原 著

Discrepancy in nutrition knowledge of hyperlipidemic risk and lipid levels among health check-up population in Taiwan

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Objectives: A cross-sectional study was conducted to investigate the association between nutrition knowledge and hyperlipidemia, **Methods:** A total of 1787 Taiwanese adults completed hyperlipidemic knowledge questionnaires during their health check-ups in a tertiary hospital from April 1998 to September 1998. Knowledge-based 4 sets were defined and the exploratory factor analysis results were used to confirm the grouping. Set 1 was defined as high cholesterol or high saturated fat foods; Set 2 as high fat or low saturated fat foods; Set 3 as high fiber foods and Set 4 as high energy or high carbohydrate foods. **Results:** Women had lower educational levels but better knowledge scores than men. Years of education had a positive correlation with nutrition knowledge scores, except for the set of high energy foods. This implied that even people with high educational levels had incomplete knowledge concerning high energy foods. Income was associated positively with high cholesterol and high fat food knowledge. Total cholesterol, HDL cholesterol and LDL cholesterol levels were not significantly associated with knowledge of hyperlipidemia. Furthermore, triglyceride levels were positively associated with scores from high energy foods. Body mass index was significantly positively associated with high energy food knowledge scores. After adjusting for age, gender, body mass index, income and education years, no lipid levels could be predicted by any knowledge scores of hyperlipidemia. **Conclusions:** The discrepancy between nutritional knowledge of hyperlipidemia and lipid profiles should be taken into consideration when planning for behavior intervention for hyperlipidemia during the health check-ups of the population of Taiwan. (*Taiwan J Public Health. 2005;**24(1)**:52-63*)

Key Words: lipids, nutrition knowledge, questionnaire, hyperlipidemia

INTRODUCTION

Hyperlipidemia is an important risk factor of cardiovascular diseases [1-3]. The National Cholesterol Education Program (NCEP) has recommended dietary modification as the primary method of intervention combined with regular exercise, weight management and medication if needed [4]. The success of dietary intervention depends on the patient's knowledge, attitude and an effective behavioral modification program [5-6]. Increased knowledge among patients can improve their control of hyperlipidemia [6]. Few studies in Taiwan, where the condition is prevalent, have examined the level of nutritional knowledge of hyperlipidemia of the population.

Elevated cholesterol levels are strong risk factors for cardiovascular disease morbidity and

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mortality [7-8]. Recent studies of triglyceride roles in cardiovascular events have shown its importance in atherosclerosis [9-11]. High density lipoprotein (HDL) cholesterol plays a protective role in cardiovascular events [12]. Also, low HDL cholesterol is an important component of metabolic syndrome and is associated with obesity [4,13]. Lower HDL-cholesterol levels were found in low fat, high carbohydrate, and high sugar diets [14]. Diets high in cholesterol and certain saturated fatty acids raise plasma cholesterol and low density lipoprotein (LDL)-cholesterol levels [15-17], whereas lower amounts of dietary cholesterol and saturated fats lower plasma cholesterol and LDL-cholesterol levels [18]. The NECP has thus recommended reducing the intake of dietary saturated fatty acid [4].

Taiwan is going through a critical socioeconomic transition period, moving from a developing to a nearly developed state. Concurrently, the per capita daily intake of energy from fat doubled from 1970 to 1990 [19-20]. A recent nutritional survey in Taiwan (Department of Health, Taiwan, R.O.C. 1998) found that daily fat consumption and percentages of total energy from fat were 79.5 gm and 33.5% for men and 61.1gm and 34.4% for women, respectively. For young adult men, 37.5% of total energy intake was from fat with a cholesterol intake of 405 mg per day. Educational health promotion programs for reducing the intake of high cholesterol foods have been conducted at schools and by the mass media. However, the influence of education on nutritional knowledge is not clear. In addition, the relationship between an individual's knowledge level of hyperlipidemia and the status of their lipid levels has not been studied in the Taiwanese population. This study assessed both the knowledge of hyperlipidemia in the Taiwanese population, and also whether an individual's lipid levels are associated with their levels of knowledge concerning nutrition.

