Consumers' knowledge, attitude, and practice regarding Front-of-package (FOP) labels at the point of purchase

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Abstract

Background: Food labeling is one of the information promotion policies designed to support necessary information of the products that consumer purchase. However, food labeling giving incentives to the food industry to reformulate their products with healthier nutrients.

Methods: This cross-sectional study was conducted as a point-of-purchase survey on 550 shoppers in chain stores in Tabriz, Iran. Data was collected using a structured questionnaire that assessed the respondents' knowledge, perception, and behaviors towards the information on food labels.

Results: The results showed that 91.8% of the consumers had knowledge about food label information. Among all the nutritional information included on food labels, the participants were most aware of the information about the calories and fat content of the foods. Most of the respondents (84.7%) paid attention to food labels to observe the expiration and production dates, 51.6% were looking at food prices in food labels, and only 8.7% of the participants read food labels to obtain information about the food additives and artificial color contents.

Conclusion: Our study suggests that food labeling could be an effective measure in health policy when the consumers' nutrition knowledge and awareness regarding how to use and interpret the information on food labels increases.

Introduction

Unhealthy food choices and diets can contribute to major non-communicable diseases (NCDs) such as obesity, type 2 diabetes, various cancers, and cardiovascular diseases (1)

NCDs currently comprise over 35 million disease cases per year, two-thirds of the world's deaths, and are expected to account for 60% of the disease burden and 73% of all deaths in the world by 2020 (2). Unhealthy diet, physical inactivity, smoking, and stress influence one’s risk factors of NCD incidence. In 2004, the World Health Organization (WHO) released the global strategy on diet, physical activity, and health. For a healthy diet, it suggested several individual goals such as achieving an energy balance and a healthy weight, decreasing energy intake from total fats and shifting fat consumption away from saturated fats to unsaturated fats and near the elimination of trans-fatty acids, increasing the consumption of fruits, vegetables, legumes, whole grains, and nuts, limiting the intake of free sugars, and limiting salt consumption from all sources and ensuring that salt is iodized (3). Several factors such as economic (household incomes, prices of goods), social, and demographic determinants as well as consumers' beliefs and lifestyle affect their choices. In order to reduce NCD incidence and overcome unhealthy eating, countries have implemented several policies such as information measures supporting informed choice and policies aimed at changing the market environment.

Food labeling is one of the information promotion policies designed to report necessary information such as nutritional values or ingredients of the products that consumers purchase (1, 4–6). Moreover, food

labeling motivates the food industry to reformulate their products with healthier nutrients. Several studies have indicated that food labeling plays an important role in consumers' decisions of choosing a healthy and balanced diet. A study reported that patients with chronic diseases who read nutrition labels tended to consume fewer calories, saturated fatty acids, and carbohydrates (5). In another research using the data from the Korea National Health and Nutrition Examination Survey (KNHANES), it was reported that consumers who read nutrition labels had a lower risk of developing metabolic syndromes (7). Experimental evidence, however, suggests that only two-thirds of the consumers with a particular interest in healthy eating, actually pay attention to food labels when shopping (1, 8). These results suggested that in most countries the effectiveness of food labeling is varied by culture, nutritional knowledge, and demographic characteristics of the population.

It is important to identify the factors affecting consumers’ use of food labels, in order to design food labeling regulations, improve public health, and enhance the profitability of the food industry (9).

The present research is designed to assess consumers' knowledge, attitude, and practice (KAP) regarding the information on food labels of the products that they purchase from chain supermarkets in Tabriz City.

Materials And Methods

Study design

The present study was a descriptive cross-sectional study conducted as a point-of-purchase survey to assess the KAP of the customers of food chain store about the information of food labels on pre-prepared and canned food products. All data collection procedures, methods and informed consent procedures were approved by ethical committee of (citation removed for blind review) and performed in in accordance with the Declaration of Helsinki.

Sampling And Data Collection

According to a similar study, the sample size was determined to be 500 using a mathematical formula and, taking into account the likelihood of failure, 550 participants were eventually considered. Using convenience sampling from three major chain stores in the city (citation removed for blind review) city (citation removed for blind review), four branches of the (citation removed for blind review), two branches of (citation removed for blind review), and two branches of the (citation removed for blind review) chain stores were chosen for the survey. The percentage of interviewees per store was similar in all eight stores.

