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Nutrition Knowledge: Application and Perception of Food Labels Among Women

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Abstract: Knowing the level of consumers' nutritional knowledge is useful for promoting dietary habits. The aim of this study was to assess women's nutritional knowledge and their food label perception and their correlates. Three hundred and eighty Women referring to four large supermarkets in Shiraz were selected for this study. Data were collected through face-to-face interview. The NKQ questionnaire was used for designing the study questionnaire. The first part contained demographic characteristics and the second section encompassed questions related to nutritional knowledge of consumers about food components. The third part consisted of questions about labeling. Data were analyzed using SPSS 16. ANOVA and t-test were used for analyzing multi-variant variables. Chi-square test was used for evaluating the relationship between variables. 49.7% of the participants were healthy and others had chronic diseases. The mean score of the women's nutrition knowledge was 20.13 (from 24) and the average knowledge of women about food components were near 50%. Consumers' information about food labels application was less than 50% for all situations. The lowest use of labels was about low-salt labels and the highest for calorie content of foods. There was a significant relationship between educational status and food label use and also a significant relationship between information about added sugar and using low-sugar labels and between knowledge about low-salt foods and using low-salt labels. A significant relationship was also seen between knowledge about fat and cholesterol use for low fat foods. So, label application was correlated with educational level and nutritional knowledge of women.

Key words: Nutritional knowledge, food labeling, label application, food components

INTRODUCTION

Nutritional knowledge of consumers and their perception about food labels are very important tools for improving dietary patterns toward a healthy diet (De Vriendt *et al*., 2009; O'Brien and Davies, 2007). Health problems due to nutrition and dietary habits, including obesity and overweight, exert a high burden on the society which leads to health epidemic problems in the 21st century (Fisberg *et al*., 2004). Many studies deciphered that nutritional information has a fundamental role in achieving a healthy life-style in people (Wills *et al*., 2009). One of the best ways for delivering health messages on nutrition and diet to consumers for better food choices is food labeling (Tudoran *et al*., 2009). Knowledge on the nutritional labeling can affect people's eating habits (Driskell *et al*., 2008). The ability for reading, perception and correct application of food labels is very crucial (Hong *et al*., 2011). Nutritional labels are good tools for keeping consumers informed about their food and diet composition (Graham and Jeffery, 2011). One way for helping consumers to make healthy food choices is a good policy for labeling (Wansink and Sobal, 2007). Using nutritional facts on labels can help to reduce daily intakes of calorie, fat, saturated fatty acids, cholesterol and sodium (Kim *et al*., 2000).

In addition, developers of food labels should consider less technical labels for consumers' perception (Lubman *et al*., 2012). Today, food labels are important tools providing good information about nutritional values of products such as calorie content, fat amount and type and etc. (Wills *et al*., 2009; Visschers and Siegrist, 2009). Specific nutritional educations that are common in primary schools in some countries (Ruzita *et al*., 2007) can affect nutritional knowledge of adults and next generations in future.

Knowing the level of consumers' nutritional knowledge is very useful for promoting their dietary

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habits according to influential variables such as cultural factors and understanding of food labeling (Carrillo *et al*., 2012). However, current data about how food labels are used by consumers in shopping situations are rare (Bonsmann *et al*., 2010). On the other hand, specific information of different populations about their nutritional knowledge can be beneficial to link these data to better food choices and dietary habits, which can be influenced by cultural values as well (Rozin, 1996).

So the aim of this study was to assess women's nutritional knowledge and their food label perception and to identify their correlates in order to improve their food choices in future through educational programs. This way we can avoid aggravation of their dietary habits and life-style.

MATERIALS AND METHODS

This was a cross-sectional study with 380 participants. Women from those referring to four large supermarkets (Refah, Sourush,Hyperstar and Etka) in Shiraz, one of the cities of Iran in Fars Province, were selected for participating in this study. Participants were recruited through convenient sampling which means recruiting available participants with the proposed criteria. Data were collected through face-to-face interview with women referring to the supermarkets for food purchasing. The NKQ questionnaire (Nutrition Knowledge Question) by Parmenter and Wardle was used for designing the study questionnaire. NKQ questionnaire is considered an efficient tool for assessing consumers' nutrition knowledge and behavior. Validity of the questionnaire was assessed through a pilot study in 30 women. The questionnaire contained 3 parts with the foods consumed commonly in Iranian population. The first part contained demographic characteristics and disease history in the participants. While the second section encompassed questions related to nutritional knowledge of consumers about specific food components such as fat, sugar, salt and some food groups such as dairy products. This part included 8 questions that contained 24 options which consumers had to tick one (Table 1). The answers range from no knowledge to high knowledge for all of the questions. And finally, the third part of the questionnaire consisted of 7 questions about labeling which were all specific for this study and predominantly focused on calorie, sugar, salt and consumers' knowledge about labels. Answers ranged from never to always (Table 2).