MATERIALS AND METHODS

Study protocol and subjects

A total of 1,787 adults who were admitted to the health examination section of a tertiary care hospital between April 1998 and September 1998 were invited to participate in this study after giving informed consent. Consecutive study subjects were invited on a voluntary basis. All adult participants were required to be able to read the questionnaire items. Severe heart disease and stroke patients were excluded from this study. No nutrition counseling was given prior to questionnaire collection. Data on socioeconomic characteristics, such as years of education and personal income and occupation, were collected to control for possible confounding factors affecting nutritional knowledge patterns. If the subject was retired or in house work, the personal income was treated as the income of one major family member. The questionnaire was completed during their stay at the hospital. One assistant collected the questionnaire and validated the answers. Physicians conducted medical record reviews for data on body weight, body height, blood pressure and serum lipid levels. Data on hypertension and the consumption of cigarettes and alcohol were also collected.

Measurements of knowledge and reliability test

The 15 questions concerning hyperlipidemia knowledge included dietary constituents, such as high fat foods, high energy foods or high fiber foods and their influence on hyperlipidemia. The English translation of the questionnaire is listed in the appendix. A dietitian reviewed the questionnaire to ensure all questions were comprehensive. A three-point scale was used to score the correctness of each answer. The scores were coded as follows: +1 for a correct answer, -1 for an incorrect answer and 0 for don't know. Cronbach alpha was used to test the internal reliability of the 15 items in the questionnaire [21]. The standardized Cronbach alpha was 0.64. After deleting one item, the Cronbach alpha values ranged from 0.61 to 0.68, indicating good reliability of the 15 items in the questionnaire.

Laboratory tests

Serum cholesterol levels were measured using the CHOD-PAP method (Boehringer Mannheim, Germany). High-density lipoprotein cholesterol (HDL-C) was measured following precipitation of apolipoprotein B-containing lipoproteins with phosphotungstic acid and magnesium ions (Boehringer Mannheim, Germany) [22]. Triglyceride concentrations were measured using the GPO-DAOS method (Wako Co., Japan). All of the lipids mentioned above were measured using a Hitachi 7450 automated analyzer (Hitachi, Japan). Low-density lipoprotein cholesterol concentrations were calculated using the Friedewald formula [23].

Clinical diagnostic criteria

Hypertension was defined according to the criteria established by the U.S. Sixth Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure [24]. A systolic blood pressure of 140 mm Hg or higher, a diastolic blood pressure of 90 mm Hg or higher, or the receiving of anti-hypertensive medication were defined as hypertension. Smoking and alcohol drinking were defined as current status.

Statistical analysis

Basic demographic and atherosclerotic risk factors were presented as mean ± standard deviation if the data were continuous, and presented in contingency tables if the data were binary or categorical. To test differences between gender, Student's t and the chi-square tests were used in continuous and categorical variables, respectively. For skewed distribution of triglyceride levels, we calculated the natural logarithm transformation.

We used exploratory factor analysis to compare the reduced dimension of the same 15-item questionnaires. The principal component method with a varimax rotation was used. Factors with eigenvalues greater than 1.0 were retained for the final rotation solution. The sample size in this study (n=1787) corresponds to a power greater than 0.80 for the factor analysis at the 0.05 level [25]. Then, we categorized the items into 4 factors, based on knowledge and principal component results. Set 1 was defined as high cholesterol or high saturated fat foods (items 1,2,3,4,5, 6,7,8,9); Set 2 as high fat or low saturated fat foods (items 10,15); Set 3 as high fiber foods (item 11) and Set 4 as high energy or high carbohydrate foods (items 12,13,14). Regrouping into 4 sets can reduce the dimensions of the15 items and prevent the problems of multiple comparisons.

We calculated the scores of 4 knowledge sets, weighted by item numbers. After adjusting for age and years of education, the gender-specific adjusted means of knowledge score sets were estimated from the generalized linear model,. We also used the linear regression model to estimate the coefficients by adjusting gender and age variables, and treating Set 1 to 4 as dependent variables. Also, we tested the linear relationship between variables by scatterplot. We could incorporate a higher order of independent variables to test for the curvilinear relationship. All of the above analyses were performed using SAS software [21] and a p value of less than 0.05 was considered statistically significant.

