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Gender Differences in Adult's Knowledge about Dietary Fats, Cholesterol, Fiber and Energy

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Abstract: The purpose of this study was to determine of adults' knowledge in Ankara, Turkey, about fat, cholesterol, fiber and energy contents of food depending on gender differences. The sample of 200 subjects was composed of 74 males and 126 females. It was determined that the question which received the highest number of correct answers was "Which has more fat: roast chicken leg or fried chicken leg?" (89.5%) and the question which received the highest number of incorrect answers was "Which is higher in calories: Butter or Margarine?" (12.5%). Except the question "Based on your knowledge, which has more fiber: Kidney beans or Lettuce?", all the other questions were answered correctly by the women.

Key words: Nutrition, knowledge, adult, fat, cholesterol, fiber and energy

Introduction

Healthy diet is the form of nutrition intended for the protection and improvement of health and the decreasing of chronic disease risks (Baysal, 1998). Diet is now considered to play a substantial role in the etiology of many chronic degenerative diseases such as coronary heart disease, atherosclerosis, non-insulin dependent diabetes mellitus, osteoporosis and some types of cancer such as colon cancer, stomach cancer, breast cancer and prostate cancer (Levy *et al.*, 1993; Turrell, 1997; Pekcan, 2001). Recent public health nutrition campaigns have highlighted dietary recommendations to decrease fat and increase fiber consumption to reduce the risk of chronic diseases (Hearty *et al.*, 2007).

For most consumers, cholesterol, fatty acids, sodium and fiber are relatively new terms used to describe foods. As a consequence, consumers may need to acquire specific nutrition information in order to implement the generic dietary advice provided by such messages. To follow general recommendations to eat less saturated fat or sodium, or to eat more fiber, for example, people need to understand what the major food sources of these components are and how their present diet is excessive or deficient in them (Levy *et al.*, 1993).

A person might have an excellent knowledge of "nutrition basics" such as the fact that regular hamburger contains more fat than ground round, for example, but at the same time s/he might not be able to translate this knowledge into reducing his/her fat intake for the purpose of reducing high blood pressure (Sapp and Jensen, 1997). There are many reasons why nutritional advice may not be followed. It may be due to a lack of knowledge or information, a general lack of interest towards making a change to one's diet, or certain

perceived or encountered barriers may prevent people from eating healthier diets such as lack of money (cost), lack of availability, lack of time (too busy with work) or taste (Kearney and McElhone, 1999).

The availability of information on personal attitudes and beliefs and the cultural context from which this information is derived can also facilitate the comprehension of the relative importance of factors that influence food choice (Kearney and McElhone, 1999; Saba and DiNatale, 1998). In this study, the determination of adults' knowledge about the fat, cholesterol, fiber and energy contents of foods to lead a healthy life and the influence of gender on such knowledge is aimed at.

Materials and Methods

Two hundred adults between the ages of 18-57 selected by use of haphazard sampling method constitute the sample of the study. The data were collected through a questionnaire. The questionnaire form was prepared by making use of the previous studies conducted in this field (Sapp and Jensen, 1997; Variyam and Blaylock, 1998). Face-to-face interviews were made collect research data. The questionnaire form was composed of two sections, the first of which was designed to obtain information about the demographic characteristics of the participants and the second part of which contained items related to nutrition knowledge.

The nutrition knowledge test was formed of 17 dichotomous items. The items asked the respondents about the amount of fiber, energy, cholesterol and fat in various foods and food categories. The questionnaire was tested on twenty subjects and the necessary modifications were made ("don't know" responses were coded as incorrect).

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Table 1: Some demographic characteristics of subjects.