Statistical analysis: The data were analyzed using SPSS version 16 (SPSS Inc.,Chicago,IL). Data were expressed as Mean±SD and frequencies. ANOVA and T-test were used for analyzing multi-variant variables and chi-square test was used for evaluating the relationship between variables. p-values less than 0.05 were considered statistically significant.

Table 1: Questions in the second part of the questionnaire, nutrition knowledge of consumers

Q No.	Questions (tick one)
1	Which fat is important for people to cut down?
2	What version of dairy foods is more beneficial?
3	Do you think which food has more added sugar?
4	Do you think which food has more saturated fat (bad fat)?
5	Do you think which foods have the highest calorie?
6	Do you think which foods have the highest unsaturated fat (good fat)?
7	Do you think which food has more added salt?

Table 2: Questions in the third part of the questionnaire, information about nutritional labels

Q No.	Questions (tick one: never rarely sometimes often always)
1	Does nutritional labeling affect your purchase?
2	How often do you read nutritional labels?
3	Do you consider the nutritional labeling too technical?
4	Does the calorie content of food affect your purchase?
5	The frequencies of reading labels for low-fat foods.
6	The frequencies of reading labels for low-salt foods.

RESULTS

The 380 women participated in this study. Data were gathered in 2012 over 3 months. After face-to-face interviews, according to the data from the first part of the questionnaire 49.7% of the participants were healthy and the rest of them had chronic diseases, especially high blood pressure. on the basis of the data from the second part of the questionnaire, the mean score of the women's nutrition knowledge was 20.13 (from 24) and the average knowledge of women about fat type and amount, added sugar, saturated fat, calorie content, unsaturated fat, added salt and cholesterol were near 50% (Table 3). With respect to the data from the third part of the questionnaire, consumers' information about food labels, effect of labels on purchase intention, specificity of labels, effect of calorie content on purchasing, average of label use for low-sugar, low-fat and low-salt foods are less than 50% for all of the situations (data shown in Table 4). The lowest use of labels for women is related to labels for low-salt foods and the highest for calorie content of foods (Table 4). About the relationship between women educational status and their nutrition knowledge, there was a significant positive relationship between their educational status and food label use (p-value = 0.05).

On the other hand, there was a significant relationship between women information about added sugar and using low-sugar labels (p-value = 0.05), while there was a significant relationship between women knowledge about low-salt foods and using labels related

Table 3: Frequencies and percentages of women's nutrition knowledge about foods and their components

	No knowledge		Low knowledge		Medium knowledge		High knowledge	
Nutrition knowledge	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Fat type	5	1.3	28	7.4	103	27.1	244	64.2
Fat amount	3	0.8	53	13.9	45	11.8	279	73.4
Saturated fat	10	2.6	71	18.7	135	35.5	164	43.2
Unsaturated fat	10	2.6	47	12.4	94	24.7	229	60.3
Cholesterol	4	1.1	37	9.7	70	18.4	269	70.8
Added sugar	8	2.1	33	8.7	32	8.4	307	80.8
Added salt	4	1.1	22	5.8	46	12.1	308	81.1
Calorie content	9	2.4	54	14.2	95	25.0	222	58.4

Table 4: Frequencies and percentages of women's nutrition knowledge about food labels

	Never		Rarely		Sometimes		Often		Always	
Labeling knowledge	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Knowledge on food labeling	40	10.5	46	12.1	6.1	16.1	108	28.4	125	32.9
Effect of labels on purchase intention	42	11.1	45	11.8	86	22.6	91	23.9	116	30.5
Food labels information to be technical	58	15.3	91	23.9	101	26.6	87	22.9	25	6.6
Importance of calorie content for food purchase	39	10.3	54	14.2	57	15	92	24.2	136	35.8
Frequency of reading low-sugar foods	69	18.2	92	24.2	95	25	65	17.1	57	15.0
Frequency of reading low-fat foods	56	14.7	67	17.6	67	17.6	89	23.4	101	26.6
Frequency of reading low-salt foods	73	19.2	102	26.8	79	20.8	57	15	69	18.2

Table 5: Frequencies of labeling perception responses by nutritional knowledge about choosing foods