RESULTS

Basic demographic characteristics of the participants

The study population included 1787 persons.

The response rate was 83.5% of the initial population. The reasons for exclusion of 354 individuals were either illiteracy or an inability to complete the questionnaire. The patterns of socioeconomic status and demographic data did not significantly differ between participants (n=1787) and non-participants (n=354), except for average ages of 54 and 56 years, respectively. The socioeconomic differences between genders were significant (Table 1). Men had a higher level of education and a higher monthly income. Half of the women were housewives. The distribution of age, anthropometric characteristics, blood pressure, lipid levels and medical history in both genders are listed in Table 2. Men were older, greater in height, weight, body mass index, and blood pressure values. Average cholesterol and LDL cholesterol levels were not significantly different between genders although men had higher triglyceride and lower HDL cholesterol levels. Men also exhibited a higher prevalence of hypertension, smoking and alcohol consumption. Approximately half of the women were postmenopausal (data not shown). The education and income levels were higher in the study population than in the general population.

Pattern of knowledge scores in the 15 item questionnaire

There were variations in the scores of the 15 items of the knowledge questionnaire (Table 3). In men, the scores ranged from -0.532 (item 9, margarine) to +0.923 (item 2, organ meats). In women, the scores ranged from -0.472 (item 9) to +0.894 (item 2). There were significantly higher scores in women for item 10 (nuts and seeds), 13 (alcohol) and 14 (high sugar beverages), suggesting that women may pay more attention to high fat and high-energy foods than men. Using exploratory factor analysis, the 15-item knowledge questionnaire was simplified into the following four factors:1) high cholesterol or saturated fat foods;2) high fat or low saturated fat foods; 3) high fiber foods; and 4) high energy or high carbohydrate foods. These distinct factors were compatible with the knowledge-based 4 sets. Therefore, we used the knowledge-based sets. Table 4 showed the adjusted means of knowledge score in the 4 sets. We found that women had higher adjusted means of knowledge scores in all 4 sets. In Set 1 and Set 2, the difference was not statistically significant. Women had higher total knowledge scores than men. People in general had the highest scores in Set 3 (high fiber foods, 0.64 in men and 0.69 in women), good scores in Set 1 and Set 2 but the lowest scores in Set 4 (0.13 in men and 0.16 in women). This indicated that people in general did not clearly recognize the risk of high energy or high carbohydrate foods. Table 5 showed the estimated parameters and significance levels for predicting knowledge scores by socioeconomic and lipid profiles. Years of education and personal incomes could predict high scores of Set 1 to Set 3 to significant levels, indicating persons with high socioeconomic status can understand the hyperlipidemic risk of high cholesterol, high fat foods. However, education years and incomes were negatively predictive of the scores in Set 4. Higher socioeconomic status groups had lower scores for the hyperlipidemic risk of high energy or high carbohydrate foods. In regard to the lipid profiles, we found triglyceride levels positively predicted the scores of Set 1 and Set 4. Subjects with hypertriglyceridemia also had high risk scores for high cholesterol or high energy foods, indicating apparent discrepancy of knowledge scores and triglyceride levels. Other lipid profiles, such as total cholesterol, HDL and LDL did not significantly predict knowledge scores. Body mass index was positively predictive for Set 4, indicating even obese subjects had higher scores on high energy or high carbohydrate foods. For binary lipid profiles as independent variables, the results of regression model were similar as Table 5(data not shown).