	Male		Female		Total	
	Sayi	%	Sayi	%	Sayi	%
Age groups						
<25	16	21.6	52	41.3	68	34.0
25-34	37	50.0	47	37.3	84	42.0
35-44	10	13.5	16	12.7	26	13.0
>45	11	14.9	11	8.7	22	11.0
Education						
University	38	51.4	66	52.4	104	52.0
High school	36	48.6	60	47.6	96	48.0
Marital status						
Married	44	59.5	65	51.6	109	54.5
Single	30	40.5	61	48.4	91	45.5
The condition of having a health problem						
No	64	86.5	106	84.1	170	85.0
Yes	10	13.5	20	15.9	30	15.0

The findings were analyzed in the Statistical Package for Social Sciences- (SPSS) programme. Gender was taken as the explanatory variable. Frequencies, averages and standard deviations have been calculated. Significant differences were tested using Pearson Chi-square analysis.

Results

Demographic characteristics: Table 1 shows the age distribution, education level and marital status of the subjects surveyed and whether they have a health problem.

The sample of 200 subjects was composed of 126 females and 74 males. It was seen that 50.0% of the males was in the 25-34 age group and 41.3% of females was in the <25 age group. The mean age was 29.9 ± 0.7 years (32.1 ± 1.1 for males, 28.6 ± 0.8 for females). Among the males, 48.6% was high school graduates, 51.4% was university graduates. Among the females 47.6% was high school graduates, 52.4% was university graduates. The majority of respondents was married (54.5%).

Eighty-five percent of the individuals stated that they did not have any health problems. The individuals who stated that they had health problems were asked whether they followed a certain diet; 23 individuals (8 males and 15 females) replied that they did and 7 individuals (2 males and 5 females) replied that they did not. When the ones who followed a diet were asked about the type of diet they followed, the majority replied that they followed diabetes diet.

Nutrition Knowledge: The replies that the individuals gave to nutrition knowledge questions are given in Table 2. Table 2 shows the percentages of correct and incorrect responses to nutrition knowledge questions. The question that received the highest number of correct answers was "Which has more fat: roast chicken leg or fried chicken leg?" (89.5%) and the question that received the highest number of incorrect answers was

"Which is higher in calories: Butter or Margarine?" (12.5%).

Over 70% of respondents knew that fruit contains more fiber than meat, apple contains more fiber than orange juice, whole milk contains more cholesterol than skim milk, peanuts contain more fat than popcorn, a fried chicken leg contains more fat than a roast chicken leg and sour cream contains more fat than yogurt.

Except the question "Based on your knowledge, which has more fiber: Kidney beans or Lettuce?", all the other questions were answered correctly by the women.

Discussion

Research indicates that behavioral change is directly related to the amount of nutrition education received (Martin, 2006). Nutrition education involves teaching about the importance of nutrition, providing educational materials that reinforce messages about healthy eating, teaching adolescent skills essential for making dietary changes and providing information on how to sustain behavioral change (Stang and Story, 2005).

Dietary fiber refers to food constituents, mostly from plants, which the human body cannot break down or digest. Fiber is eliminated from the body in the form of fecal material. Sometimes called roughage or bulk, fiber adds almost no feel or energy, value to the diet, but it does volume (Lutz and Przytulski, 2001). Among the reported benefits of fiber are that it promotes regularity, may reduce cholesterol levels, may assist in the control of blood sugar and may promote weight loss (Ersosy, 2001; Lutz and Przytulski, 2001).

In this study 5 questions were asked with respect to fiber. While more than 50.0% of the participants answered 4 of these questions correctly (the 1st, 2nd, 3rd and 4th questions), it was found out that only 43.0% of the individuals answered the question "Based on your knowledge, which has more fiber: kidney beans or Lettuce" correctly. In another study conducted, it was observed that from among the questions posed about fiber, the least known was "kidney beans or lettuce" pair (Sapp and Jensen, 1997).