After obtaining the requisite permits from store managers and consent from participants, data collection started. The verbal consent from illiterate participants and the written informed consent from those who could read and write in Persian was obtained. Five trained research assistants asked general shoppers to participate in the 15-20-minute survey, explaining the study goal to them when the shoppers decided to participate.

It included only participants aged 18 years or older. The consumers participated voluntarily in the study without the impact of any incentives. The structured questionnaire comprising four parts was used for measuring respondents' background, knowledge, perception, and behaviors regarding information and contents of food labels.

The socio-demographic characteristics such as gender, age, household size, marital status, education level, occupation, and monthly income was asked in respondents' background. The knowledge section of questionnaire contained three multiple-choice questions that evaluated the basic knowledge and concept of food labels of the participants'.

However, the participants' perception and behavior about characteristics of food labels ,and also applicability of food labels during purchasing food products and the reasons for checking or not checking food labels was assessed on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) by ten questions. (9).

The questionnaire was piloted to recognize and solve potential problems. All the completed questionnaires were coded and the data were analyzed using SPSS statistical software (version 23, SPSS Inc, Chicago, IL, 2018). Data analysis was carried out in three stages. Data cleaning was carried out in the first stage to get rid of the data that contain missing responses. The descriptive statistics tests was used to reveal the underlying patterns. Finally, in order to determine the relationships between the variables, chi-square tests were carried out.

Results

Table 1 presents the socio-demographic characteristics of the respondents. The majority of the respondents were female (59.2%), young (56.8%), married (83.2%), had a high school diploma or higher education (81.4%), and 78.4% of their household sizes were between 2–4 people. A large percentage of the subjects (40.8%) had a monthly income between 3 to 6 million Rials.

Table 1
Socio-demographic characteristics of subjects

variables	Male			Female			Total	t	P-value
	Mean ± SD	Min	Max	Mean ± SD	Min	Max	Mean ± SD		
Age	40.05 ± 13.12	2	75	36.16 ± 11.28	15	65	38.13 ± 12.39	− 3.88	> 0.0001*
Household size	3.48 ± 1.01	1	7	3.6 ± 1.23	1	9	3.54 ± 1.12	1.14	0.2
Num. of household employed	1.34 ± 0.74	0	7	1.52 ± 0.81	0	6	1.43 ± 0.78	2.72	0.007*
	Number		percent	Number		percent	Total	χ^2	P-value
Gender	279		50.7	271		49.3	550 (100)	-	-
Marital status	50		17.9	63		23.2	113 (20.5)	4.27	0.11
Single	227		81.4	207		76.4	434 (78.9)		
Married									
Education	3		1.1	6		2.2	9 (1.6)	9.25	0.02*
Illiterate	40		14.3	36		13.3	76 (13.9)		
Under diploma	69		24.7	95		35.1	164 (29.8)		
Diploma	167		59.9	132		49.1	299 (54.4)		
University									

Independent T test and chi-squared test was used for quantitative and qualitative, respectively.

variables	Male			Female			Total	t	P-value
	Mean ± SD	Min	Max	Mean ± SD	Min	Max	Mean ± SD		
Employment status	29		10.4	31		11.4	60 (10.9)	240.85	< 0.0001*
Unemployed	11		3.9	0		0	11 (2)		
workers	106		38	61		22.5	167 (30.4)		
Employee	89		31.9	16		5.9	105 (19.1)		
Self-employed	43		15.4	11		4.1	54 (9.8)		
Retired	1		0.4	151		55.7	152 (27.6)		
Homemaker									
Monthly family income (Rial)	13		4.7	11		4.1	24 (4.4)	2.52	0.64
Under 3 million	6		2.2	8		3	14 (2.5)		
Between 3 to 6 million	39		14	44		16.5	83 (15.1)		
Between 6 to 10 million	55		19.7	61		22.9	116 (21.1)		
Between 10 to 15 million	165		59.1	142		53.4	307 (55.8)		
Over 15 million									

Independent T test and chi-squared test was used for quantitative and qualitative, respectively.

variables	Male			Female			Total	t	P-value
	Mean ± SD	Min	Max	Mean ± SD	Min	Max	Mean ± SD		
Household food costs	15		5.4	14		5.2	29 (5.3)	3.09	0.68
Under 1.5 million	22		7.9	25		9.2	47 (8.5)		
Between 1.5 to 3 million	42		15.1	41		15.1	83 (15.1)		
Between 3 to 5 million	78		28	61		22.5	139 (25.3)		
Between 5 to 7.5 million	121		43.4	124		45.8	245 (44.5)		
Over 7.5 million									
Referral frequency to chain stores	40		14.3	35		12.9	75 (13.6)	4.24	0.37
Weekly	28		10	16		5.9	44 (8)		
Several times in a week	93		33.3	99		36.5	192 (34.9)		
Monthly	57		20.4	59		21.8	116 (21.1)		
Several times in a month	54		19.4	61		22.5	115 (20.9)		
Several times in a year									
Independent T test and chi-squared test was used for quantitative and qualitative, respectively.									