Table 1. The distribution of socioeconomic status by gender in the study population. (n=1787)

	Men n=1050	Women n=733	*P* value
Education level (%)			
Junior high school or less	11.1	34.3	0.001
Senior high school level	25.8	30.3	
Undergraduate level	38.2	30.7	
Graduate level	24.8	4.7	
Personal monthly income (New Taiwan dollars) (%)			
Less than 30,000	8.7	21.8	0.001
30-50,000	17.8	28.3	
60-90,000	28.9	28.3	
More than 100,000	44.6	21.5	
Occupation (%)			
Office	38.1	18.5	0.001
Labor	8.3	3.7	
Business	28.3	14.2	
Housewife	-	50	
Retired	1.7	7.2	
Others	8.2	6.2	

Table 2. Basic anthropometric, blood pressure, lipid levels and medical history by gender in the study population. (n=1787)

	Men n=1050		Women n=737		*P* value
	Mean	S.D.	Mean	S.D.	
Age (year)	54.2	12.9	52.7	12.2	0.02
Body height (cm)	167.7	6.0	155.5	5.5	0.0001
Body weight (g)	69.6	10	57.2	8.8	0.0001
Body mass index (kg/m^2)	24.7	3.3	23.71	3.6	0.0001
Systolic blood pressure (mmHg)	128.9	17.9	125.5	20.2	0.0002
Diastolic blood pressure (mmHg)	81.6	10.8	78	10.7	0.0001
Total cholesterol (mg/dL)	193.4	35.8	196.2	37.4	0.11
Triglyceride (mg/dL)	161.4	105.3	129.1	88.3	0.0001
Triglyceride (mg/dL)*	136.7	1.76	108.7	1.77	0.0001
HDL-Cholesterol (mg/dL)	45.4	11.6	55.9	15.3	0.0001
LDL-Cholesterol (mg/dL)	116.6	30.2	114.7	32.7	0.21
	No.	(%)	No.	(%)	
Hypertension	334	31.8	188	25.5	0.004
Smoking	438	41.7	29	3.9	0.001
Alcohol drinking	691	65.8	207	28.1	0.001

*: geometric means and standard deviation. Abbreviation: SD, standard deviation.

Table3. The distribution of knowledge scores for each item in the questionnaire by gender in the study population. (n=1787)

Item	Men n=1050		Women n=737		*P* value
	Mean	S.D.	Mean	S.D.	
1. Eggs	0.35	0.75	0.33	0.74	0.65
2. Meat	0.92	0.33	0.89	0.36	0.08
3. Lard or tallow	0.83	0.44	0.81	0.46	0.32
4. Whole fat milk	0.78	0.49	0.78	0.49	0.83
5. Fatty meat	0.74	0.60	0.72	0.64	0.36
6. Meats	0.72	0.63	0.71	0.62	0.94
7. Fish	0.88	0.40	0.87	0.41	0.58
8. Cookies, cakes	0.34	0.81	0.35	0.79	0.84
9. Margarine	-0.53	0.75	-0.47	0.76	0.10
10. Nuts and seeds	0.32	0.81	0.47	0.74	0.0001
11. Edible fungus, kelp, agar	0.66	0.62	0.67	0.59	0.81
12. Rice or other cereals	-0.18	0.86	-0.15	0.85	0.56
13. Alcoholic beverages	0.42	0.76	0.53	0.69	0.001
14. High sugar beverages	0.10	0.85	0.19	0.81	0.03
15. Tofu	0.62	0.67	0.66	0.60	0.16

Abbreviation: SD, standard deviation.

Table 4. The characteristics and distribution of 4 knowledge sets by gender in the study population. (n=1787)

Set Characteristics	Men		Women		P-value
	Adjusted Mean*	S.E.	Adjusted Mean*	S.E.	
1 High cholesterol or high saturated fat foods	0.54	0.01	0.59	0.01	0.0004
2 High fat or low saturated fat foods	0.45	0.02	0.59	0.02	<.0001
3 High fiber foods	0.64	0.02	0.69	0.02	0.14
4 High energy or high carbohydrate foods	0.13	0.02	0.16	0.02	0.29
Total knowledge score	6.68	0.13	7.53	0.15	<.0001

*: adjusted variables were age and years of education. S.E.: standard error

DISCUSSION

This study summarized 4 knowledge sets of hyperlipidemia and investigated the distribution between genders. We clearly found that women had similar or higher knowledge scores than men. Also, the study showed that people with more years of education could not identify the risk of high energy or high carbohydrate foods as an important risk for hyperlipidemia. However, other knowledge scores were positively correlated with years of education. None of these knowledge scores predicted lipid levels among adult Taiwanese.

