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The Evaluation of the Effect of Education about Nutrition and Cholesterol on the Knowledge Level of Women

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Abstract: The aim of this study was to evaluate the effect of education about nutrition and cholesterol on the knowledge level of women. Data obtained from women aged 17-50 (n = 48). The model of pretest (education) -post-test was applied at the study. A question form and an assessment test were improved and they were applied as an assessment test before pretest and following a five-week education program it was applied once again as a post-test. There determined a significance between the average scores of pre and post test of the questions taken in the category of data questions of nutrition consumption "saturated fats are effective on the increase of bad-cholesterol" and the one in the category of energy and nutrition components "protein is essential for the growth and repair of body tissues" (p<0.01). When we examine the data questions dealing with cholesterol, it is obvious that the questions "cholesterol is a fat-like substance existing in all cells of the body" (p<0.05) change significantly depending on their test scores. It was determined that the education given over nutrition and cholesterol brought about a positive change at the knowledge levels of women.

Key words: Cholesterol, knowledge of nutrition, education of nutrition, woman

Introduction

CHD (Coronary Heart Disease) is a major cause of morbidity and mortality in the world. The World Health Report 2002 shows that high blood pressure, tobacco and cholesterol are the major contributing factors to all deaths in the world of the ten leading risk factors, six related to nutrition, diet and physical activity. Balanced diet can play an essential role in improving population health (Tate, 1990; WHO, 2003). Of the main causes of death worldwide all ages, in 2005 are cardiovascular diseases, 30% and it is getting increased. The death rates for all chronic diseases rise increasingly (WHO, 2005). Each year at least 4.4 million people die of raised total cholesterol levels (Ezzate *et al.*, 2004). Many international studies have shown that a high level of cholesterol in the blood increases the risk of developing (PAHO, 2004).

Studies carried out revealed that nutrition and life style are effective on the high level of cholesterol (Yamasaki *et al.*, 1994; Thune *et al.*, 1998; Mora *et al.*, 2006). It has also been known that cholesterol levels of foods, saturated, unsaturated and trans fat acid content, antioxidants, carbohydrate, protein and fiber, vitamin B and homosistein are other dietary factors affecting cholesterol level (Mensink and Katan, 1987; Nygard *et al.*, 1997; Edward and Havranek, 1999; GISSI, 1999; Ludving *et al.*, 1999; Mann *et al.*, 1999; NCEP, 2001; Bunyard *et al.*, 2002; El Ayachi *et al.*, 2005). While saturated fat acids in animal nutrients, coconut and cocoa increase LDL (Low Density Lipoprotein) level (Whitney and Rolfes, 2002; Wardlaw, 2003), it was

determined that mono unsaturated fat acids which are abundant in olive oil, canola oil, avocado, hazelnut and sesame oil have a neutral effect on LDL and triglyceride level and that it decreased cholesterol level and increased HDL (High Density Lipoprotein) level (Mensink and Katan, 1987). Of multi unsaturated fat acids, n-3 fat acids are abundant in fatty sea fish, flaxseed and oil, canola oil, hazelnut and green leafy vegetables (Whitney and Rolfes, 2002; Wardlaw, 2003). It was found in the studies that deaths caused by coronary hearth disease are quite less in those consuming n-3 fat acids. It was indicated that trans fat acids inherent in many nutrients increase LDL levels, whereas they decrease HDL level (Tate, 1990; NCEP, 2001). It is recommended that daily cholesterol taken in a diet be less than 200 mg (NCEP, 2001). Fibrous content of the diet is a little poorer when we compare its relation to cardiovascular diseases with other diets, whereas higher carbohydrate intake increase LDL level and decrease HDL level, therefore it is recommended that carbohydrate intake be increased in diet in order to avoid from atherosclerosis, that carbohydrate intake not exceed 60.0% of daily total calorie and 15.0% of protein and an adult should take 20-30 g fiber with daily nutrients (Ludving *et al.*, 1999; Whitney and Rolfes, 2002). It was also expressed in some studies that vitamins A and C, significant antioxidants, are insufficient in decreasing coronary hearth disease and that studies carried over vitamin E are also insufficient (Edward and Havranek, 1999; GISSI, 1999). In a study conducted by Tate and Cade to determine the level of knowledge in

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the general population concerning dietary fat and the risk of coronary heart disease, they found that the overall knowledge levels were high with no difference between men and women, although women were more able to select the best food items than men (PAHO, 2004).

