



Adolescents with Higher Althernate Healthy Eating Index For Taiwan (AHEI-T) Scores Have Lower Blood Lipid Level

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Introduction

Cardiovascular disease (CVD) is the major cause of death in Taiwan, and hyperlipidemia is one of the important contributors. It is well known that the atherosclerosis develops since fetus. However, the hyperlipidemia could be prevented or improved early by the lifestyle change. The American Heart Association recommends increasing cereal fiber, vegetable and fruits intake, and decreasing red meat and food with high cholesterol or satisfied fatty acid (SFA) intake to prevent CVD.

Alternate Healthy Eating Index (AHEI) is a simple tool to assess the diet quality, and modified from America dietary guideline. The more cereal fiber, vegetable, fruits and soybean, and the less SFA and red meat intake, and the higher AHEI-T score you get. Our laboratory modifies the AHEI according to latest dietary guideline in Taiwan and names it as Alternate Healthy Eating Index for Taiwan (AHEI-T). In the past, we have showed that the AHEI-T score could represent the dietary quality and is negatively associated with CVD risk factors in Taiwan adults.

Objective

In this study, we tried to evaluate the correlation whether AHEI-T scores could be a good index for hyperlipidemia of adolescents in Taiwan.

Methods

Six hundred and twenty-eight junior high school students in north Taiwan were recruited. The age, gender, anthropometric data, blood data and self-reported dietary records were collected. The body height and body weight were measured, and body mass index (BMI) was calculated by dividing the body weight (kg) by the height (m) square.

After at least 8 hours fasting, the blood sample was drawn and assessed the lipid profile. Subjects with serum total cholesterol more than 200 mg/dL, or low density lipoprotein cholesterol (LDL) more than 130 mg/dl, or high density lipoprotein cholesterol (HDL) less than 35 mg/dL, or serum triglyceride (TG) more than 130 mg/dL was considered hyperlipidemia.

The scores of AHEI-T were calculated by self-reported 3-days dietary records (2 weekdays and 1 weekend). The range of score was from 2.5 to 97.5. Besides, dietary energy, protein, carbohydrate and fat were evaluated by the Database for Taiwan Area Food Nutritive Composition Factors.

Data were presented as mean $\pm$ SE. Subjects were dichotomy by AHEI-T score, and subjects with the lower score were in B1 group and others in B2 group. The odds ratio was calculated to determine the effect of AHEI-T score on hyperlipidemia. $p < 0.05$ was considered as statistically significant.

Results and Discussion

There are 24 boy subjects among 50 subjects. Only six male adolescents had hypercholesterolemia, including serum total cholesterol and LDL (data did not show). However, only female subjects had hypo-HDL-emia. The hyperlipidemia prevalence in this study was lower than previous studies.

The AHEI-T score was significantly negative correlated with serum TG level (table 1). In the previous studies, the serum TG is inverse associations with whole grains and cereal fiber. Mellen et al (2008) consider whole grains could confer cardiovascular benefits by acting on the amount or size of TG, resulting in improving the atherogenic process of CVD. Cereal fiber is one main component of AHEI-T.

However, the AHEI-T score 42.9 could not predict the hyperlipidemia condition (table 2). A little number of adolescents have hyperlipidemia may be one of the reasons. We need more sample size to find out the reasonable cut-point for predicting hyperlipidemia.

Conclusion

Adolescents in north Taiwan with higher ATEI-T score have lower blood lipid level. AHEI-T may be a good dietary index for assessing the improvement of lipid profile in adolescents.

Table 1. Spearman rank correlation between AHEI-T score and anthropometric variables and lipid profile¹.

	BW	TC	TG	HDL	LDL
AHEI-T	-0.37*	-0.02	-0.29*	0.28	-0.01

¹AHEI-T= the Alternate Healthy Eating Index for Taiwan, BW= Body weight, TC= Total cholesterol, TG= Total triglycerol, HDL= High density lipoprotein cholesterol, LDL= Low density lipoprotein cholesterol.

* $p < 0.05$, and statistical analyzed by Spearman rank correlation.

Table 2. Odds ratio of lipid profile in normal range according to dichotomy of AHEI-T score^{1, 2, 3}

Recommendation		B1	B2	p for trend
n		25	26	
AHEI-T score		38.6 $\pm$ 0.49	48.4 $\pm$ 1.1	
Range		33.2 - 42.8	42.9 - 69.1	
TC	<200	1 (reference)	1.8 (0.15-23.15)	0.5017
TG	<130	1 (reference)	3.6 (0.35-36.69)	0.0819
HDL	>35	1 (reference)	1.4 (0.08-26.23)	0.9539
LDL	<130	1 (reference)	6.1 (0.60-62.23)	0.056

¹Values are number (percentage), mean $\pm$ SE, and odds ratio with 95% confidence interval.

²AHEI-T= the Alternate Healthy Eating Index for Taiwan, BMI= Body mess index, TC=Total cholesterol, TG=Total triglycerol, HDL=High density lipoprotein cholesterol, LDL= Low density lipoprotein cholesterol

³Statistical analyzed by logistic regression.