Meat and lard are common foods in Taiwan. This study found that most individuals know the consumption of such foods is associated with increased serum lipids compared to fish as a healthier alternative. In contrast, few people were aware of the benefits of tofu. Soybean proteins can lower serum cholesterol [26]. Since tofu and other soybeans products are widely available and relatively inexpensive in Taiwan, it would be worthwhile emphasizing the beneficial ef-

Table 5. Multiple linear regression models for a range of socioeconomic status and lipid profiles for association with Set 1 to Set 4 scores, adjusting for gender and age effects.

Variables	Set 1: high cholesterol or high saturated fat foods			Set 2: high fat or low saturated fat foods			Set 3: high fiber foods			Set 4: high energy or high carbohydrate food		
	β	S.E.	P	β	S.E.	P	β	S.E.	P	β	S.E.	P
Education years	7.82	0.7	<.0001	7.5	1.38	<.0001	4.25	1.63	0.01	-5.75	1.64	0.001
Income	4.04	0.68	<.0001	3.86	1.34	0.004	2.76	1.53	0.07	-0.94	1.6	0.56
Total cholesterol	0.03	0.02	0.07	0.04	0.03	0.25	0.06	0.04	0.14	0.04	0.04	0.30
Triglyceride*	2.53	1.13	0.03	0.43	2.19	0.84	3.16	2.56	0.22	9.41	2.58	0.0003
HDL-cholesterol	0.07	0.05	0.17	0.11	0.09	0.22	0.01	0.11	0.91	-0.20	0.11	0.07
LDL-cholesterol	0.00	0.02	0.87	0.03	0.04	0.42	0.04	0.05	0.36	0.01	0.05	0.85
Body mass index	-0.12	0.19	0.54	-0.18	0.37	0.62	-0.12	0.43	0.78	1.21	0.43	0.01

*: logarithm transformed, Abbreviation: S.E., standard error

fects of the intake of soybean products.

Obesity is an independent risk for cardiovascular events [27]as well as contributing to low concentrations of HDL cholesterol, decreased glucose tolerance, and elevated plasma triglyceride and cholesterol concentrations [28-30]. Consumption of alcohol increases VLDL production by the liver [31]. On the other hand, reduced body fat can decrease total cholesterol, LDL, VLDL, triglyceride and increase HDL [32]. Alcohol consumption increases serum triglycerides [33-34]. According to a recent nutrition and health survey in Taiwan [20], the prevalence rates of hypertriglyceridemia (≧200mg/dl) are 15.8% and 19.2% in adult men and women, respectively. Researchers pointed out that the high prevalence of hypertriglyceridemia might relate to the high rates of obesity and alcohol consumption in Taiwan [35]. Our study found that people had relatively low knowledge scores of high energy and alcohol consumption, indicating the importance of such a dietary modification.

Most of the individuals did not know that alcohol consumption might increase serum lipids [36]. A large amount of alcohol is often consumed by men during social drinking. Our study showed that knowledge scores about alcoholic beverages were higher in women than men (Item 13 in Table 3, 0.53 in women vs. 0.42 in women, P=0.001). Men may neglect the harmful effects of the lipid profiles of alcoholic beverages. Education showing the benefits of alcohol abstinence should be emphasized for men.

Consuming an excessive amount of high in sugar or high in fat foods, such as sugar containing beverages, cookies, cakes and peanuts increases energy intake and may raise serum lipids. Simple carbohydrates such as high sugar beverages can elevate triglyceride levels [37]. Also, large portions of complex carbohydrates, such as rice or other cereals, had adverse effects on triglyceride. In this study, we found that the knowledge scores of these two items were very low (for men, -0.18 in rice and 0.10 in high sugar; for women, -0.15 in rice and 0.19 in high sugar). This implied that people did not know the harmful effects of large portions of carbohydrates. We must emphasize that large portions of carbohydrates are not good for lipid control in educating the general populous.