Women make up 31.59% of world population and 29.80% of the population in Turkey between the ages of 15 and 64 (SRWW, 2005; Anonymous, 2003). Household work is mostly shared by spouses, whereas most part of such works as preparing and cooking meals are made by woman (Broman, 1988; Deacon and Firebaugh, 1988). Illiteracy of woman might cause the malnutrition and insufficient nutrition of the whole family. In this respect, nutrition education of woman is of great importance in healthy and conscious nutrition of family members and in growing healthy generations. The fact that women adopt a nutrition style suitable to their life styles and that they know what to care in food preparation and cooking and the relation between nutrition and health can be obtained by an education in correct nutrition and avoiding from bad-cholesterol (Kottke *et al.*, 1999). The purpose of this study is to evaluate the effect of the education given to women over nutrition and cholesterol on the knowledge level of them.

Materials and Methods

Women attending to community education centers consist of the sampling of the study. Community education centers are the courses acting under Ministry of Education and providing free courses parallel with the demands of volunteer trainees. Mostly individuals at middle and lower socio-economic levels attend these courses. The study was carried over 48 women at the age group of 18-48, attending to various courses of Community Education Centers in Ankara, capital city of Turkey.

The women were informed about the purpose of the study. They joined the study voluntarily. A questionnaire was used in order to obtain information about their demographic characteristics and a placement test was applied so as to measure their knowledge levels of nutrition and cholesterol. Also, a pretest was applied over 10 women to correct possible mistakes at the questionnaire and the placement test and omit unnecessary questions. Furthermore, body weight and height of the women were taken and BMI (Body Mass Index) values were calculated. Height was taken with a non-flexible tape measure without shoes, in a position where feet are touching each other and the body is vertical. Body weight was also taken with a calibrated scale by taking thick clothes off and without shoes. BMI was calculated with the formula of $BMI = \text{weight (kg)} / \text{height (m)}^2$ (WHO, 2005; Whitney and Rolfes, 2002). The model of pretest process (education) -post-test was applied at the study. The questionnaire and the placement test prepared were applied to the women as

a pretest before the test was applied and the same level of placement test was applied as a post test after a five-week education. During the education, such devices as computer, projection and posters were used as an educational tool and the participants were handed out booklets prepared over the issue. The education was scheduled as two hours per week and 5 weeks in total. At the first 5-10 minutes the attention of the group was driven into the issue and the subjects told were revised with the method of question-answer. With the presentation of Power Point and posters, the attention of the group was intensified into the issue. The questions by the group were answered, the true ones were strengthened and the mistakes were corrected. The essential parts of the subject were revised at the end of each class as question and answer. A post test was applied at the end of the five-week education. The answers were categorized in two groups as "true" and "false". The question was assessed as 1-0 or 0-1 according to its status of true or false. There were 25 expressions at the placement test including the knowledge questions of food consumption, energy and nutrient components and cholesterol. Every true answer given to these expressions was assessed as 1 point. Therefore, the highest score to be collected was 25 and the least being 0. SPSS 13.0 software was used in the evaluation of the data. The questionnaire dealing with the personal characteristics of the women were evaluated and the charts showing the absolute and percentage values were formed. Whether the evaluations concerning the average scores of pre and post test of the placement test measuring the knowledge level of nutrition and cholesterol level were true or not was examined.