Among the participants, 8.2% had no information about food labels. However, about 43.7% of men and 56.5% of women were aware of the nutritional information and type of applied front-of-package (FOP) food labels (Fig. 1).

The consumers' awareness of the nutritional information components namely calories, macronutrients, micronutrients, fiber, sodium, and cholesterol is shown in Fig. 2. Among all the nutritional information included on food labels, the participants were most aware of the information about the calories and fat content of the food.

The participants’ practice on labels included packaging at the time of purchase was also examined and presented in Table 2 based on their demographic characteristics. The subjects’ attention to food labels

had a significant relationship with the level of education so that those with academic education had the highest level of attention to food labels and the other socio-demographic characteristics had no significant association with their level of attention. Among the subjects who always paid attention to labels at purchase time, 58% had higher education.

Table 2
– Distribution of attention to food labels based on the socio-demographic characteristics of the study population

Variables	Attention to labels at purchasing time				X2 value	P-value
	Always	Often	Sometimes	Never		
Gender	148 (47)	73 (57)	46 (48.4)	4 (33.3)	4.99	0.17
Male	167 (53)	55 (43)	49 (51.6)	8 (66.7)		
Female						
Marital status	55 (17.5)	30 (23.4)	24 (25.3)	4 (33.3)	8.15	0.22
Single	259 (82.5)	97 (75.8)	70 (73.7)	8 (66.7)		
Married						
Education	5 (1.6)	2 (1.6)	0 (0)	2 (16.7)	30.34	< 0.0001*
Illiterate	45 (14.4)	18 (14.1)	10 (10.5)	3 (25)		
Under diploma	81 (25.9)	40 (31.3)	41 (43.2)	2 (16.7)		
Diploma	182 (58.1)	68 (53.1)	44 (46.3)	5 (41.7)		
University						
Employment status	32 (10.2)	12 (9.4)	15 (15.8)	1 (8.3)	12.61	0.63
Unemployed	6 (1.9)	4 (3.1)	1 (1.1)	0 (0)		
workers	96 (30.6)	40 (31.3)	28 (29.5)	3 (25)		
Employee	65(20.7)	24 (18.8)	14 (14.7)	2 (16.7)		
Self-employed	34 (10.8)	7 (5.5)	10 (10.5)	3 (25)		
Retired	81 (25.8)	41 (32)	27 (28.4)	3 (25)		
Homemaker						
Location of living	79 (62.2)	29 (22.8)	15 (11.8)	4 (3.1)	6.24	0.39
High SES…districts	188 (56.3)	72 (21.6)	66 (19.8)	8 (2.4)		
Moderate SES districts	36 (58.1)	16 (25.8)	10 (16.1)	0 (0)		
Low SES districts						
Chi-Square						
*p < 0.05 is significant						
… Socio-economic Status						

As depicted in Table 3, there was a statistically significant difference between men and women in terms of reasons for paying attention to food labels, which included paying attention to the kind of the product, observing the price, and observing the weight of the products ($p < 0.05$).

Table 3
– Consumers' reasons for their practice regarding to food labels

Reasons	Total N (%)	Male N (%)	Female N (%)	χ^2 value	P-value
Observing the expiration and production date	466 (84.7)	227 (84.4)	239 (89.5)	3.75	0.15
Paying attention to the kind of food product	178 (32.4)	102 (37.9)	76 (28.8)	5.26	0.02*
Observing the Price	284 (51.6)	165 (61.3)	119 (44.6)	15.12	< 0.0001*
Observing the weight of products	63 (11.5)	41 (15.2)	22 (8.2)	6.33	0.01*
Considering the Food ingredients	100 (18.2)	50 (18.6)	50 (18.7)	0.002	0.96
Gaining the nutritional information	74 (13.5)	31 (11.6)	43 (16.1)	2.31	0.12
Observing the food additives & artificial colors contents	49 (8.9)	21 (7.8)	28 (10.5)	1.15	0.28
Chi-Square					
*p < 0.05 is significant					

Discussion

This study explored whether the subjects' knowledge and awareness of food labels were acceptable or not. Among the subjects, 92% had information about food labels and the level of knowledge in women was higher than men. The highest level of awareness was of price and date (expiration and production date) and the lowest level of knowledge was about food additives and artificial colors. The results of studies on the use of nutrition labels by consumers and their awareness of these labels on packaged foods are very different. In some of these studies, little awareness has been reported, and in others, it is reported more often, which can be due to many reasons such as nutritional knowledge, education, age, health consideration, and nutritional contents (9–14).