In this study, with respect to the questions about fiber, females supplied correct answers at a higher rate with regard to males excluding the question to which the highest number of incorrect answers was given. In another study, the rate of the females who knew the food with the higher rate of fiber content in the "meat-fruit" and "whole bread-white bread" pairs was found to be higher (Erman and Ozcelik, 2007). In a study Cremer and Kessler (1992) conducted on adults aged 18 and over, it was found out that 53.4% of the participants knew that apple has a high rate of fiber and 18.7% knew that kidney beans has a high rate of fiber.

Anderson *et al.* (2000) performed a pooled analysis that explored the relationship between whole grains and whole wheat bread, cereal fiber, total dietary fiber, fruits

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Table 2: Percentage of correct responses item for the nutrition knowledge test.

Questions	b	Correct		Incorrect		Statistics
		n	%	n	%	
Based on your knowledge, which has more fiber: fruit or meat?	<u>M</u>	58	78.4	16	21.6	$\chi^2=0.759$ df=1 p>0.05
	F	105	83.3	21	16.7	
	T	163	81.5	37	18.5	
Based on your knowledge, which has more fiber: cornflakes or oatmeal?	<u>M</u>	41	55.4	33	44.6	$\chi^2=0.057$ df=1 p>0.05
	F	72	57.1	54	42.9	
	T	113	56.5	87	43.5	
Based on your knowledge, which has more fiber: whole wheat bread or white bread?	<u>M</u>	42	56.8	32	43.2	$\chi^2=0.075$ df=1 p>0.05
	F	74	58.7	52	41.3	
	T	116	58.0	84	42.0	
Based on your knowledge, which has more fiber: orange juice or an apple?	<u>M</u>	50	67.6	24	32.4	$\chi^2=2.526$ df=1 p>0.05
	F	98	77.8	28	22.2	
	T	148	74.0	52	26.0	
Based on your knowledge, which has more fiber: kidney beans or lettuce?	<u>M</u>	33	44.6	41	55.4	$\chi^2=0.122$ df=1 p>0.05
	F	53	42.1	73	57.9	
	T	86	43.0	114	57.0	
Based on your knowledge, which has more cholesterol: liver or meat?	<u>M</u>	36	48.6	38	51.4	$\chi^2=0.260$ df=1 p>0.05
	F	66	52.4	60	47.6	
	T	102	51.0	98	49.0	
Based on your knowledge, which has more cholesterol: butter or margarine?	<u>M</u>	32	43.2	42	56.8	$\chi^2=1.300$ df=1 p>0.05
	F	65	51.6	61	48.4	
	T	97	48.5	103	51.5	
Based on your knowledge, which has more cholesterol: egg whites or egg yolks?	<u>M</u>	44	59.5	30	40.5	$\chi^2=3.462$ df=1 p>0.05
	F	91	72.2	35	27.8	
	T	135	67.5	65	32.5	
Based on your knowledge, which has more cholesterol: skim milk or whole milk?	<u>M</u>	57	77.0	17	23.0	$\chi^2=0.441$ df=1 p>0.05
	F	102	81.0	24	19.0	
	T	159	79.5	41	20.5	
Which has more fat: peanuts or popcorn?	<u>M</u>	55	74.3	19	25.7	$\chi^2=0.309$ df=1 p>0.05
	F	98	77.8	28	22.2	
	T	153	76.5	47	23.5	
Which has more fat: ice cream or sherbet?	<u>M</u>	47	63.5	27	36.5	$\chi^2=0.114$ df=1 p>0.05
	F	83	65.9	43	34.1	
	T	130	65.0	70	35.0	
Which has more fat: roast chicken leg or fried chicken leg?	<u>M</u>	63	85.1	11	14.9	$\chi^2=2.381$ df=1 p>0.05
	F	116	92.1	10	7.9	
	T	179	89.5	21	10.5	
Which has more fat: yogurt or sour cream?	<u>M</u>	56	75.7	18	24.3	$\chi^2=3.789$ df=1 p>0.05
	F	109	86.5	17	13.5	
	T	165	82.5	35	17.5	
Which is highest in calories: butter or margarine?*	<u>M</u>	9	12.2	65	87.8	$\chi^2=0.012$ df=1 p>0.05
	F	16	12.7	110	87.3	
	T	25	12.5	175	87.5	
Which is highest in calories: sugar or straight alcohol?	<u>M</u>	25	33.8	49	66.2	$\chi^2=0.027$ df=1 p>0.05
	F	44	34.9	82	65.1	
	T	69	34.5	131	65.5	
Which kind of fat is more likely to be liquid rather than a solid; saturated fats, polyunsaturated fats, or both equally likely?	<u>M</u>	19	25.7	55	74.3	$\chi^2=2.850$ df=1 p>0.05
	F	47	37.3	79	62.7	
	T	66	33.0	134	67.0	
Is cholesterol found in: vegetables and vegetable oils, animal products like meat and dairy products, all foods containing fat or oil?	<u>M</u>	20	27.0	54	73.0	$\chi^2=0.494$ df=1 p>0.05
	F	40	31.7	86	68.3	
	T	60	30.0	140	70.0	