Results

Demographic characteristics of women: 81.3% of women taken into the study are 25 years old and younger. The rate of the women graduating from a high school is 29.2% and the ones graduating from a university is almost nearer (31.2%). Only 10.3% the women are working. It was determined that according to BMI, 62.4% of the women have a normal body weight, that 75.0% of the women have no health problems, 12.4% of them have diseases of digestion system, 6.3% have diseases of nervous system and that 6.3% of them have coronary and hearth diseases. It was also found that 31.5% of the women are smokers and that 4.2% of them consume a glass of alcohol once or twice a week and the type of alcohol consumed are beer or wine. 33.3% of the women make sports regularly (Table 1).

Nutrition and cholesterol knowledge levels of women: While the average scores of pretest at the expression of "fat requirement of the body for a healthy eating should be met by olive oil" taken in the category of the

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Table 1: Demographic Characteristics of Women (n = 48)

	Frequency	%		Frequency	%
Age			Health problem		
≥ 25	39	81.3	Non	36	75.0
26-35	5	10.5	Disease of digestion system	6	12.4
36-45	2	4.1	Disease of nervous system	3	6.3
46 ≤	2	4.1	Heart-coronary disease	3	6.3
Education status			Smoking		
Primary	19	39.6	Yes	15	31.5
High school	14	29.2	No	33	69.5
University	15	31.2			
Working status			Alcohol consumption		
Working	5	10.3	Yes	2	4.2
Not working	43	89.7	No	46	95.8
BMI(kg/m ²)			Making sport		
≥18	9	18.8	Yes	16	33.3
18.1-24.9	30	62.4	No	32	66.7
25-29.9	9	18.8			

Table 2: t Test Results Concerning the Knowledge Questions about Food Consumption n = 48

The knowledge questions about food consumption	Pre test Mean±SD	Post test Mean±SD	t	p
Fat requirement of the body for a healthy eating should be met by olive oil	0.29±0.45	0.68±0.46	-4.49	0.00**
Poultry and fish should be preferred to lamb and beef to decrease bad-cholesterol	0.58±0.49	0.81±0.39	-4.49	0.00**
People having a high cholesterol should avoid fried food	0.89±0.30	0.97±0.14	-1.66	0.10
Meat products such as sausage and salami should be consumed less as they consist of saturated fats	0.85±0.35	1.00±0.00	-2.83	0.00**
Over consumption of alcohol increases the risk of heart diseases	0.93±0.24	0.89±0.30	-0.70	0.48
In the case of high cholesterol, consumption of vegetables and fruit, leguminous seeds and cereal groups should be increased.	0.79±0.41	0.91±0.37	-1.77	0.08
Such leguminous seeds as dry beans have a high fiber content, they help the decrease of bad-cholesterol	0.50±0.50	0.83±0.37	-3.66	0.01**
Eating a few nuts a day will increase good-cholesterol	0.43±0.50	0.72±0.44	-2.95	0.05*
Saturated fats are effective on the increase of bad-cholesterol	0.64±0.48	0.87±0.33	-2.86	0.00**
Whole milk and dairy products decreases cholesterol	0.60±0.49	0.70±0.45	-1.04	0.30

*p<0.01, **p<0.05, sd = 46

knowledge questions related to food consumption in the evaluation of knowledge levels concerning nutrition and cholesterol was 0.29, it increased up to 0.68 after the education. The difference was found significant according to t test. Depending on the test scores of "poultry and fish should be preferred to lamb and beef to decrease bad-cholesterol", there became no significant difference (p>0.01). It was found that average score of post test (0.81) was higher than that of pretest score (0.58). The expression of "meat products such as sausage and salami should be consumed less as they consist of saturated fats." was significantly different in terms of test scores (p>0.01).

While the total scores obtained at the pretest 0.50 at the question of "such leguminous seeds as dry beans, lentils, chickpeas and peas prove useful in decreasing bad-cholesterol", it increased up to 0.85 after the education. The difference was found significant statistically (p<0.01). There was a significant difference between the pre and post test average scores at the questions of "eating a few nuts a day will increase good-

cholesterol" (p<0.05) and "saturated fats are effective on the increase of bad-cholesterol" (p<0.01). There determined no significant difference at the other expressions (p>0.05) (Table 2).