Margarine consumption produces more saturated fats and trans fatty acids that may affect lipid metabolism [38-41]. However, in this study individuals were unaware of such high saturated fat foods. Also, the evidence showed that soluble fiber lowers serum cholesterol [32, 42-43]. Edible fungi (such as wood ears, common in Taiwanese food), kelp and agar containing higher amounts of soluble fiber are very popular in Taiwan. These plant foods would be good sources of soluble fiber. In this study, we paid particular attention to knowledge of high fiber foods such as fungus, kelp, or agar. These foods are considered as high in soluble fiber and low in calories. This is in contrast to vegetables and fruits, which are rich in insoluble fiber or high simple sugar (fruits) foods. For controlling hyperlipidemia, we recommend soluble fiber foods morer than insoluble fiber foods because an excessive amount of fruit has adverse effects on lipid profiles. Foods such as fungi are ideal for this purpose. helpful for lipid

A balanced diet with nuts and seeds can improve serum lipid profiles and favorably influence fatty acid components in hyperlipidemic patients [44-45], but an excessive intake of nuts and seeds may increase total fat intake. Especially in adult Taiwanese, nuts and seeds are common sources of snacks, and are frequently associated with high energy intake among obese patients. Encouraging a balanced but not excessive consumption of nuts and seeds is an important task in dietary education in Taiwan and elsewhere.

Limitations of this study

Because the study population was comprised of adults who underwent health examinations at a tertiary hospital, extrapolation of the results to the general population may not be truly representative The education and income levels of this study population were higher than in the general population. Highly selective population characteristics may have existed in this cross-sectional study. While the subjects of this study were better educated on hyperlipidemia risks, the general population may have less healthy diets and thus may exhibit a higher susceptibility to hyperlipidemia.

We encountered some possible instrument limitations. For adult Taiwanese, discriminating between the concept of cholesterol and triglyceride was rather difficult. We thus designed the questionnaire using the more general term, "hyperlipidemia" to prevent confusion. Although the 4 knowledge sets were defined by knowledge basis and confirmed by exploratory factor analyses, the questionnaire was only designed for hyperlipidemia risk knowledge. A quantitative questionnaire is a better test of knowledge. Quantification concerning foods should be emphasized. For example, populations whose primary diet consists of rice or other cereals generally do not suffer from hyperlipidemia. Also, nuts and seeds possess generous quantities of long-chain and monounsaturated fatty acids and have been shown to reduce lipid levels. We did not measure other confounding factors affecting lipid levels, such as exercise and genetic factors. We cannot make inferences concerning excessive intakes of certain foods for the risk of hyperlipidemia. A large amount of cereals, nuts and seeds contain high amounts of energy. We wanted to test knowledge of the potential adverse effects of excessive amount of cereals, nuts and seeds. Although this knowledge questionnaire did not reflect the lipid levels in this cross-sectional population, there were low scores in knowledge of high energy or high carbohydrate foods, implying that people did not have correct hyperlipidemic risk knowledge for this area. Thus, emphasizing the risk of high energy foods is mandatory for controlling hyperlipidemia.

Conclusion

This study confirms gender and socioeconomic discrepancies in the nutritional knowledge of hyperlipidemia. Our results also indicate that individuals may overlook the beneficial effects of healthier alternatives such as tofu and other soybean products, which are widely available in Taiwan. These results may have important implications for clinicians and dietitians and assist them in understanding the discrepancies between knowledge and the lipid levels of patients in hospital patients. Health professionals should consider these results in the development of hyperlipidemia intervention programs and promoting knowledge of the risks of high energy and high carbohydrate foods for appropriate modification of diets in order to reduce risk. The questionnaire used in this study is simple and reliable. It may be useful in clinical practice, especially for gathering information to facilitate intervention individuals at risk of atherosclerosis.

