	78 (16.4)	61 (12.8)	0.000
Potassium content	183 (56.7)	68 (21.1)	72 (22.3)	318 (66.7)	88 (18.4)	71 (14.9)	0.008
Iron content	190 (58.8)	61 (18.9)	72 (22.3)	136 (70.4)	73 (15.3)	68 (14.3)	0.002

understanding the information on food labels. The most influential factor on reading food labels in this study was reported to be “contribution to healthy eating” (66.5%, Table 1). It was shown in some studies that only a general health statement on the food label induced an increase perception of the food as healthy (20-26). On the other hand, there are also studies showing that information on a label perceived as the risk of any illness had stronger effect in the choice of purchase (23,24).

In this study, the second important factor in food label reading of the participants was “comparing two similar products of different brands” (11.1%) (Table 1). Ares et al. (22) reported that brand name is the most significant factor on purchasing healthy food, and that there are two types of consumers in terms of purchasing. While the first group of customers take brand name and healthy content into consideration, the second group look for a certain brand and good taste. For this group, health benefits and price are less important than the other group of customers.

Another factor effective in reading food labels was statements related to chronic diseases (20). However, this study found that the least effective factor in reading food labels was statement of a chronic disease (2.3%) (Table 1). This may have been caused from the fact that the majority of the participants were young or middle aged adults, and that the rate of those who were diagnosed with a chronic disease was low with 18.4%. Saba et al. (24) determined that products with a general health statement were preferred less than products stating that they reduced the risk of any diseases. On the other hand, van Kleef et al. (23) found that health statements related to heart, cancer, and osteoporosis on food labels was more effective than other health statements such as reducing stress, and good for skin.

Making almost all the information on food labels more understandable (e.g. optimal font size and print color, statements, symbols, logos, and measurement units) is important for social nutritional education. More than half of the participants (n:441; 55.1%) in the study thought that the information on food labels did not meet their expectations (M:52.0%; F:57.2%). Accordingly, the primary reasons were found to be difficulty finding production and expiry dates (26.3%), very little font size (18.3%), inconsistency between the

net amount of the product and the statement on the label (15.4%), incomprehensible label language (14.0%), location of the label on the package other than front face (5.4%), and unnoticeable print color (6.8%) (Table 2). Van Kleef & Dagevos (2015) reported that in particular, simplified nutrition labelling located on the front of packs has the potential to effectively inform consumers of the healthiness of food products and help prefer more conscious food choices (27).

Jacobs et al. (26) conducted study to investigate difficulties that consumers had while reading and understanding food label information. The results of the study was consistent with this study, as customers were disturbed by very small font size on food labels. Besler et al. (28) found in a similar study that food label information was incomprehensible and the label font was too small, also 24.9% of the consumers partly understood food label information, 19.6% understood nothing. By correcting these negative outcomes, it is possible to prevent meaning confusion in food label information, to increase food label reading, and to lead positive changes while choosing healthy food. In a literature review related to this topic carried out in America and Canada, it was revealed that consumers had several difficulties in understanding food label information both on the front and back of the food package. In that review, it was stated that the food label information on the front side of the food package should be written in a simpler language, and that a content table with simple and clear language should be included. It was also additionally stated that the terms used on the label should be presented with a simple language such as “high”, “medium”, and “low”, the color should be noticeable, and that a traffic lamp-like system should be used to indicate the value of all nutrients in terms of health (29).

In addition to mandatory label information in our country, some symbols are also used on food labels. A great majority of community, consumers' interest in reading food labels and understanding statements and symbols is effective in their food label reading. Besler et al. (28) determined that the meaning of symbols and abbreviations on food labels were not understood by the customers. While there was no significant difference between knowing what “antioxidant” symbol meant by gender ($p>0.05$), there was a significant dif-

ference between had knowledge of other symbols by gender ($p < .05$) (Table 3). Many of the studies investigating whether food label information was read by consumers; was reported that women read food labels much higher than men (5,15,18,30-33). In accordance with other studies conducted on this subject, the rate of 5 correct answers in women and 2 in men was over 50.0% in this study. The mean score obtained from the statements in Table 3 was 3.64 ± 1.69 (M:3.19 \pm 1.66 and F:3.94 \pm 1.65), and the scores obtained were statistically different by gender ($p < .05$).