With the examination of the knowledge questions concerning energy and food components, it is seen that the question of "one of the components supplying energy to the body is carbohydrate" have a significant difference depending on test scores (p>0.01). It is also determined that the average post test scores (0.97) is higher than that of pre test scores (0.56). There was a significant difference between the pre and post test average scores at the questions of "protein is essential in the growth and repair of body tissues" (p<0.01) and "there is more vitamin C in the vegetables and fruit with green leaves" (p<0.01). There determined no significant difference at the other expressions (p>0.05) (Table 3).

As for knowledge questions concerning cholesterol, there was a significant difference statistically between the pre and post test average scores at the questions of "cholesterol is a fat-like substance inherent in the whole

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Table 3: t Test Results Concerning the Knowledge Questions about Energy and Food Components n = 48

Questions about energy and food components	Pre test Mean±SD	Post test Mean±SD	t	p
One of the components supplying energy to the body is carbohydrate	0.56±0.50	0.97±0.14	-5.35	0.00**
Protein is essential in the growth and repair of body tissues	0.79±0.41	0.95±0.20	-2.68	0.01**
Meat, fish, milk and dairy products are good sources of protein	0.93±0.24	1.00±0.20	-1.77	0.08
Vitamin C is abundant at such food as sugar, starch.	0.81±0.39	0.87±0.33	-0.90	0.37
There is more vitamin C in the vegetables and fruit with green leaves	0.37±0.48	0.83±0.37	-5.14	0.00*
Saturated fats are less in animal products	0.66±0.47	0.79±0.41	-1.23	0.22
The whole energy at the body is supplied from fats.	0.66±0.47	0.83±0.37	-1.83	0.07

*p<0.01, sd = 46

Table 4: t Test Results Concerning the Knowledge Questions about Cholesterol n = 48

Knowledge questions about cholesterol	Pre test Mean±SD	Post test Mean±SD	t	p
Cholesterol is a fat-like substance inherent in all cells of the body	0.77±0.42	0.91±0.27	-2.19	0.03*
The total cholesterol level of a healthy person is 180-200 mg/dl	0.20±0.41	0.72±0.44	-5.83	0.00**
Smoking and obesity decrease good-cholesterol	0.14±0.35	0.75±0.43	-8.47	0.00**
Bad-cholesterol level increases with regular exercise	0.70±0.45	0.93±0.24	-3.08	0.00**
Offal, butter and yolk are rich in terms of cholesterol	0.77±0.42	0.93±0.24	-2.22	0.03*
Cholesterol level increases after menstruation and it also increases the risk of heart diseases at women	0.06±0.24	0.18±0.39	1.77	0.08
Obesity is factor decreasing cholesterol	0.64±0.48	0.89±0.30	-3.29	0.00**
The decrease of bad-cholesterol below 130 mg/dl is normal	0.18±0.39	0.70±0.45	-6.61	0.00**

*p<0.01, *p<0.05, sd = 46

cells of the body" (p<0.05), "the total cholesterol level of a healthy person is 180-200 mg/dl" (p<0.01), "smoking and obesity decrease good-cholesterol" and "bad-cholesterol level increases with regular exercise" (p<0.01). The question of "offal, butter and yolk are rich in terms of cholesterol" shows a significant difference depending on test scores (p>0.05). It was also determined that the average post test scores (0.93), is higher than that of average pre test scores (0.77). While average scores of pre test at the question of "obesity is factor decreasing cholesterol" was 0.64, it increased up to 0.89 after the education. The difference was significant statistically (p<0.01). The question of "the decrease of bad-cholesterol below 130 mg/dl is normal" was also significant statistically depending on the test scores (p<0.01) (Table 4).