*Correct answers are underlined. ^bM: Male, F: Female, T: Total. *The energy values of butter and margarine are equal.

and vegetables and the risk for coronary heart diseases (CHD). After the adjustment for confounding factors, they found that the strongest inverse association was between wholegrain and whole wheat bread intake and the risk of CHD. In another study investigating whether the observed lower cardiovascular disease risk was related to fiber from any specific food group, it was found that the lower risk appeared to be predominantly related to fiber intake from dark breads such as whole wheat (Mozaffarian *et al.*, 2003).

Cholesterol is a fatlike substance, but it's not a fat itself. Cholesterol has a different structure from fat and performs different functions in the human body. Some functions promote health; some don't. As a part of body chemical called bile, it helps the body digest and absorb fat, too. With the help of sunlight, a form of cholesterol in the skin can change to vitamin D, a nutrient essential for bone building. However, too much cholesterol in the bloodstream is linked to heart disease (Duyff, 2002). In this study, 4 questions were posed about the

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cholesterol content of foods (6th, 7th, 8th and 9th questions). The question that received the highest number of correct answers is the one about the cholesterol content of "skim milk- whole milk" pair (79.5%). In the study conducted by Sapp and Jensen (1997) a similar result was obtained with a higher rate of correct answers given to this question. While the cholesterol content of "butter-margarine" pair was the question that received the highest number of incorrect answers, it was the one that received the highest number of correct answers in Sapp and Jensen's (1997) study. While the rate of females that answered this question correctly is higher than that of the males, an exact opposite result was obtained in Erman and Ozcelik's (2007) study (females 45.3%, males 48.7%). In the study that Bani and Hashim (1999) conducted, it was found out that males were more informed than females with respect to the cholesterol contents of foods.

In a study it was found that over 90% of respondents knew that whole milk contains more cholesterol than skim milk, a fried chicken leg contains more cholesterol than a roast chicken leg, ice cream has more fat than sherbet, whole wheat bread contains more fiber than white bread, peanuts contain more fat than popcorn and egg yolks contain more cholesterol than egg whites (Sapp and Jensen, 1997). In this study, although the rate of the respondents who answered these questions correctly was more than the rate of those who answered them incorrectly, the rate of the ones who gave correct answers was not as high as that. When it is taken into account that the majority of the individuals who participated in the research is university graduates, it can be considered that these rates are low and individuals need information about healthy nutrition. In a survey, health professionals were asked for their opinions regarding the public's most common barriers to changing their diet, apathy was the most important barrier, while the most important barrier selected by consumers was 'lack of knowledge' (Kearney and McElhone, 1999). People may be aware of the main nutrition messages- and they do appear to be judging from their definitions of a healthy diet 'Eat less fat', 'Eat more fruit and vegetables', 'Aim for balance and variety', they do not perceive these as personally relevant to themselves (Kearney and McElhone, 1999) because food choice is a repeated behavior and habit is likely to play an important role in the maintenance of a frequently repeated behavior (Saba and DiNatale, 1998).