“Recycling” symbol on the food label was known by the majority of the participants in the study. This may be due to increased awareness in the society as well as implementation of environmental protection policies Turkey. It’s noteworthy, however, that the number of those who did not know such health-related symbols as “gluten free” (M:56.3%, F:37.9%) and “contains antioxidants” (M:77.4%, F:77.4%) was high (Table 3). This result may be due to the rate of those who had chronic diseases in the study was only 18.4%, and that individuals paid attention to health-related warnings on food labels when they or their family members had a chronic diseases (such as celiacs) investigated. Indeed, some studies showed that consumers investigated food label symbols more in the presence of a chronic disease (23,24). In another study carried out in Spain and Denmark, it was found that symbols could be misinterpreted due to cultural differences, however the interest in food labels can increase visually to a great extent (34). Bix L et al. (35) studied the effect of attention getting properties of food labels on the front side of food packages with eye contact duration in vitro and they found that prolonged examination of food label by faster but attractive eye contact. In addition, they determined that the reaction time given to food labels which use color-code system on the front side was faster. In this study, selected sample food label was shown to participants and they were asked how many calories it contains. As a result, the frequency of wrong response in both genders were high (M:85.8%, F:74.6%) and the mean difference found significant ($p < .05$).

Nowadays, food labeling is attracting more attention as a mechanism which is likely to put an impact on people’s diets at the population level to provide a sup-

porting remedy for high and growing levels of obesity and nutrition diseases (36-37). World Health Organization (WHO) and Food and Agriculture Organization (FAO) declared that in order to prevent common health problems, energy intake, total fat and trans fat, sugar and sodium should be reduced in the diet (38). Nutrition labels generally involves information about calories, serving size, and amounts and/or daily values of many macronutrients, vitamins, and minerals (e.g., carbohydrate, fats, calcium, Na) (39). For this reason, food labeling has become a part of dietary habits, physical activity and health strategies of WHO since 2004 (40). In the study, participants who wanted carbohydrate (sugar content), total fat, light, salt and sodium content, most common vitamins, fiber, calcium, potassium and iron content as label information were differed by ($p < .05$, Table 4). These results may be due to the increased awareness that amount of food intake for the treatment of increasing diseases associated with nutritional deficiencies (malnutrition, vitamin D deficiency, anemia, cancer, cardiovascular diseases, allergy, asthma, and obesity) (2).

Jacobs et al. (26) found that consumers read information about fat and cholesterol content in nutritional information of food labels. It was determined in a study carried out in Holland on this topic that “ \sqrt{b} ” symbol, which meant “contains low energy, sugar, salt, saturated fat, and abundant fiber” and was used for body weight control, was known by 62.0% of consumers, especially more by women (68%) (41). Although not statistically significant, women wanted to see saturated fat, protein and energy content of a packaged food more than men (Table 4). In some studies conducted on the same subject, it was determined that willingness to examine the food label was related to customers’ health, for instance a customer needs to low-fat food was interested in fat content on food label (7,42-43).

Conclusion

In conclusion, consumers living in Turkey are willing to read food labels. In this study, it was found that all of the participants were reading nutritional labels. Label readings of consumers with a high level of education and young and middle age groups were found

to be high. The most influential factor on reading food labels in this study was reported to be "contribution to healthy eating". More than half of the consumers stated that they could not meet the expectations of the information on the food labels. In addition to, findings reveal that there were significant correlations between some food label symbols, food label statements and gender. Expecting to see some food information on labels such as carbohydrate (sugar content), total fat, light, top vitamins, amount of fiber, calcium, sodium, potassium and iron content differed by gender.

Food labels are effective tools that help individuals make healthy food choices, and the information on the labels have an influence on the purchasing stage. Therefore it is recommended by the study that educational programs should be developed so that individuals can read food labels effectively, the symbols and statements on food labels can be taught via public spots, and that public awareness can be raised for reading and perceiving the food labels correctly.

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