Effects of Consumption of Processed Marine Fish on Cardiovascular Risk Factors

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Abstract

Several research evidences support the beneficial effects of fish consumption on cardiovascular disease (CVD) in people. The effect of the consumption of marine fish, a rich source of omega-3 fatty acids, on the risk of CVD has not yet been clearly understood. This prospective convenient quasi-experimental study was conducted to examine the association of fish, curried made with coconut cream and deep fried in coconut oil, consumption with the CVD risk using a group of non-randomized two groups healthy adults selected (n = 74). In the experiment, healthy subjects (two groups) were fed with fish prepared either as a curried containing coconut cream or deep fried in coconut oil (300 g per week for 6 months). Pre and post interventional lipid profile parameters and hs- CRP were measured using dynamic enzymatic extended stability cholesterol oxidase-phenol-4-aminophenazone method and immune turbidimetric methods, respectively. The fatty acid composition, particularly, n-3 PUFA of curried, deep fried and raw fish was determined using Supelco (SP -2330) model gas chromatography. Blood pressure reading and body mass index data were recorded throughout the study. A pre-tested structured questionnaire was used to collect data regarding subjects' history, dietary plan, fish consumption, and socio demographic characteristics of the subjects.

Data showed increase of triglyceride (TG), low-density lipoprotein (LDL), and very low-density lipoprotein cholesterol (VLDL) concentrations in curried fish eaters compared to deep fried fish eaters. Both curried fish made in coconut cream and deep fried fish consumption did not show a significant impact on cardiovascular risk profiles except HDL content in curried fish consumption showed significantly lower in post intervention. Lipid indices such as TC : HDL, LDL: HDL, AC (non-HDL:HDL)and API ([Log(TG: HDL)] showed the significantly different between pre and post intervention in fried fish eaters. hs –CRP concentrations showed no different between pre and post interventional time in curried and fired fish eaters. Among the subjects 18 % had within the healthy

BMI (18.5-22.9), 50 % of subjects had above health range (23-26.9), 18% were obese (>27) and 14% were below health range (<18.5) as per cut off values of Asian population. There was no significant difference in BMI and blood pressure between pre and post intervention study in both curried and fish eaters ($p>0.01$). A decrease of n-3 PUFA content in curried fish (14.07mg/100g) and fried fish (4.32mg/100g) by processing from raw fish (15.42mg/100g) was seen in the result. Overall, the non-HDL concentration increased after subjects consumed a diet rich in fish, regardless of the processing method used. The results suggest the consumption of curried or fried fish affected cardiovascular risk profiles differently.

Table1.Cardiovascular risk profiles, lipid profile indices, and hs-CRP concentration among subjects who consumed curried fish and fried fish

CURRIED FISH EATERS				FRIED FISH EATERS		
Lipid Profiles	Post	Pre-	P value	Post	Pre	P value
(mg/dL)	Intervention	Intervention		Intervention	Intervention	
TC	193.86±37.63	188.06±27.26	0.10	178.54±25.20	178.67±29.45	0.71
TG	132.97±54.14	143.91±67.56	0.36	96.95±28.91	107.05±46.94	0.06
LDL	122.14±31.44	113.37±23.55	0.34	111.89±21.39	110.31±28.37	0.29
HDL	45.17±4.85	46.00±9.23	0.01**	46.69±15.68	44.41±8.21	0.89
VLDL	26.59±10.83	28.79±13.51	0.36	19.39±5.78	21.41±9.39	0.06
NON-HDL	148.69±34.32	142.06±24.57	0.14	131.85±21.93	134.26±29.29	0.18
Lipid Indices						
TC: HDL	4.28±0.60	4.19±0.71	0.08	3.99±0.23	4.12±0.87	0.00*
LDL: HDL	2.67±0.53	2.52±0.56	0.14	2.55±0.23	2.62±0.66	0.00*
AC	3.28±0.58	3.18±0.71	0.07	2.94±0.46	3.12±0.87	0.00*
API	0.05±0.00	0.05±0.00	0.00*	0.04±0.01	0.05±0.01	0.01**

*Significant, $P < 0.00$; **Significant, $P < 0.05$., HDL-C: high-density lipoprotein, LDL: low-density lipoprotein, VLDL: very low-density lipoprotein, TC: total cholesterol, TG: triglycerides, VLDL: very low-density lipoprotein. AC: atherogenic coefficient non-HDL:HDL), API [log(TG:HDL)]: atherogenic index of plasma.

The beneficial effect of n-3 PUFA in marine fish consumption on cardiovascular risk profiles is modulated by the cooking method, particularly, prolonged heating and high content of SFA containing ingredients used for curried and fried fish made.

Keywords: Fish consumption; Omega-3 fatty acids; Cardiovascular risk factors; Lipid profile