Discussion

It was determined in this study that women had 18.8% more weight according to BMI. The fact that BMI is over 30 and more is considered as "obesity" (NIH, 1998; Whitney and Rolfe, 2002). However, no obesity was encountered at the women included in the study. It was found by the studies carried out that obesity is a positive risk for coronary hearth diseases and high level of BMI has a negative effect on the levels of plasma lipid and lipoprotein (Nygard *et al.*, 1997; Neufeld *et al.*, 1997; Thune *et al.*, 1998; NCEP, 2001; Dorn *et al.*, 2003; Mora *et al.*, 2006). It was clarified that plasma cholesterol and LDL levels are 30 mg/dl higher compared to those at normal weight (BKI<25 kg/m²) and that the levels of HDL is 3-6 mg/dl lower at the obese than the ones at normal

weight. Women have diseases of coronary hearth, digestion, nervous and liver, gallbladder and pancreas. Yalin *et al.* (2001) determined in a study carried out in Turkey that 32.0% of individuals have hypertension and 12.0% have diabetes mellitus. According to WHO (2006) major CHD factors of risk for high-mortality at developing countries are high blood pressure, tobacco use, high cholesterol, obesity and low fruit and vegetable intake. Almost a third of the women included in the study smoke. It is well known that smoking is factor of risk causing cardiovascular diseases (Thune *et al.*, 1998; NCEP, 2001; Mora *et al.*, 2006). Smoking lowers HDL levels, whereas it increases LDL oxidation (Neufeld *et al.*, 1997). At a study by Wilson *et al.* (1983) it was found that smoking cause a decrease 4 mg/dl at men and 6 mg/dl at women at the levels of HDL. There determined a significant negative relation between the number of cigarettes and HDL level. HDL levels at the ones smoking were found similar with the one who do not smoke one year after they quit smoking. In another study carried out in Turkey, it was observed that HDL levels of the males smoking 20 or more cigarettes a day is 11.0% lower on average than those not smoking and that HDL levels of the females smoking 20 or more cigarettes a day is 15.0% lower on average than non-smokers (Onat *et al.*, 2001). The latest case of smoking at that the frequency of the amount of cigarettes at the addicted female smokers increased about 20.0% in Turkey. It is estimated that 14.3 million (10.4 million males and 3.9 million females) of 36.2 adults smoke regularly (Onat *et al.*, 1999). At a study where environmental effects of smoking were evaluated at the children of 2-18 years of age having a high risk lipid

profile, it was stated that average HDL levels of smoking parents are low compared to those not exposed to smoke of cigarette (Neufeld *et al.*, 1997).

In the study, it was found very few of the women drink alcohol. Alcohol consumption is not widespread in Turkey and alcohol consumption of females is lower than that of males. Epidemiological studies show that middle scale regular alcohol consumption lowers the risk of CHD (Rimm *et al.*, 1996; Rimm *et al.*, 1999; Çelik *et al.*, 2002). Too much alcohol consumption increases the risk of CHD as it increases the amount of fat at the abdomen (Dorn *et al.*, 2003). Drinking too much alcohol can damage the liver and heart muscle lead to high blood pressure and raise triglycerides (PAHO, 2004). The increasing effect of alcohol consumption on the risk of CHD was referred to the fact that it increases the level of HDL and the sensitivity of insulin about 5-10% and the decrease of 20/30% fibrinogen (Rimm *et al.*, 1999). Age and smoking increase blood pressure about 5.3 mmHg at the males drinking too much alcohol compared to non-smokers, whereas an opposite relation was observed at women (Rimm *et al.*, 1999). It was stated that the useful effect of drink on CHD was not due to the type of drink but because of alcohol itself (Thune *et al.*, 1998; Rimm *et al.*, 1996; Mora *et al.*, 2006). In another study, it was found that two glasses (20-30 g) of alcohol consumption a day for men and one glass (10-15) for women decreased the risk of CHD at about 30.0-40.0% (Hines and Rimm, 2001). It was found that a third of women included in the study make sports. It was determined in the studies that lack of physical activity is a major factor of risk (King *et al.*, 1995; Thune *et al.*, 1998; Mora *et al.*, 2006). In a study where long term effects of different density of physical activity at women and men at the age of 50-65 was investigated, it was found that the increase of HDL is at low density, however it was clearer at the group to which more sessions were applied and thus it was stated that the frequency of exercise might have a significant effect on the increase of HDL level (King *et al.*, 1995; Thune *et al.*, 1998; Edward and Havranek, 1999; WHO, 2003; WHO, 2006; Mora *et al.*, 2006).