In the present study, most of the participants claimed that they always read food labels when they purchase food, and the level of attention in women was more than men (53% versus 47%). Similar results were also found in the study by Begum, in which 54% of the subjects stated that they pay attention to food labels on packages at sale points (15). Orozco et al. stated that more than 50% of the study subjects in Ecuador reported not using any of the nutrition label information on processed foods at the time of purchase due to the lower level of education and the accompanying high rate of illiteracy (16).

In this study, among the information that is included on food labels namely nutrients, calorie, carbohydrate, protein, fat, vitamins, iron, cholesterol, sodium, and fiber content, the participants were most attentive to calories and fat content on the labels and this level of attention was higher in women compared with men (55.7% versus 37.3% for calorie and 53.9% versus 43% for fat). In the last years, people's thoughts have changed regarding body image and obesity in many countries including Iran. Haghighian Roudsari reported that attention to fitness was one of the main determinants of choosing foods with low fat content and calories with the impression that these foods could improve their appearance (17). Abbot also revealed that most of the consumers use labels for a special interest such as health concerns regarding calorie and fat content (18). The minimum level of attention to the items in the table on food labels was related to the attention to the amount of iron and dietary fiber which was approximately equal between men and women. Consistent with the results of previous studies, women are more interested in using food labels than men (14, 19). In the study conducted by Kasapila and Shawa, it was reported that women have a higher tendency than men to use nutrition labels when purchasing food products (20).

The reasons for consumers' attention to food labels have also been studied. The evidence has revealed that the most important reason for using food labels is observing the expiration and production dates, followed by checking the product price. Many studies on food labels have shown similar results (9, 21–23). The present findings revealed that women's attention to food labels for observing expiration dates, nutritional information, and food additives was higher than men's. Meanwhile, the weight of the product and its price were the main reasons for checking food labels in men. In the study by Jung (24), it was reported that women paid attention to food labels more often than men, and the key reason for assessing food labels was checking the expiration date (60%), food's ingredients (16.4%), and nutritional information (13.7%). This might be associated with the design of nutrition labels on food packages, the difficulties to understand the concepts of the items on nutrition labels (15), and the non-user-friendly design (14).

Consumers with a higher education had better practice on food labels than those with lower education levels, which confirmed the results of previous studies (11, 12, 14). This finding revealed that higher education could lead to higher nutritional knowledge and literacy in people and help them to use nutrition labels better. Previous researchers have disclosed that women, married individuals, and highly educated people had a higher tendency to use nutrition labels.

Conclusion

The results of this study demonstrated that consumers need to be trained to optimally use nutrition labels in order to be able to make healthy food choices. A well-designed educational program should be executed to clarify the meaning of the items and symbols as well as the value messages on the labels. This is especially important when they intend to compare several foods from a food group in order to choose healthy ones. Although nutrition labels are frequently used, the actual use is considerably lower. It should be mentioned that most of the time, consumers stated they read the nutrition labels, but this does not necessarily mean the use of the label (25). Thus, it is recommended to food industries to establish a nutrition label format with better quality in terms of color, font, size, and clarity so that it can be easily used by the general public.

Declarations

Ethical approval and consent to participate

This study was approved by the Ethics Committee at Tabriz University of Medical Sciences. Data collection began after obtaining necessary permissions from store managers and informed consent from all of the participants.

Consent for publication

Not applicable

Availability of data and materials

Not applicable

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

(Blinded) and (blinded) contributed to the conception of the work, and (Blinded) and (blinded) conducting the research steps and sampling. (Blinded) and (blinded) were responsible for drafting manuscript. All authors drafted the work revising it critically for important intellectual content and approved the final version to be published.