Excessive consumption of fat has been linked to the development of cardiovascular disease (Linchtenstein *et al.*, 1998). In our study, 4 questions were posed about the fat content of foods (10th, 11th, 12th and 13th questions). The rate of the females who answered all these questions correctly was higher than the males. Most of the individuals answered the "Which has more

fat: Roast chicken leg or Fried chicken leg?" and "Which has more fat: Yogurt or Sour cream?" questions correctly (89.5% and 82.5% respectively). A similar result was obtained in the study conducted by Sapp and Jensen (1997). As the rate of particularly cardiovascular diseases is increasing today, it is essential that individuals be informed about this topic. The efficient way for the individuals to decrease fat intake is to be informed about the fat content of foods. Studies have suggested strong links between fat intake and cardiovascular diseases. So public health nutrition education efforts have high-lighted dietary recommendations to decrease fat intake (Saba and DiNatale, 1998). The health seeking tendency among consumers has led to a growing number of reduced fat foods on the market and has also influenced people's attitudes towards reduced-fat foods. People tend to think of low-fat foods as healthier and more positive alternatives than full-fat foods (Roininen *et al.*, 1999). In the study conducted by Auld *et al.* (1991), it was found out that females' level of knowledge about fat and cholesterol was better than that of the males. In another study conducted by Sanlier and Yabanci (2002) it was observed that females knew more about the fat-disease link when compared to males and that males were knowledgeable about the fat content of a diet.

The question "Which is higher in calories: Butter or Margarine?" was answered correctly by only 12.5% of the individuals and the question "Which is highest in calories: Sugar or Straight alcohol" was answered correctly only by 34.5%. In a study; it was found that respondents with negative attitudes towards healthy eating behavior consumed greater amounts of white bread, whole milk, butter, chips, red meat dishes, meat products and sugar than the respondents with positive attitudes (Hearty *et al.*, 2007).

Saturated fats are likely to be solid at room temperature and they are usually found in animal products. Unsaturated fats are likely to be liquid at room temperature and of plants origin (Lutz and Przytulski, 2001). Only 33.0% of the respondents answered the related question correctly. This rate was found to be 27.4% in 1991 in a study conducted by Sapp and Jensen (1997).

Cholesterol is found only in animal origin foods such as meat, poultry, fish, organ meats (liver, brain and kidneys) dairy products and eggs. Plants do not contain cholesterol (Brown, 2000).

The rate of the respondents who knew that cholesterol is found in animal origin food such as meat and dairy products was found to be 30.0%. In the study conducted by Sapp and Jensen (1997), in 1991, 44.0% of the respondents answered the related question correctly.

Except the question "Based on your knowledge, which has more fiber: Kidney beans or Lettuce?" all the other questions were answered correctly by the women. In

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many studies females have expressed more positive attitudes toward low-fat foods and eating healthily (Roininen and Tuorila, 1999; Roininen *et al.* 1999) and more negative attitudes toward high-fat foods (Towler and Shepherd, 1992; Roininen *et al.*, 2001). Also females were more concerned than males about eating healthily (Roininen *et al.*, 1999), Hearty *et al.* (2007) found that males have more negative attitudes towards healthy eating behavior than females. In general, females were found to be more aware of diet and health issues and embrace dietary changes to a greater degree than men (Barker *et al.*, 1995; Girous *et al.*, 2001). According to Turrell (1997) there are at least four possible explanations for the higher rate of dietary guideline compliance among women. First, women are more knowledgeable about food, nutrition, health and their relationships. Second, women exhibit more positive health and food related beliefs and attitudes. Third, women manifest a more heightened concern about their personal and physical appearance than men. And fourth, women are more likely than men to report that they prefer the taste of healthy foods and meals.

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