Of the knowledge questions of food consumption, there was a significant difference between the average test scores at the expression of "fat requirement of the body for a healthy eating should be met by olive oil". Mensink and Katan (1987) founded that serum control level dropped 0.46 mmol/l and serum triglyceride level dropped to 0.06 mmol/l, whereas HDL level increased up to 0,03 mmol/l at the group to which only olive oil die was applied. In another study, it was determined that while preparing home made foods, the oils used were oil olive, sunflower oil, corn oil, soybean oil, butter and margarine respectively and that tallow was never used (Mensink and Katan, 1987). Cater and Denke (2001) found that as the amount of oil is increased at

diet, the level of blood triglyceride is also increased. In summary, individual fatty acids have diverse effects on human health. Heart diseases have been found to be favorably affected by the consumption of certain unsaturated fatty acids. Unsaturated fatty acids lower plasma total cholesterol and "bad" cholesterol levels when substituted for saturated fatty acids. However, NCEP (2001) recommended that the amount of mono unsaturated fat acids taken in diet shouldn't exceed 20% of total calorie for a healthy nutrition.

Of the knowledge questions used at the evaluation of knowledge levels of nutrition and cholesterol, "poultry and fish should be preferred to lamb and beef to decrease bad-cholesterol" and "meat products such as sausage and salami should be consumed less as they consist of saturated fats" showed a significant difference in terms of test scores. NECP (2001) recommended that daily energy should be supplied by saturated fats at the rate of 7.0%, by mono unsaturated fats at the rate of 20.0% and by poly unsaturated fats at the rate of 10.0%. At the question of "such leguminous seeds as dry beans, lentils, chickpeas and peas prove useful in decreasing bad-cholesterol", there is a significant difference between the average test scores. The need for protein is mostly supplied by such leguminous seeds as peas, chickpeas, dry beans, lentils and by whole cereals. As these foods are rich in terms of fiber, they are helpful in dropping blood cholesterol level (Ludving *et al.*, 1999; Mann *et al.*, 1999). In a study, fiber consumption was mixed with other dietary compositions and it was determined that it has a relatively poor relation with cardiovascular risk factors (Ludving *et al.*, 1999). According to NCEP (2001) it is recommended that 20-30 g fiber a day should be consumed.

There is no significant difference between the average pre and post test scores at the questions of "eating a few nuts a day will increase good-cholesterol" and "saturated fats are effective on the increase of bad-cholesterol". Hu and Stampfer (1999) summarized the relationship between nut consumption and risk of CHD, the relation between nut consumption and the risk of CHD and found an inverse association. In addition, several clinical studies have pointed out beneficial effects of diet high in nuts. Ellsworth *et al.* (2001) further examined the specific relationship between the frequency of nut intake at and risk of death in the postmenopausal women in the 12-year Iowa health study and concluded frequent nut consumption may offer these women modest protection against the risk of death from all causes and CHD Hu and Stamfer (1999) concluded regular nut consumption at certain amounts can be recommended in the context of a health and balanced diet. It was determined by various studies that saturated fat acids taken by diet increased LDL level (Bunyard *et al.*, 2002; Yamasaki *et al.*, 1994; WHO, 2003). Animal products, palm seed, coconut, cocoa,

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whole milk and dairy products contain a great amount of saturated fats (Whitney and Rolfes, 2002). It was found that in spite of the fact that there is a major difference at the amount of total fat consumption, the amount of oil consumption increases compared to fat consumption (Tate, 1990; Bunyard *et al.*, 2002; WHO, 2003).