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References

1. Brambila-Macias J, Shankar B, Capacci S, Mazzocchi M, Perez-Cueto FJ, Verbeke W, et al. Policy interventions to promote healthy eating: a review of what works, what does not, and what is promising. Food and nutrition bulletin. 2011;32(4):365-75.
2. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. The lancet. 2006;367(9524):1747-57.
3. Organization WH. Global status report on noncommunicable diseases 2014. World Health Organization; 2014.
4. Hawkes C, Organization WH. Nutrition labels and health claims: the global regulatory environment. 2004.
5. Post RE, Mainous III AG, Diaz VA, Matheson EM, Everett CJ. Use of the nutrition facts label in chronic disease management: results from the National Health and Nutrition Examination Survey. Journal of the American Dietetic Association. 2010;110(4):628-32.
6. Taylor CL, Wilkening VL. How the nutrition food label was developed, part 1: the Nutrition Facts panel. Journal of the American Dietetic Association. 2008;108(3):437-42.
7. Kang H-T, Shim J-Y, Lee Y-J, Linton J, Park B-J, Lee H-R. Reading nutrition labels is associated with a lower risk of metabolic syndrome in Korean adults: The 2007–2008 Korean NHANES. Nutrition, Metabolism and Cardiovascular Diseases. 2013;23(9):876-82.
8. Wills JM, Grunert KG, Fernandez Celemin L, Storcksdieck genannt Bonsmann S. European consumers and nutrition labelling. Food Eng Ingredients. 2009;34(3):11-3.
9. Bazhan M, Mirghotbi M, Amiri Z. Food labels: An analysis of the consumers' reasons for non-use. Journal of Paramedical Sciences. 2015;6(1).
10. Higginson CS, Kirk TR, Rayner M, Draper S. How do consumers use nutrition label information? Nutrition & Food Science. 2002;32(4):145-52.
11. Mahgoub S, Lesoli P, Gobotswang K. Awareness and use of nutrition information on food packages among consumers in Maseru (Lesotho). African Journal of Food, Agriculture, Nutrition and Development. 2007;7(6).
12. Ranilović J, Colić Barić I. Differences between younger and older populations in nutrition label reading habits. British Food Journal. 2011;113(1):109-21.
13. Shine A, O'Reilly S, O'Sullivan K. Consumer use of nutrition labels. British Food Journal. 1997;99(8):290-6.
14. Themba G, Tanjo J. Consumer awareness and usage of nutrition information in Botswana. Bus Manage Horiz. 2013;1:44.
15. Begum V. Effects of Kellogg's Nutritional Label on Consumer Buying Behaviour in Dubai, UAE. Procedia-Social and Behavioral Sciences. 2015;211:1195-202.

16. Orozco F, Ochoa D, Muquinche M, Padro M, Melby CL. Awareness, Comprehension, and Use of Newly-Mandated Nutrition Labels Among Mestiza and Indigenous Ecuadorian Women in the Central Andes Region of Ecuador. Food and nutrition bulletin. 2017;38(1):37-48.
17. Haghighian Roudsari A, Vedadhir A, Amiri P, Kalantari N, Omidvar N, Eini-Zinab H, et al. Psycho-socio-cultural determinants of food choice: A qualitative study on adults in social and cultural context of Iran. 2017;12(4):241.
18. Abbott R. Food and nutrition information: a study of sources, uses, and understanding. British food journal. 1997;99(2):43-9.
19. Kim SY, Nayga Jr RM, Capps Jr O. Food label use, self-selectivity, and diet quality. Journal of Consumer Affairs. 2001;35(2):346-63.
20. Kasapila W, Shawa P. Use and understanding of nutrition labels among consumers in Lilongwe (Malawi). African Journal of Food, Agriculture, Nutrition and Development. 2011;11(5):5171-86.
21. Gonzalez-Roa MdC, Calatrava-Requena J. Food labeling use and differentiated consumers behavior: A survey analysis in spanish food market. 2008.
22. Hyang S, Kyong A. Consumer's awareness and utilization for food labels. Journal of the Korean Scociety Food Science Nutrition. 1999;28:948-53.
23. Kim N-Y, Lee J-S. A study on perception and utilization of food-nutrition labeling by age in Busan residents. Journal of the Korean Society of Food Science and Nutrition. 2009;38(12):1801-10.
24. Jung H-Y, Kim H-A. Consumer's perception and utilization of food labels by age and gender. Journal of the Korean Society of Food Science and Nutrition. 2016;45(3):437-44.
25. Grunert KG, Wills JM. A review of European research on consumer response to nutrition information on food labels. Journal of public health. 2007;15(5):385-99.