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Appendix: English translation of the 15 item hyperlipidemia knowledge questionnaire

Please check the answer according to your knowledge after reading each statement

Yes	1.	People who regularly consume large portions of egg may develop elevated blood lipids
Yes	2.	Meat organs are rich in cholesterol
No	3.	For people with hyperlipidemia, use of lard or tallow in foods is a good choice
No	4.	For people with hyperlipidemia, whole milk is a good choice for dairy consumption
No	5.	Consumption of large portions of fatty meat is unlikely to elevate blood cholesterol
No	6.	People who eat large portions of red meat, such as pork, beef or lamb, are not more likely to elevate their blood cholesterol
Yes	7.	Substituting fish for meat may help in reducing hyperlipidemia
Yes	8.	Compared to avoiding high fat desserts, eating large portions of cookies and cakes is more likely to elevate blood lipids,
Yes	9.	Eating large portions of stick margarine may elevate blood lipids
Yes	10.	Eating large portions of nuts and seeds may elevate blood lipids
Yes	11.	Eating large portions of wood ears, kelp, or agar, may reduce blood cholesterol
Yes	12.	Eating large portions of rice or other cereals may elevate blood lipids
Yes	13.	Consuming too much alcohol may elevate blood lipids
Yes	14.	Consuming a large amount of soft drinks or other sugar containing beverages may lead to elevated blood lipids
Yes	15.	Substituting tofu for meat may help in controlling hyperlipidemia.

Since items 3, 4, 5 and 6 were false, the scores were reversed. If the item was answered correctly it received a +1; if the item was answered incorrectly it received a -1; don't know received a 0.

Appendix: Chinese version:

你認爲以下的敘述是否正確，請以自己已知的知識作答，在適當的框框打勾即可，謝謝您！

正確	不正確	不知道		
☐	☐	☐	(1)	雞蛋吃多了，會升高血脂肪
☐	☐	☐	(2)	動物內臟含較高膽固醇
☐	☐	☐	(3)	高脂血症患者，烹飪用油最好選擇豬油或牛油
☐	☐	☐	(4)	高脂血症患者，牛奶宜選擇全脂奶
☐	☐	☐	(5)	吃肥肉或三層肉不會升高血膽固醇
☐	☐	☐	(6)	多吃豬、牛、羊等肉類並不會升高血膽固醇
☐	☐	☐	(7)	高脂血症患者，吃魚會比吃豬、牛肉好
☐	☐	☐	(8)	吃糕餅西點會升高血脂肪
☐	☐	☐	(9)	多吃植物性奶油會升高血脂肪
☐	☐	☐	(10)	多吃花生瓜子會升高血脂肪
☐	☐	☐	(11)	多吃木耳、海帶、洋菜可以降低血膽固醇
☐	☐	☐	(12)	米飯吃過量會升高血脂肪
☐	☐	☐	(13)	多喝酒會升高血脂肪
☐	☐	☐	(14)	多喝汽水、蜂蜜等甜飲料會升高血脂肪
☐	☐	☐	(15)	高脂血症患者，吃豆腐會比吃肉類好

臺灣健康受檢者高脂血相關飲食知識與血脂值之差異研究

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目標：高脂血症營養知識可能與高脂血症危險性有關，本研究之目的係以橫斷式族群探討營養知識及血脂質之間的關係。**方法**：以自1998年四月到九月共1787位至台大醫院接受健康檢查的民眾，並完成高脂血問卷爲研究對象。營養知識問卷共15題，經因素分析定義出四組因子。第一組爲高膽固醇或高飽和脂肪食物；第二組爲高油脂或低飽和脂肪食物；第三組爲高纖維食物；第四組爲高能量或高碳水化合物食物。**結果**：女性教育程度較低，但比男性有較高的營養知識分數。教育程度與營養知識分數呈正相關性，但在高能量營養知識則例外，即教育程度並未能提高對高能量食物之認知。收入狀況與高膽固醇、高脂食物知識呈正相關性。血三酸甘油酯值與高能量食物營養知識分數呈正相關性；身體質量指數亦與高能量食物營養知識分數呈正相關性。經年齡、性別及身體質量指數、社經地位調整之後，所有血脂質與營養知識分數並無相關性。**結論**：高脂血症相關營養知識分數與血脂質並不一致，此可作爲高脂血症飲食阻介計畫之參考。(台灣衛誌 2005；**24(1)**：52-63)

關鍵詞：脂質、營養知識、問卷、高脂血症

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