Of the knowledge questions of energy and nutrition, there is a significant difference at the question of "one of the components supplying energy to the body is carbohydrate" in terms of its test scores. According to NCEP (2001), 50.0-60.0% of daily energy should be met by carbohydrates. It is not recommended that carbohydrates be consumed more the recommendation (Mensink and Katan, 1987; NCEP, 2001; Bunyard *et al.*, 2002). In his study Liu (2002), found that too much consumption of carbohydrate increased LDL level and caused hyper triglyceride by increasing the activity of lipoprotein lipase enzyme and that refined high carbohydrate diet decreased the level of HDL. There is a significant difference between the average post test scores at the question of "there is more vitamin C in the vegetables and fruit with green leaves". Vitamin C is abundant at such vegetables and fruit as vegetable with green leaves, orange group, strawberry, rosehip, tomato, broccoli, brussels sprout and grapes (Whitney and Rolfes, 2002).

The knowledge questions of "cholesterol is a fat-like substance inherent in all cells of the body", "smoking and obesity decrease good-cholesterol" and "bad-cholesterol level increases with regular exercise" concerning cholesterol show a significant difference statistically in terms of test scores. Cholesterol is a way, fat-like substance that occurs naturally in cells everywhere in the body. Your body use cholesterol to make cell membranes, hormones, vitamin D and bile acids which are needed for the digestion of fats. Only a small amount of cholesterol is needed by the body. In fact, your body can make all the cholesterol it needs and it is not necessary to get additional amounts from the diet. Cholesterol circulates in the blood attached to proteins called lipoproteins. The most important ones are LDL (Low Density Lipoproteins) and HDL (High Density Lipoproteins). The LDL carries most of the cholesterol in the blood and this LDL cholesterol is commonly referred to as "bad-cholesterol". When the level is too high in the blood, the excess is deposited on the walls of the arteries. This can contribute to the narrowing or blockage of the coronary arteries, leading to the development of heart disease. HDL cholesterol, on the other hand, is known as the "good-cholesterol" because the HDL moves cholesterol from all parts of the body back to the liver, where it is broken down and removed eventually from the body (PAHO, 2004; WHO 2006).

The question of "offal, butter and yolk are rich in terms of cholesterol" gives a significant difference according to

test scores. Offal (brain, liver and kidney), butter and yolk are rich foods in terms of cholesterol and saturated fats. It is recommended that daily intake should be less than 200 mg/dl (2.3 mmol/l) (NCEP, 2001; WHO, 2006). Gökçe (1997) found the level of HDL of butter group was considerably high compared to HDL level of control group, whereas HDL level of sunflower oil was considerably low compared to control group. Besides, total cholesterol level was found high at butter group. Therefore, butter is considered as a risk factor for arteriosclerosis.

There determined no significant difference between the average test scores at the question of "cholesterol level increases after menstruation and it also increases the risk of heart diseases at women". It was determined in several studies that estrogen has a positive effect on plasma lipoproteins and that it retarded the increase at the risk of coronary disease at postmenopausal women (NCEP, 2001; Bunyard *et al.*, 2002; WHO, 2002). The difference between average pre and post test scores was found significant statistically at the question of "obesity is factor decreasing cholesterol". It was determined in the studies that obesity is a risk factor for CHD and it has a negative effect on plasma lipid and lipoprotein levels (WHO, 2003; El Ayachi *et al.*, 2005; WHO, 2006).

Implications: As shown at the results of the study, the education given over nutrition and cholesterol brought about positive changes on the knowledge levels of the women. Giving proper nutrition education to women from primary education onwards will be effective on well-balanced nutrition of both women and their families, on their healthy living and growing healthy generations. As well as formal education, some educational programs should also take place at the mass media. Educational strategies for health should be included in a comprehensive program for women health to develop dietary behavior and lifestyle from an early age and in order to reduce the incidence of CHD. The program should focus not only on knowledge of CHD but also on teaching people how to obtain healthy food.

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