Questions	Low knowledge	Medium knowledge	High knowledge	p-value
Importance of calorie content for food purchase				
Never	13	12	12	NS
Rarely	10	33	7	
Sometimes	8	41	7	
Often	26	56	9	
always	37	79	19	
Frequency of reading low-sugar foods				
Never	8	17	42	p≤0.05
Rarely	8	7	76	
Sometimes	8	3	81	
Often	6	2	57	
always	3	3	49	
Frequency of reading low-fat foods				
Never	0	26	29	p≤0.05
Rarely	0	15	52	
Sometimes	1	14	52	
Often	0	13	76	
always	0	11	89	
Frequency of reading low-salt foods				
Never	10	18	44	p≤0.05
Rarely	3	9	90	
Sometimes	4	9	64	
Often	3	4	50	
always	2	6	60	

NS: Non-significant, p-values less than 0.05 are considered statistically significant

to low-salt foods (p-value = 0.05). In addition, a significant relationship was also seen between participants' knowledge about fat amount and type and cholesterol use for low fat foods (Table 5).

DISCUSSION

In the present study, 32.9% of the women always used nutritional labels and 10.5% never used them and this might help consumers eating healthfully by better food choices (Graham and Jeffery, 2012), while according to the results of Zhanghualiu study in 2010, 58.36% of men and 80.3% of women rarely used food labels (Hong *et al*., 2011) which shows urgent need for improving nutritional labeling application among consumers. However in another study by Satia *et al*. (2005), 78% of the consumers read the labels at the time of purchasing. Education presented statistically significant differences in their knowledge about label use in that study (Satia *et al*., 2005). Additionally, in another study by Carillo, a positive relationship between educational level of consumers and food label use was also seen (Carrillo *et al*., 2012) which were all in accordance with the result shown in the present study.

On the other hand, in a study in 2012, among immigrants in Soviet Union, 55% of the consumers always or often used food labels and 33% of them had the skill for reading and understanding the labels (Lubman *et al*., 2012). In addition in Carillo's study, nutritional labeling rarely affected food purchases because of consumers problem about understanding the technical labels (Carrillo *et al*., 2012), while in the present study, It is noteworthy that only 6.6% of women mentioned that the labels' information are too technical and this may be due to the high educational status of the participants (49.47% of the participants had university degrees).

In the present study, it goes without saying that consumers' nutrition knowledge about salt, sugar and fat was significantly correlated with food label uses. While the highest use of nutritional labeling in the participants was for low calorie and low fat foods, respectively and the lowest was for low-sugar foods. In a study in 2010 on UK population, consumers paid attention to the expert's recommendations about calorie intake (Grunert *et al*., 2010). However in Cariloo's study, consumers mentioned that they never or rarely paid attention to the food labels for checking low fat foods (Carrillo *et al*., 2012). On the other side of the coin, the highest nutritional knowledge was about added salt and the lowest about saturated fat. Although in Nayga 's study a weak link between knowledge and purchase behavior was seen (Nayga, 2000). However, Lumbman concluded that there was a good relationship between food labels perception through avoiding foods high in salt and saturated fat (Lubman *et al*., 2012) and Carillo found the same results according to the effects of consumers' knowledge on purchase decision (Carrillo *et al*., 2012) which are all in line with the results of the current study. On the other hand, the results of Grime 's study were not the same. In his study, more than half of the participants were unable to use sodium labels. That was partially due to low knowledge of the consumers and lack of awareness and concern about salt risks (Grimes *et al*., 2009). Hence, more education plus friendly labeling formats are essential for such a population.

Although, this study sheds light on the effects of nutrition knowledge on label application, there are some limitations as well. The main limitation of our study is about gender specification for the participants that excluded the males and this can affect the results as in some studies it was mentioned that women have better nutritional knowledge than men (Gracia *et al*., 2007; Misra, 2007).

To sum up, label use was almost correlated with educational level and nutritional knowledge of women and it's crystal clear that consumers' nutritional knowledge can affect food labels application. Although most of the consumers were able to understand the food labels, the perception was not easy for less educated women. At the time that governments try to expand efforts for food labeling regulation, the most important point is being sure about the labels application by the consumers in-order to have better food choices. However, governments should design labels with better formats that are understandable and accessible for everyone to reinforce labeling policies. This way, we can avoid neglecting or misinterpreting of labels. So, opinions are divided as to whether nutritional education programs can improve food label application and finally leading to better food choices and it's highly believed that food labeling is a very important form of education to all consumers. This can be a hot topic and a place of debate for future studies.

CONCLUSION

So, it's concluded that nutrition knowledge can affect label perception and nutrition-based educational programs can easily improve consumers' knowledge about label application.

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